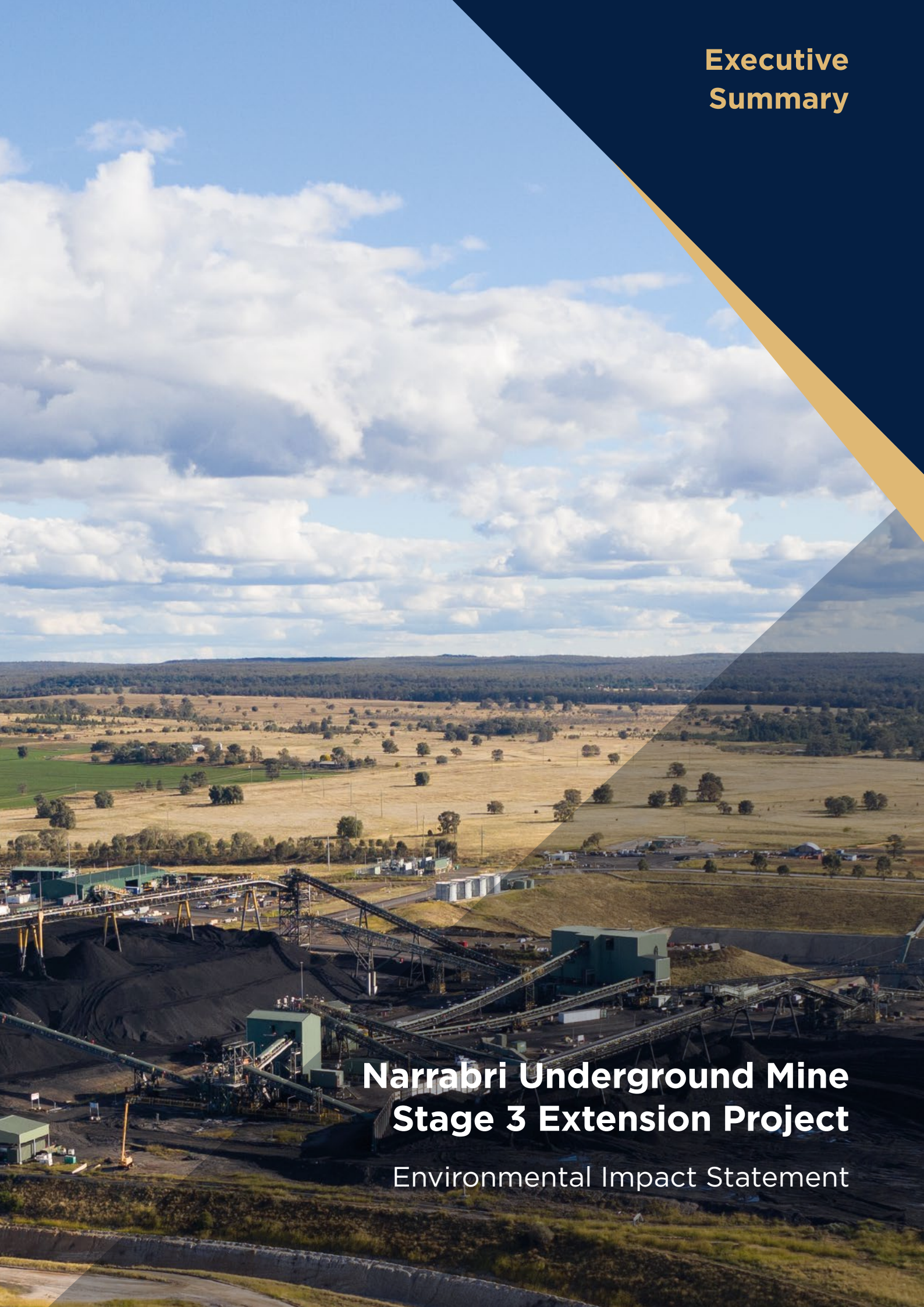
Executive Summary



Narrabri Underground Mine Stage 3 Extension Project

Environmental Impact Statement

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NARRABRI UNDERGROUND MINE STAGE 3 EXTENSION PROJECT

Existing Narrabri Underground Mine

- The Narrabri Mine is an existing underground coal mining operation, situated in the Gunnedah Coalfield of NSW, which commenced in 2008 and employs up to approximately 520 personnel.
- The Narrabri Mine is approved to extract coal at a rate of up to 11 million tonnes per annum of run-of-mine coal until July 2031.

Proposed Stage 3 Extension Project

- Narrabri Coal Operations Pty Limited (NCOPL) is proposing an extension to the approved underground mining area to gain access to additional coal reserves.
- The extension of the approved underground mining area would increase the mine life to 2044.
- This would allow for continued employment of the existing operational workforce at the Narrabri Mine and the socio-economic benefits associated with ongoing expenditure by NCOPL in the regional economy and payment of royalties to the NSW Government.
- The net benefit of the Project to the NSW community is estimated to be $599 million in net present value terms.
- The use of existing/approved mine infrastructure (such as the existing Pit Top Area) for the Project maximises the potential benefits of previous NCOPL investment and minimises the need for new surface development areas in comparison to a greenfield mine proposal.
- NCOPL is seeking State and Commonwealth approval for the Project, with the application supported by this Environmental Impact Statement.

Strategic Development of Mining in NSW

- The Project is considered to be wholly consistent with the NSW Government's *Strategic Statement on Coal Exploration and Mining in NSW*.
- The *Strategic Statement on Coal Exploration and Mining in NSW* recognises the ongoing demand for coal over the life of the Project, particularly in the Project's export markets in Asia. In addition, the *Strategic Statement on Coal Exploration and Mining in NSW* notes the NSW Government will recognise existing industry investment by considering responsible applications to extend the life of current coal mines.

Key Project Design Considerations

- The proposed longwall extensions occur beneath NCOPL-owned land and State Forests.
- The longwall layout and surface infrastructure (e.g. gas drainage infrastructure) have been designed to minimise impacts on key features of significance (e.g. Aboriginal heritage sites and habitat features for threatened species).
- Surface infrastructure would be progressively decommissioned over the life of the Project, with disturbed land to be rehabilitated to the pre-mining land use (agriculture and forestry).
- Key feedback obtained from local community stakeholders has been concerns regarding the potential need for a new southern pit top to access coal in the Project Area. The Project addresses this concern by using the existing Pit Top Area for coal handling and transport, rather than constructing a new facility to the south.

Key Environmental Assessment Considerations

- The Project is predicted to comply with the recognised thresholds of acceptability outlined in Government Policies. In particular, it is predicted there would be:
  - No greater than 2 metres of groundwater drawdown at private bores in 'highly productive' aquifers (including the Namoi Alluvium and Pilliga Sandstone).
  - Negligible impacts to surface water resources, including the Namoi River.
  - No greater than a negligible noise exceedance, except where an existing noise agreement is in place or where NCOPL intends to form an agreement with the relevant landowner.
  - No exceedance of relevant air quality impact assessment criteria at privately owned receivers.
- Impacts on biodiversity would be offset by measures developed in accordance with NSW Government Policy.
- Commercial agreement with NSW Forestry Corporation is being sought to allow development within the State Forest.

Public Interest

- Given the significant incremental socio-economic benefits of the Project, when compared against the predicted impacts during the Project and post-mining that can be managed within accepted thresholds of acceptability, the Project is considered to be in the public interest.

EXECUTIVE SUMMARY

ES1 BACKGROUND

The Narrabri Mine is an existing underground coal mining operation situated in the Gunnedah Coalfield. 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), in the North West Slopes and Plains region of New South Wales (NSW) (Figure ES-1).

The Narrabri Mine is operated by Narrabri Coal Operations Pty Ltd (NCOPL), on behalf of the Narrabri Mine Joint Venture, and currently employs up to approximately 520 personnel.

This document is an Environmental Impact Statement (EIS) for the Narrabri Underground Mine Stage 3 Extension Project (the Project). The Project would involve the extension of the underground mining areas at the Narrabri Mine to gain access to additional areas of run-of-mine (ROM) coal reserves. The Project would also include an extension to the mine life, development of additional supporting infrastructure and continued use of existing infrastructure.

The EIS provides:

- a description of the Project;
- a summary of consultation undertaken;
- an assessment of potential impacts;
- the Project environmental management strategy, including continuation and extension of existing Narrabri Mine environmental monitoring and mitigation measures; and
- an evaluation of the merits of the Project.

ES2 THE PROJECT

ES2.1 Overview of the Existing/Approved Narrabri Mine

Stage 1 of the Narrabri Mine was approved under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* in 2007 and involved initial site establishment activities and continuous miner underground mining operations.

Project Approval 08_0144 for Stage 2 of the Narrabri Mine was issued under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* in 2010 and allowed the Narrabri Mine to convert to a longwall underground mining operation.

The Narrabri Mine, incorporating Stages 1 and 2, extracts coal from the Hoskissons Coal Seam. Project Approval 08_0144 allows for the production and processing of up to 11 million tonnes per annum (Mtpa) of ROM coal until July 2031. The approved Narrabri Mine comprises 20 longwall panels (Figure ES-2).

ROM coal is processed at the Narrabri Mine coal handling and preparation plant (CHPP) to produce thermal and pulverised coal injection (PCI) product coal (i.e. coal that can be used for steel production). Product coal is then transported from site by rail via the Werris Creek Mungindi Railway to the Port of Newcastle for export.

CHPP rejects are emplaced in a dedicated rejects emplacement area.

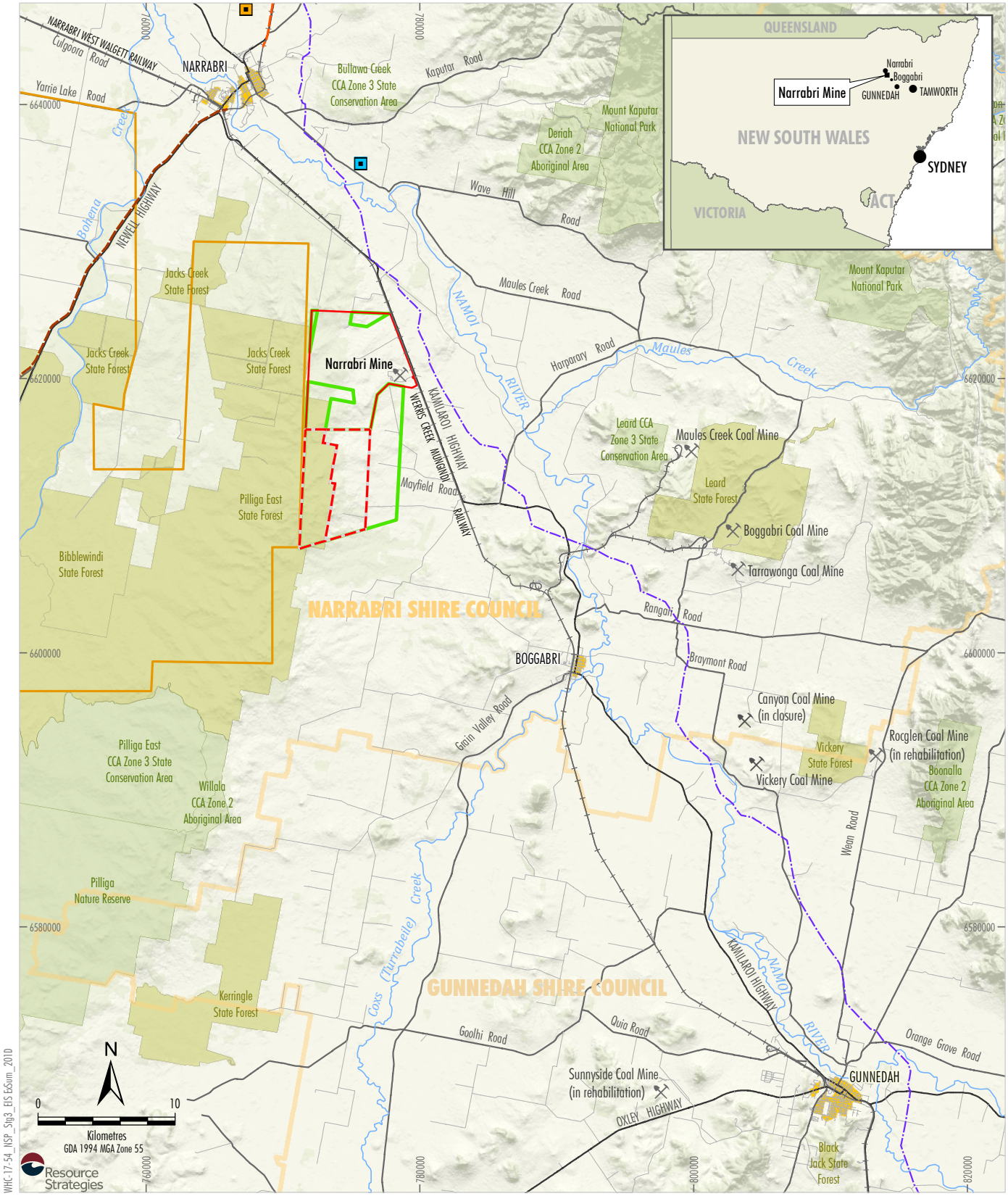
The Pit Top Area incorporates the majority of the Narrabri Mine surface infrastructure, including the box cut, CHPP, ROM and product coal stockpiles, rail loop and product coal load-out infrastructure (Figure ES-3).

ES2.2 Overview of the Project

The Project involves an extension to the approved underground mining area to gain access to additional coal reserves within Mining Lease Applications (MLAs) 1 and 2, an increase in the mine life to 2044, and development of supporting surface infrastructure.

Key existing infrastructure at the Narrabri Mine (e.g. CHPP, ROM coal and product coal stockpiles and associated coal handling infrastructure) would continue to be used for the Project. The use of existing/approved Narrabri Mine infrastructure for the Project maximises the potential benefits of previous NCOPL investment and minimises the need for new surface development areas in comparison to a greenfield mine proposal.

Product coal would continue to be transported by rail to the Port of Newcastle.



LEGEND

- Mine Site
- Exploration Licence (EL 6243)
- Mining Lease (ML 1609)
- Provisional Mining Lease Application Area
- Local Government Boundary
- State Forest
- State Conservation Area, Aboriginal Area

Other Major Projects

- Narrabri South Solar Farm
- Proposed Silverleaf Solar Farm
- Narrabri Gas Project (Santos NSW [Eastern] Pty Ltd)
- Inland Rail (Narrabri to North Star - Phase 1)
- Proposed Inland Rail (Narromine to Narrabri)
- Queensland Hunter Gas Pipeline

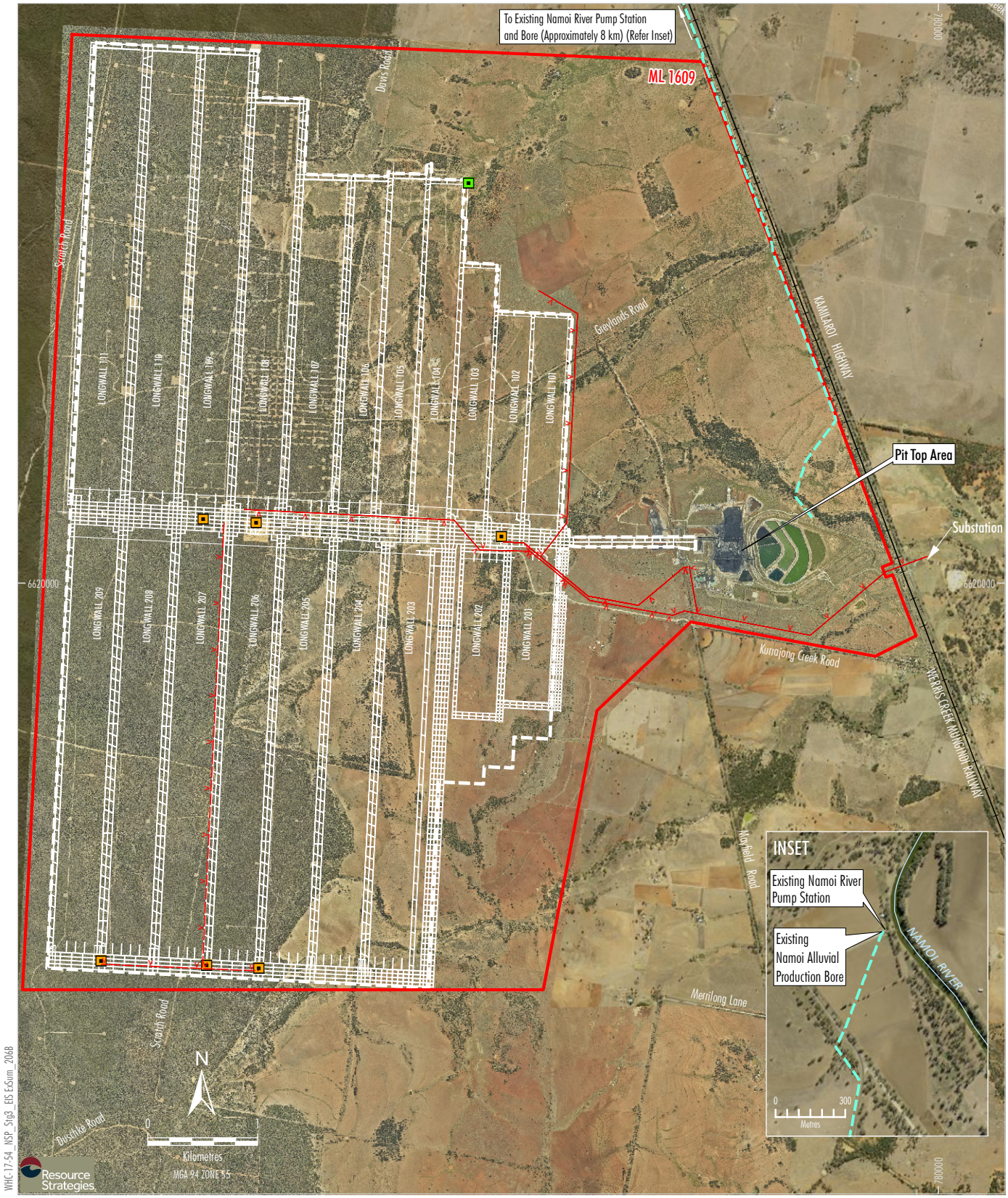
Source: Geoscience Australia (2011); NSW Spatial Services (2019)

WHITEHAVEN COAL

NARRABRI STAGE 3 PROJECT

Regional Location

Figure ES-1



LEGEND

- Mining Lease (ML 1609)
- Approved Narrabri Mine
- Underground Mine Footprint
- Underground Mining Layout
- Electricity Transmission Line (Constructed)
- Electricity Transmission Line (Not Yet Constructed)
- Existing Namoi River Pipeline (Buried)
- Indicative Ventilation Complex
- Indicative Ventilation Complex - Decommissioned

Source: NCOPL (2019); NCOPL (2015); NSW Spatial Services (2019)

WHITEHAVEN COAL

NARRABRI STAGE 3 PROJECT

Approved Narrabri Mine
Indicative Underground Mining Layout

Figure ES-2

Source: Orthophoto: NCOPL (2019)

WHITEHAVEN COAL

NARRABRI STAGE 3 PROJECT

Existing Pit Top Layout

Figure ES-3

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The Project would allow for continued employment of the existing operational workforce (up to approximately 520 full-time equivalent personnel) at the Narrabri Mine.

Table ES-1 provides a tabulated summary of the key characteristics of the Project and a comparison to the approved Narrabri Mine.

ES2.3 Project Development Activities

The Project would use the existing and approved Pit Top Area and supporting infrastructure to maximise the potential benefits of previous NCOPL investment and to minimise the need for new surface development areas.

Additional infrastructure and upgrades to existing infrastructure that are required to support the Project would be progressively developed in parallel with ongoing mining operations, including:

- development of underground roadways, coal clearance infrastructure and other ancillary infrastructure required to access and support Project underground mining areas;
- underground mining machinery replacement and upgrades;
- development of services corridors and access tracks to surface infrastructure;
- development of mine ventilation infrastructure;
- development of gas management infrastructure;

Table ES-1
Summary Comparison of the Existing/Approved Narrabri Mine and the Project

Project Component	Existing/Approved Narrabri Mine	The Project
Mining Method and Resource	▪ Longwall mining of the Hoskissons Coal Seam.	▪ Unchanged.
Underground Mine Geometry	▪ Twenty longwall panels (Longwalls 101 to 111 and Longwalls 201 to 209). ▪ 295 m wide longwall panels for Longwalls 101 to 106. ▪ 400 m wide longwall panels for Longwalls 107 to 111 and Longwalls 201 to 209.	▪ Twenty-one longwall panels (Longwalls 101 to 111 and 201 to 209 and Longwall 210). ▪ No change to Longwalls 101 to 111 and 201 and 202. ▪ Extension of Longwalls 203 to 209 into MLAs 1 and 2. ▪ Additional longwall panel within MLA 1 (Longwall 210) which is approximately 410 m wide.
Tenements	▪ Mining operations conducted within Mining Lease (ML) 1609.	▪ Continued mining operations conducted within ML 1609. ▪ Mining operations conducted within MLAs 1 and 2.
Mine Life	▪ Mining operations approved until July 2031.	▪ Extension of mining operations to 2044.
ROM Coal Production	▪ Approved total ROM coal production of approximately 170 million tonnes (Mt)[1].	▪ Total ROM coal production increased to approximately 252 Mt.
ROM Coal Production Rate	▪ ROM coal production of up to 11 Mtpa.	▪ Unchanged.
Underground Mine Surface Infrastructure	▪ Ventilation shafts, pre-drainage and post-drainage sites, mine safety pre-conditioning sites, access roads and electricity transmission lines.	▪ Augmentation of the existing gas drainage, mine safety pre-conditioning, mine ventilation system, services corridors and boreholes, access tracks and electricity transmission lines within MLAs 1 and 2.
Underground Mine Access	▪ Via three drifts at the box cut.	▪ Unchanged.
Coal Washing	▪ CHPP and secondary crusher/screen.	▪ Continued use of existing facilities, with replacement or upgrades of components as required.

Table ES-1 (Continued)
Summary Comparison of the Existing/Approved Narrabri Mine and the Project

Project Component	Existing/Approved Narrabri Mine	The Project
Coal Handling and Stockpiling	▪ ROM coal stockpile capacity of approximately 700,000 tonnes. ▪ Product coal stockpile capacity of approximately 500,000 tonnes.	▪ Unchanged.
Reject Management	▪ CHPP rejects placed in reject emplacement area.	▪ Continued disposal of coal reject waste in the reject emplacement area. ▪ Disposal of exploration drilling waste in the reject emplacement area, including potential receipt and disposal of exploration drilling waste products from off-site.
Product Coal Transport	▪ Product coal transported from site by rail. ▪ Average of four trains per day. ▪ Peak of eight trains per day.	▪ Unchanged.
Water Management	▪ Conducted in accordance with the Water Management Plan (including discharge under the conditions of Environment Protection Licence 12789 and Project Approval 08_0144).	▪ Water management strategy generally unchanged. ▪ Development of Southern Mine Water Storage within MLA 1.
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 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 would increase. ▪ Continued progressive development of electricity transmission lines to service the extended underground mining area and associated surface infrastructure.
Hours of Operation	▪ 24 hours per day, seven days per week.	▪ Unchanged.
Employment	▪ Operational workforce (employees and contractors) of approximately 520 full-time equivalent personnel.	▪ Continued employment of up to approximately 520 full-time equivalent personnel. ▪ Possible short-term increases in employment for development activities and potential additional development requirements.
Site Access	▪ Primary access via a sealed mine access road connected to the Pit Top Area.	▪ Unchanged.
Surface Development Footprint	▪ Approximately 210.5 hectares (ha) of woodland/forest native vegetation clearance.	▪ Approximately 640 ha of additional surface development footprint to support underground mining.
Rehabilitation Strategy	▪ Conducted in accordance with the MOP.	▪ Unchanged.
Capital Investment Value	▪ Not applicable.	▪ $404 million.

[1] Based on current mine planning, the approved Narrabri Mine is expected to produce a total of approximately 145 Mt of ROM coal (i.e. approximately 25 Mt less than the approved total described for Stage 2 of 170 Mt).

- development of exploration boreholes;
- development of service boreholes;
- development of pre-conditioning areas;
- water management system upgrades;
- CHPP upgrades; and
- minor augmentations and upgrades of other surface facilities.

ES2.4 Underground Mining Operations

The Project involves the continuation of longwall mining operations to extract coal from the Hoskissons Coal Seam (Figure ES-4). The proposed extensions to the approved longwall panels occur beneath land owned by NCOPL or by NSW Forestry Corporation.

Longwall mining involves the extraction of rectangular panels of coal defined by underground roadways constructed around each longwall. The longwall shearer travels back and forth across the width of the coal face, progressively removing coal in slices from the panel. Once each slice of coal is removed from the longwall face, the hydraulic roof supports are moved forward, allowing the roof and a section of the overlying strata to collapse behind the longwall machine (referred to as forming a "goaf") (Figure ES-5).

The Project would result in an additional ROM coal production of 107 Mt compared to the currently approved Narrabri Mine. The maximum amount of ROM coal produced in any one year would be 11 Mt, consistent with the currently approved Narrabri Mine.

Consistent with the approved Narrabri Mine, underground mining operations would be conducted on a continuous basis, 24 hours per day, seven days per week.

Underground Mine Access

The existing underground mine personnel, materials and coal access would remain unchanged for the Project (Plate ES-1).

Underground main headings would be developed to access and support the Project underground mining areas (i.e. for access, ventilation and coal clearance).

Coal clearance infrastructure and other ancillary infrastructure would be developed for the Project underground mining areas. The existing coal clearance infrastructure would also be upgraded and augmented progressively throughout the life of the Project through replacement or upgrades of conveyors, sizers, drives, winders and supporting systems.

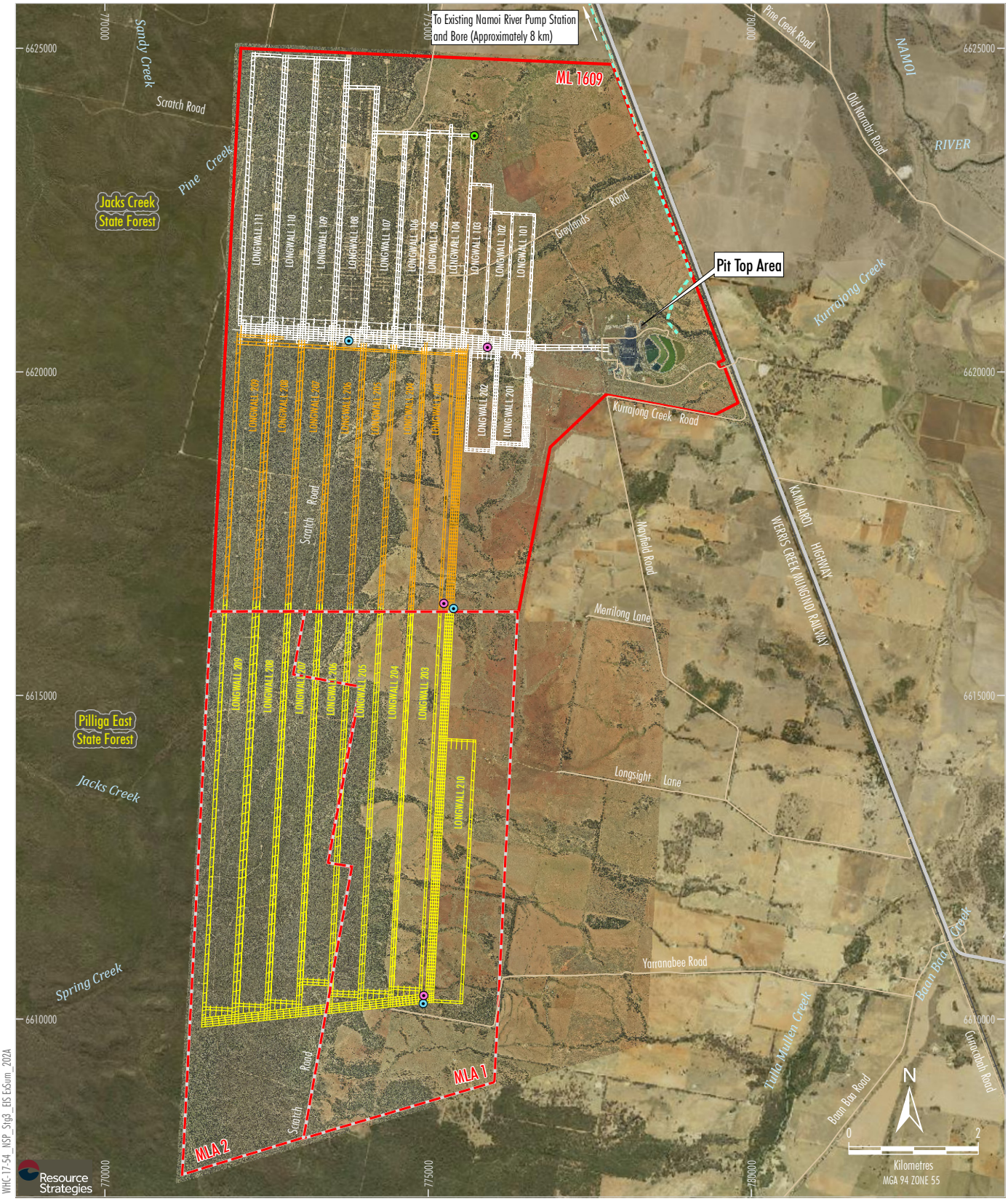
Ventilation Complexes

A ventilation system would continue to be required to maintain a safe working environment.

The existing/approved ventilation complexes would continue to be used for the Project.

Additional ventilation complexes would also be constructed progressively, ahead of mine development on land owned by NCOPL (Figure ES-6).

Plate ES-1 Narrabri Mine Box Cut and Drifts



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LEGEND

- Mining Lease (ML 1609)
- Provisional Mining Lease Application Area
- Existing Namoi River Pipeline (Buried)
- Approved Underground Mining Layout
- Indicative Underground Mining Layout to be Extended for Project
- Indicative Underground Project Mining Layout
- Indicative Ventilation Complex (Downcast)
- Indicative Ventilation Complex (Upcast)
- Indicative Ventilation Complex (Upcast - Decommissioned)

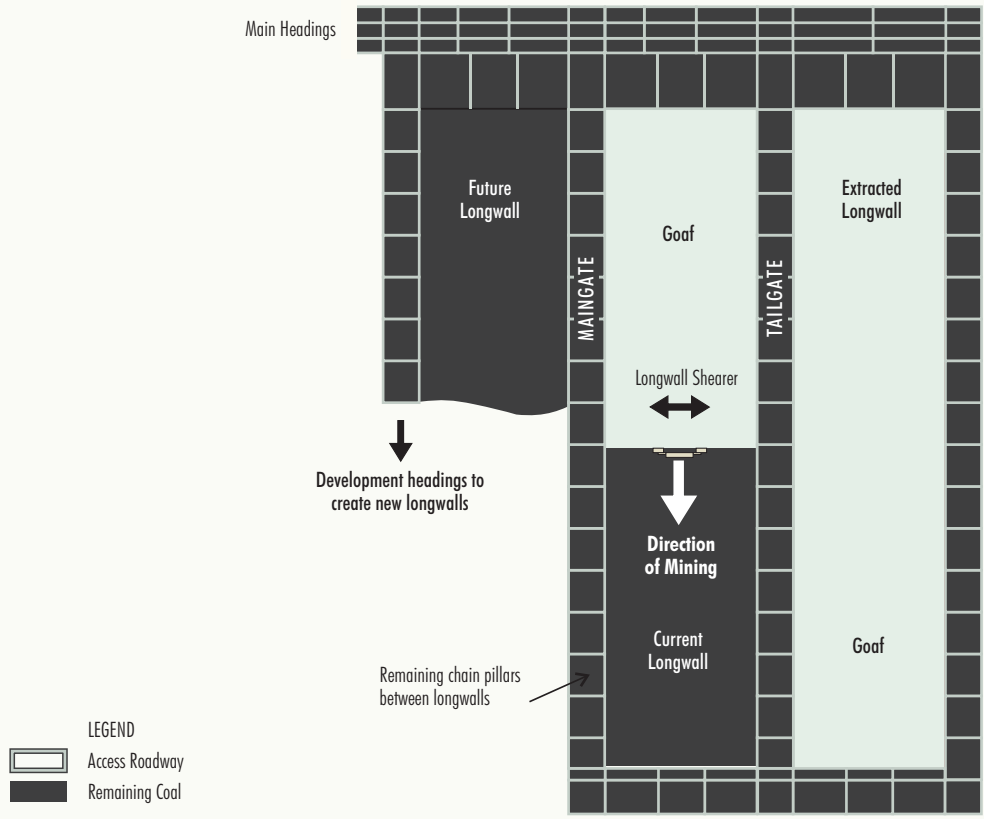
Source: NCOPL (2019); NSW Spatial Services (2019)

WHITEHAVEN COAL

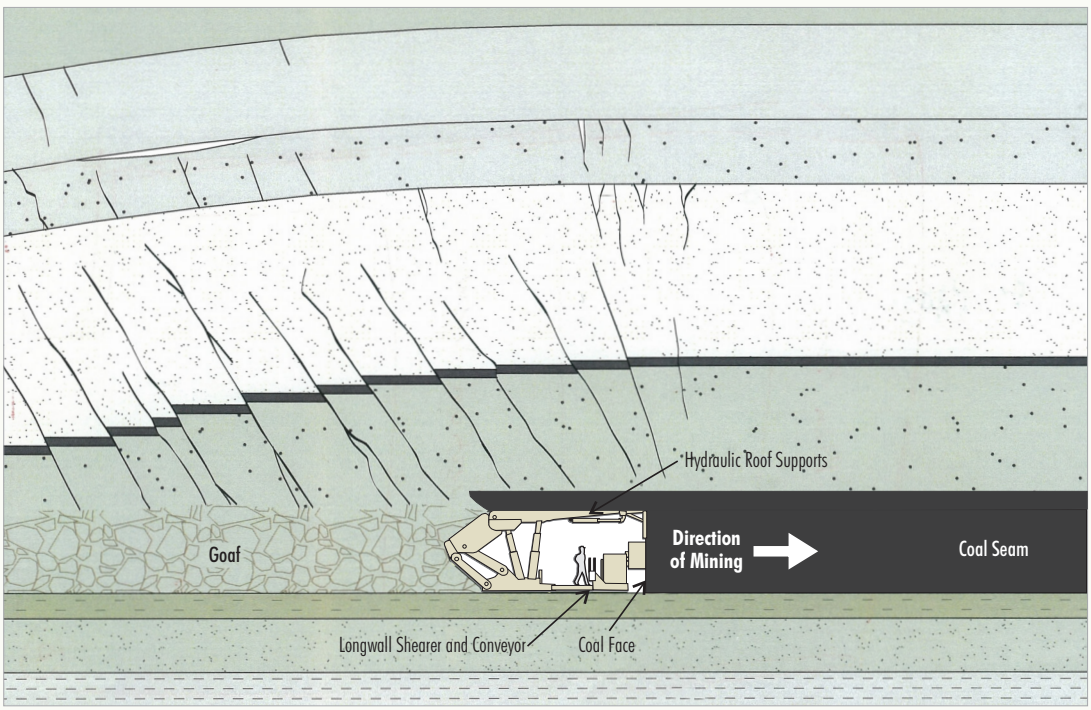
NARRABRI STAGE 3 PROJECT

Project General Arrangement - Indicative Underground Mining Layout

Figure ES-4



PLAN VIEW



SECTION VIEW

Note: Conceptual only - not to scale

Source: After Hansen Consulting (2008)

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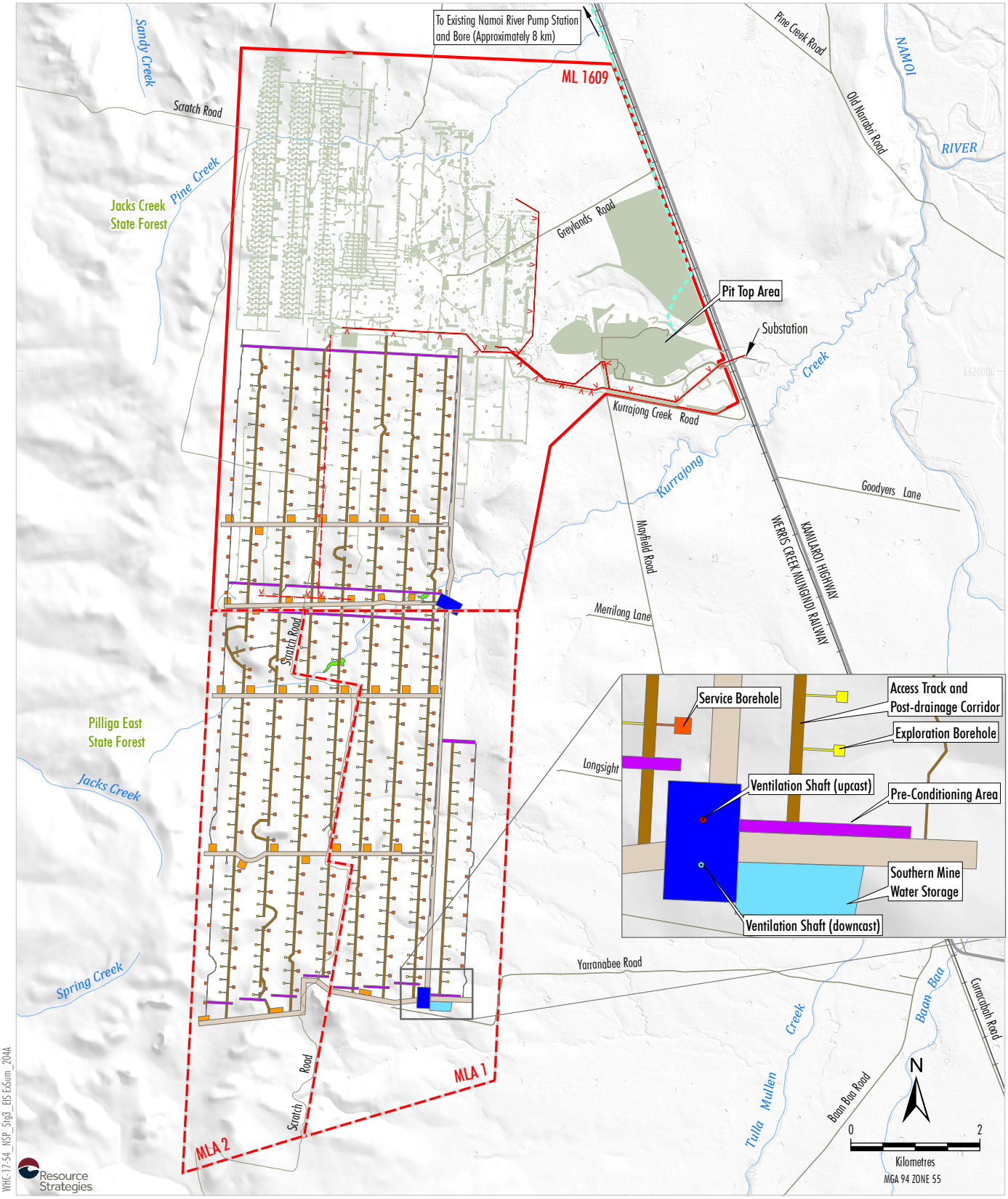
Resource Strategies

WHITEHAVEN COAL

NARRABRI STAGE 3 PROJECT

Longwall Mining Method - Conceptual Cross-section and Plan

Figure ES-5



LEGEND

- Mining Lease (ML 1609)
- Provisional Mining Lease Application Area
- Electricity Transmission Line (Constructed)
- Electricity Transmission Line (Not Yet Constructed)
- Existing Namoi River Pipeline (Buried)
- Existing/Approved Surface Development*
- Services Corridor
- Service Borehole
- Exploration Borehole
- Access Track and Post-drainage Corridor
- Pre-Conditioning Area
- Service Borehole and Power Reticulation
- Southern Mine Water Storage
- Ventilation Complex
- Farm Dam Decommissioning Works

*Excludes the Impact Reduction Area (Refer to Figure 2-12)

Source: NCOPL (2019); NSW Spatial Services (2019)

WHITEHAVEN COAL

NARRABRI STAGE 3 PROJECT

Project General Arrangement - Indicative Surface Development Footprint

Figure ES-6

Mine Safety Gas Management

Pre-mining gas drainage and goaf gas drainage would continue to be progressively developed for the Project to reduce the gas content in the coal seam to levels suitable for safe underground mining operations.

Pre-drainage of the coal seam would be progressively conducted ahead of longwall and development mining operations through a combination of surface to in-seam boreholes (Figure ES-6) and conventional underground in-seam drainage methods.

Goaf gas drainage would be conducted behind the progressing longwall mining operations using goaf drainage boreholes (Figure ES-6).

Given the low methane levels in the gas extracted from the Narrabri Mine to date, gas has been vented to the atmosphere and flaring (although approved for the Narrabri Mine) has not been technically feasible.

Ongoing monitoring of gas volumes and composition and investigation of developments in flaring technology would determine whether flaring is a viable option to assist with managing gas associated with the Project.

Mine Safety Pre-conditioning

Pre-conditioning of the Digby Conglomerate (a geological unit overlying the Hoskissons Coal Seam) and other geological units would be required for the Project to mitigate the potential for wind blast events (i.e. an event resulting in sudden, mass air movement) occurring underground.

Pre-conditioning areas would be developed on the surface to allow for pre-conditioning to occur (Figure ES-6).

Other Supporting Infrastructure

Other infrastructure and activities associated with underground mining operations would include:

- existing infrastructure at the Pit Top Area, such as administration, bathhouse and parking facilities;
- existing infrastructure for servicing of underground mining equipment;
- existing and new infrastructure for electricity distribution and communication systems; and
- existing and new storage and handling of materials used by underground mining equipment (e.g. hydraulic fluids, roof bolts, wear plates, miscellaneous consumables and safety equipment).

ES2.5 ROM Coal Handling and Preparation

The Project would use the existing coal handling and processing infrastructure located at the Narrabri Mine.

ROM coal would be primary sized underground before being transferred to the ROM coal stockpile on the surface via the drift conveyor.

The ROM coal is then fed to either a rotary breaker or a secondary bypass crusher. The rotary breaker reduces the size of the ROM coal before it is transferred to either the CHPP or directly to the product coal stockpile.

The CHPP would produce the following main streams:

- combined (partly washed) thermal coal;
- washed PCI coal;
- coarse coal reject material; and
- coal fines.

Over the life of the Project, a range of equipment within the CHPP and its associated infrastructure would be replaced or upgraded as a component of general maintenance or to increase efficiency.

ES2.6 Product Coal Handling and Transport

Consistent with existing operations, product coal would typically be transported from the Narrabri Mine via the Werris Creek Mungindi Railway to the Port of Newcastle.

Product coal would be loaded onto trains 24 hours per day, seven days per week. Consistent with the approved Narrabri Mine, an average of four trains are loaded each day and a maximum of eight trains each day are loaded during peak coal transport periods.

ES2.7 Management of Reject and Exploration Waste Material

Coal reject generated during coal preparation at the Narrabri Mine would include coarse reject and coal fines. Consistent with the approved Narrabri Mine, coarse coal reject generated from the CHPP would be disposed of in the reject emplacement area.

Coarse reject material that would be produced over the life of the Project (including the existing and approved Narrabri Mine), can be accommodated within the approved reject emplacement capacity.

The Project would also involve the co-disposal of exploration drilling waste (over the life of the Project) from other Whitehaven exploration activities in the area with the coarse reject material in the reject emplacement area.

ES2.8 Water Management

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

Water required for the Project would be preferentially sourced from groundwater inflows to underground workings and water collected in the site water management system. Supplementary water supply required over the life of the Project would be sourced from the Namoi River and/or Namoi Alluvium water sources via existing and approved infrastructure.

Water treatment facilities would treat water collected in the site water management system to maximise re-use of water on site. The treated (filtered) water produced would be used in mining operations and potable water supply, discharged via the existing licensed discharge point on the Namoi River, or provided to other water users in the area for beneficial re-use (e.g. irrigation). The brine waste product may be used for stockpile dust suppression.

The Project site water management system has sufficient capacity and flexibility to accommodate a wide range of groundwater inflows and climate scenarios while:

- providing security of supply for Project operations;
- containing brine on-site, with no uncontrolled off-site release; and
- maintaining a very low risk of uncontrolled off-site release of mine water and Pit Top Area water.

ES2.9 Infrastructure and Services

The Project would involve the continued use of existing/approved surface infrastructure at the Narrabri Mine for the life of the Project.

The existing primary access to the Narrabri Mine site from the Kamilaroi Highway is via Kurrajong Creek Road and an internal sealed mine access road connecting to the Pit Top Area, which would be retained for the Project.

The existing 66 kV electricity transmission line would continue to supply most of the electricity requirements of the Project. Electricity transmission lines would be progressively extended as ventilation complexes and the mine is developed.

The existing/approved Namoi River pump station, alluvial production bore and pipeline would continue to supply supplementary water for the Project.

ES2.10 Impact Reduction Area Development Footprint

The indicative Surface Development Footprint excludes some areas of surface development associated with the approved Narrabri Mine.

The approved Narrabri Mine surface development areas that are not required for the Project would be forgone subject to approval of the Project.

ES2.11 Workforce

The Project would allow for the continued employment of up to approximately 520 full-time equivalent personnel at the Narrabri Mine.

The operational workforce would continue to predominantly reside locally (e.g. within the NSC and Gunnedah Shire Council [GSC] LGAs).

There would be multiple, short periods of development activity throughout the Project life as infrastructure development occurs, which would require additional personnel. Activities would include longwall change-outs, periods of higher underground development activities, drilling programs, ventilation shaft development, scheduled plant shutdowns or other maintenance programs.

These activities would require approximately 20 full-time equivalent personnel (in addition to the current operational workforce) for multiple, short periods throughout the Project life.

ES3 ASSESSMENT PROCESS

ES3.1 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*.

This EIS considers the potential environmental impacts of the Project in accordance with the Secretary's Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning, Industry and Environment, including input from the Commonwealth Department of Agriculture, Water and the Environment.

NCOPL is seeking development consent for the Project from the NSW Minister for Planning and Public Spaces or the Independent Planning Commission.

ES3.2 Commonwealth

NCOPL referred the relevant elements of the Project to the Commonwealth Minister in April 2019 (EPBC 2019/8427). A delegate of the Commonwealth Minister determined on 30 September 2019 that the proposed action is a controlled action and, therefore, the action also requires approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Therefore, this EIS provides an assessment of potential impacts (in accordance with the revised SEARs) with respect to the following *Environment Protection and Biodiversity Conservation Act 1999* controlling provisions for the Project:

- *Environment Protection and Biodiversity Conservation Act 1999* listed threatened species and communities; and
- water resources.

The proposed action is to be assessed pursuant to the bilateral agreement between the Commonwealth of Australia and the State of NSW relating to environmental assessment.

ES3.3 Determination

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

The Project will then be determined by the NSW Minister for Planning and Public Spaces 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 under the *Environment Protection and Biodiversity Conservation Act 1999*.

ES4 ENGAGEMENT

Consultation conducted during the preparation of this EIS has provided the opportunity to identify issues of concern or interest to stakeholders and to consider these issues within the EIS. Open communication with stakeholders has been encouraged during consultation.

The key objectives of NCOPL's ongoing consultation with stakeholders are to:

- engage with government and public stakeholders about the Project;
- seek input from key stakeholders on elements of the Project; and
- recognise and respond to local interest or concerns regarding the Project.

NCOPL has consulted with:

- key State government agencies;
- NSC and GSC;
- the Commonwealth Department of Agriculture, Water and the Environment;
- neighbouring land and tenement holders;
- infrastructure owners and service providers; and
- the local community, including representatives of the Aboriginal community.

NCOPL maintains open lines of communication with the community through a number of community initiatives and local involvement. In addition, NCOPL undertook the following specific consultation activities for the EIS:

- a community drop-in session;
- briefings to the Narrabri Mine Community Consultative Committee;
- a community newsletter to local residents and other stakeholders;
- a community survey as part of the Social Impact Assessment;
- consulting with representatives of the Aboriginal community;
- providing information through a local community event;
- consulting local community groups; and
- briefing NCOPL's staff and contractors.

Key feedback obtained from local community stakeholders has comprised concerns regarding the potential need for a new southern pit top to access coal in the Project Area. The Project addresses this concern by using the existing Pit Top Area for coal handling and transport, rather than constructing a new facility to the south. Given this, material community concern regarding the Project has been limited.

ES5 KEY ENVIRONMENTAL ISSUES AND PROJECT MITIGATION

The EIS is supported by a number of specialist studies that include detailed impact assessments covering all environmental, social and economic aspects that may be potentially impacted by the Project.

The following sub-sections provide a summary of the key environmental issues raised during EIS consultation and the proposed Project mitigation measures that would avoid, minimise and offset any potential impacts.

ES5.1 Subsidence

Natural and built features that may experience subsidence effects include:

- ephemeral drainage lines;
- predominantly flat agricultural areas (Plate ES-2);
- occasional steep slopes and rocky outcrops;
- native vegetation;
- areas of verified Biophysical Strategic Agricultural Land (BSAL);
- Aboriginal heritage sites;
- power and telecommunications lines;

- State survey control marks; and
- NCOPL and privately-owned infrastructure and improvements, including dwellings, unsealed tracks, fences, farm dams and groundwater bores.

Plate ES-2 Flat Terrain above Longwall 203

Source: Ditton Geotechnical Services (2020).

Subsidence impacts on a rocky feature called Bulga Hill have been reduced by incorporating a mining setback (i.e. truncation of the mining area). The Bulga Hill is known to provide habitat for the threatened Large-eared Pied Bat.

The environmental impact assessment and engagement processes did not identify any other potential subsidence impacts on built or natural features that would warrant consideration of avoidance or further minimisation of subsidence impacts.

The levels of impact on other natural and built features can be managed through the preparation and implementation of appropriate management strategies.

ES5.2 Water Resources

The Project is located in the Namoi River catchment. The Namoi River flows in a north-westerly direction approximately 3 km to 5 km to the east of the eastern boundary of the Project. The approved Narrabri Mine (ML 1609) is located within the catchments of Kurrajong (Plate ES-3) and Pine Creeks.

MLAs 1 and 2 are located in the Kurrajong Creek and Tulla Mullen Creek tributary catchments. Both of these catchments flow to Tulla Mullen Creek to the east of the Project. These creeks are ephemeral with minimal to no baseflow.

The key 'highly productive' aquifers identified in the vicinity of the Project are alluvium associated with the Namoi River and the Jurassic-aged Pilliga Sandstone. Underlying the Pilliga Formation are the Jurassic-aged Purlawaugh Formation and Garrawilla Volcanics as well as Triassic and Permian-aged formations. These units are considered 'less productive' under the NSW *Aquifer Interference Policy* (i.e. do not meet the 'highly productive' criteria for yield and water quality). Some of these units are considered to be aquitards, which involve very slow movement of groundwater.

The key Project mechanisms with the potential to impact water resources would be dewatering of the Hoskissons Coal Seam, which is required as part of the mining operations and may induce indirect groundwater drawdown on other formations. In addition, the formation of the goaf would result in changes in geological units above the Hoskissons Coal Seam and result in subsidence effects such as cracking and ponding on the surface.

The key impacts on water resources are:

- potential subsidence impacts on ephemeral drainage lines, such as ponding, surface cracking and stream channel alignment change, which would not materially affect downstream water quality or flows with the implementation of monitoring and remediation measures; and
- potential impacts on a limited number of privately-owned water supply bores accessing 'less productive' aquifers, which are predicted to exceed the minimal harm impact criterion (i.e. more than 2 m drawdown) and would be managed in accordance with NSW Government policy (i.e. 'make good' provisions would apply to allow the bore to continue to be productive or provide an alternative water supply).

Potential cumulative impacts of the Project and the nearby Narrabri Gas Project have been considered for the Project. Because the Narrabri Gas Project mainly targets coal formations below the Hoskissons Coal Seam and the physical distance between the two projects, cumulative impacts are considered to be limited.

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Resource Strategies

Source: WRM (2020)

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Photographs of Kurrajong Creek

Plate ES-3

ES5.3 Land Resources and Agriculture

The area around the Project is predominantly used for grazing for beef cattle and sheep, with some dryland cropping of fodder crops to support grazing production. Cropping is generally restricted to fodder crops for livestock and is opportunistic, based on favourable soil moisture conditions and weather forecasts. There is no irrigated agriculture. Surface water is the main water source for stock and domestic use, since groundwater tends to be of poor quality. There is verified BSAL mapped in the Project area; however, agricultural productivity of this land was not found to be elevated relative to other agricultural land in the vicinity.

For the period of active mining and remediation, it would be necessary to remove small areas from agricultural production to manage the safety of people and livestock whilst subsidence occurs and until it is remediated.

It is expected that impacts to agricultural land use in the Project area from subsidence would be short-term, with minimal to no impacts to production, including over areas identified as BSAL. There would also be impacts associated with the development and operation of surface infrastructure above the mine. This infrastructure would be progressively developed over time and decommissioned/rehabilitated when no longer required. Development of infrastructure on land owned by NSW Forestry Corporation would be undertaken in accordance with an agreement with NSW Forestry Corporation.

The Agricultural Impact Statement concluded that the Project is likely to have insignificant impacts on agricultural resources and agricultural production with the implementation of appropriate management and rehabilitation measures. Further, the Agricultural Impact Statement concluded that the Project would have negligible outcomes for the regional agricultural industry and related services and employment.

ES5.4 Biodiversity

The Project area includes areas of biodiversity value, including native woodland areas, derived grasslands and native fauna habitat. Other areas associated with agricultural land uses contain less biodiversity value as they are mainly cleared.

The majority of woodland areas are associated with the Pilliga East State Forest, which supports limited commercial harvesting. The area has not been subject to recent harvesting; however, adjacent areas have been selectively harvested.

At a broad level, the Project has been designed to avoid or minimise impacts on biodiversity values through the use of the substantial existing infrastructure at the Narrabri Mine (such as the Pit Top Area and the existing ventilation shafts).

NCOPL reviewed the positioning of infrastructure to avoid or minimise impacts on native vegetation, threatened species habitat and prescribed impacts in consideration of the results of the detailed ecological survey work.

Surveys conducted for the Project have identified threatened ecological communities and habitat suitable for threatened flora and fauna species. The environmental assessment describes the potential impacts of the Project on local and regional ecology and associated Project mitigation and offset measures.

Biodiversity impacts have been assessed in accordance with the Biodiversity Assessment Method, which sets a standard that would result in no net loss of biodiversity values in NSW. Residual biodiversity impacts would be offset by measures developed in accordance with NSW Government policy.

ES5.5 Air Quality and Noise

Potential air quality and noise impacts are generally limited to the Pit Top Area and other mining infrastructure such as the ventilation complexes.

The assessments showed that air quality and noise impacts would be limited to potential noise impacts at a small number of residences. These residences would be managed in accordance with NSW Government policy. For example, NCOPL has obtained agreements with two of these residents with respect to the elevated noise levels anticipated.

Air quality and noise emissions would continue to be managed by existing mitigation measures, such as water sprays on the coal stockpiles and control of noise emissions from bulldozers working in the Pit Top Area.

ES5.6 Greenhouse Gas Emissions

Greenhouse gases directly generated by the Project (which are called Scope 1 emissions) on average are estimated to be approximately 1.04 million tonnes of carbon dioxide equivalent (Mt CO_2-e) per year. Indirect emissions associated with the on-site use of electricity (i.e. Scope 2 emissions) are estimated, on average, to be 0.12 Mt CO_2-e per year.

A key Scope 1 emission would be gas emitted during the mining process (Section ES2.4). Gas extracted from the Hoskissons Coal Seam associated with the Project is expected to have a higher methane content, although a lower volume than for the existing Narrabri Mine. Gas from the Narrabri Mine is currently vented to the atmosphere. Ongoing monitoring of gas volumes and composition and investigation of developments in flaring technology would determine whether flaring is a viable option to manage gas associated with the Project. Accordingly, depending on localised gas volumes and composition, there may be opportunities to flare gas for the Project, which would reduce Scope 1 greenhouse gas emissions.

Scope 3 greenhouse gas emissions that may be emitted by other parties, such as from the use of the product coal produced by the Project, are considered in this EIS.

ES5.7 Aboriginal Cultural Heritage

The Aboriginal Cultural Heritage Assessment (Plate ES-4) identified 60 Aboriginal cultural heritage sites within the area investigated for the Project. Of the 60 identified Aboriginal cultural heritage sites, 36 are surface artefact scatters, 22 are isolated artefacts and two are grinding groove sites.

The archaeological significance of the 60 identified Aboriginal cultural heritage sites was considered by Whincop Archaeology and all but five sites are considered to be of low scientific significance. The remaining five Aboriginal cultural heritage sites are considered to be of moderate scientific significance. The sites of moderate scientific significance include four artefact scatters and one grinding groove site (Plate ES-4). No sites of high scientific significance were identified.

Plate ES-4 Aboriginal Cultural Heritage Assessment Survey

Source: Whincop Archaeology (2020).

None of the identified Aboriginal cultural heritage sites would likely be directly impacted by surface disturbance. One site of moderate scientific significance (Mayfield GG1) would be subject to indirect impacts associated with the effects of subsidence.

ES5.8 Road Transport

The Project would use the existing Narrabri Mine primary access from the Kamilaroi Highway via Kurrajong Creek Road and the Mine Access Road.

The Project would not change the existing Narrabri Mine operational road transport characteristics (i.e. traffic volumes and distribution). The Project would, however, result in the continuation of the operational activity at its existing level until 2044, rather than ceasing in mid-2031 (as currently approved).

ES5.9 Economic Effects, Social and Community Infrastructure

The Economic Assessment indicates the Project would result in a total net benefit to the NSW economy of $599 million in net present value (NPV) terms, which:

- is inclusive of the estimated costs for environmental externalities and internalisation of environmental management costs by NCOPL; and
- conservatively excludes any indirect economic impacts associated with benefits to workers or suppliers.

In addition, the Project would produce the following other socio-economic benefits:

- the continued employment of the existing Narrabri Mine operational workforce (up to approximately 520 full-time equivalent personnel);
- multiple, short periods of development activity throughout the Project life, which would provide employment for an additional 20 full-time equivalent personnel;
- indirect (flow-on) employment and business opportunities associated with related upstream or downstream industries;
- the continuation of the NCOPL's funding contributions to local community programs and groups during the life of the Project; and
- confirmation of continued use of the existing Pit Top Area rather than constructing a new facility within Exploration Licence (EL) 6243.

NCOPL would continue to work with local government and the community to minimise potential social impacts of the Project and maximise potential opportunities.

ES5.10 Rehabilitation and Mine Closure

The Project would require the progressive rehabilitation of surface development areas and the remediation of subsidence impacts in the underground mine area.

The Project would be rehabilitated to a safe, stable and non-polluting landform of a similar character to surrounding areas.

Rehabilitation would be undertaken progressively as soon as reasonably practicable as areas become available following mining operations.

The Project would not require significant changes to the approved final landform design. The conceptual final landform for the Project would continue to generally approximate the pre-mining landscape with the exception of the reject emplacement area and surface impacts from subsidence in the underground mining area.

The conceptual post-mining land use of the Project would continue to comprise a combination of native vegetation, agricultural (pasture) and forestry (State Forest) land uses. Project infrastructure may be retained for alternate post-mining uses (where agreed with relevant regulatory authorities and landholders).

Over the life of the Project, rehabilitation performance measures and completion criteria would, periodically, be updated and refined in consultation with relevant regulatory authorities and stakeholders in accordance with the relevant NSW rehabilitation and mine closure guidelines.

ES5.11 Environmental Monitoring

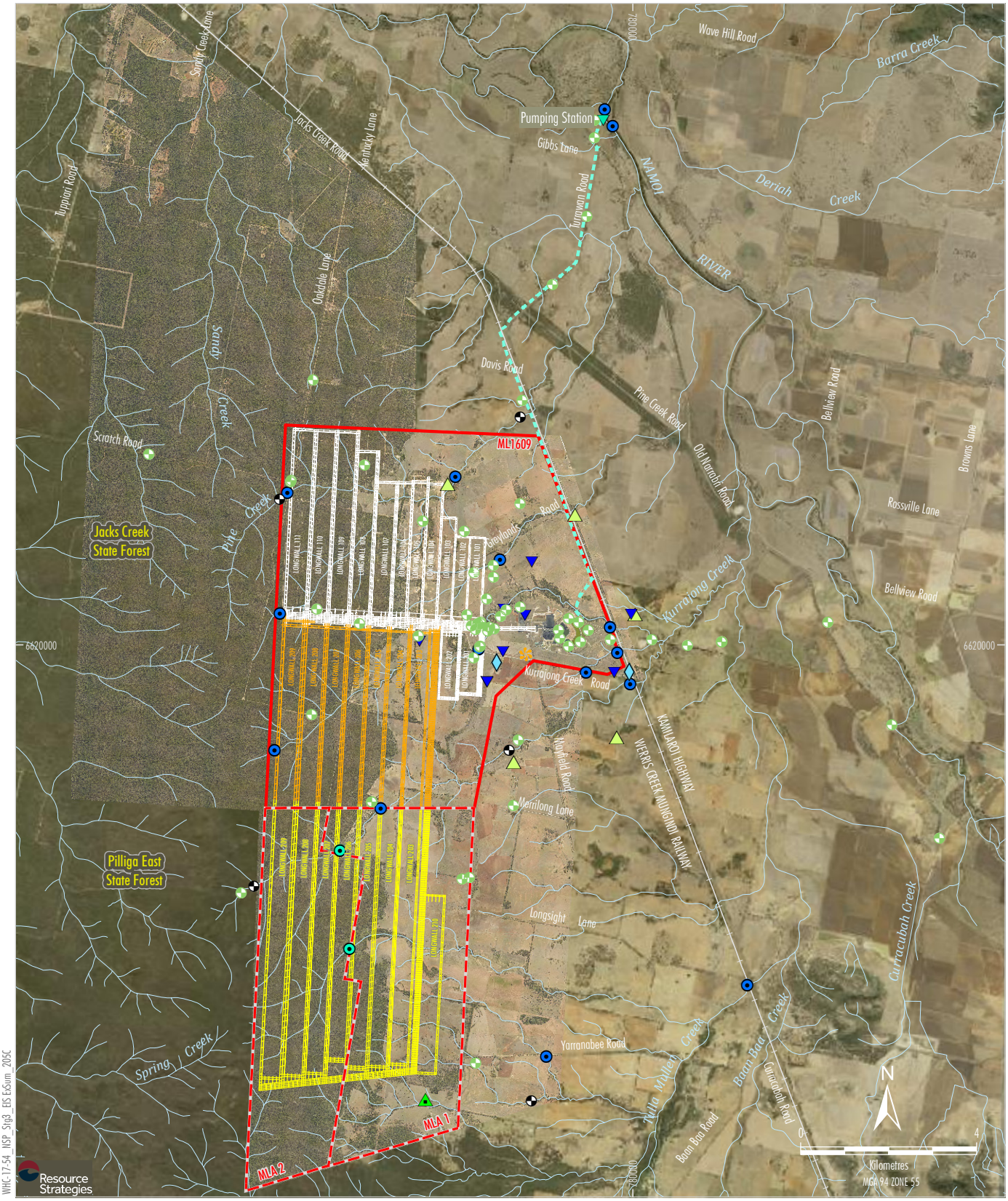
The Narrabri Mine environmental management system includes various environmental monitoring plans and programs that have been developed and implemented since operations commenced. The monitoring plans and programs would be augmented for the Project (Figure ES-7).

ES6 PROJECT ALIGNMENT WITH FUTURE OF COAL STATEMENT

The *Strategic Statement on Coal Exploration and Mining in NSW* outlines the NSW Government's approach to the continued development of the State's coal resources for the benefit of the State in the context of the global transition to alternative energy sources to meet climate change commitments under the *Paris Agreement*.

The *Strategic Statement on Coal Exploration and Mining in NSW* recognises the value of coal production to the State, including:

- The potential for coal production to deliver significant economic benefits to regional communities.
- The public services and infrastructure that are funded by the significant royalty payments generated from coal production.
- The significant contribution that coal production provides to export earnings as the State's largest export commodity.



LEGEND

- Mining Lease (ML 1609)
- Provisional Mining Lease Application Area
- Existing Namoi River Pipeline (Buried)
- Approved Underground Mining Layout
- Indicative Underground Mining Layout to be Extended for Project
- Indicative Underground Project Mining Layout

Existing Monitoring Sites

- Surface Water Monitoring Site*
- Narrabri Coal Operations
- Noise Monitoring Site
- Deposited Dust Monitoring Site
- PM_{10} Monitoring Site
- Meteorological Station
- Pumping Station

Proposed Monitoring Sites

- Surface Water Monitoring Site (Indicative)*
- Groundwater Monitoring Site (Indicative)
- Noise Monitoring Site (Indicative)

** Does not include on-site water storage monitoring locations.*

Source: NCOPL (2019); NSW Spatial Services (2019); WRM (2020)

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Current and Proposed Environmental Monitoring Locations

Figure ES-7

The *Strategic Statement on Coal Exploration and Mining in NSW* outlines that coal production for the export market will continue to have an important role to play in NSW:

- Thermal coal is a critical global energy source (currently supplying over one-third of all electricity produced).
- Demand for thermal coal is likely to remain stable in the medium term, notwithstanding the transition to alternative energy sources, as demand from developing countries (particularly in south-east Asia) is expected to increase as they seek to expand access to electricity for their citizens.
- Ending or reducing NSW thermal coal exports while there is still strong, long-term global demand for thermal coal would be likely to have little to no impact on global greenhouse gas emissions as thermal coal users would likely source thermal coal from alternative lower quality suppliers relative to NSW thermal coal.
- Demand for coal used in steel making is expected to be sustained over the longer term as there are currently limited available practical substitutes.

The *Strategic Statement on Coal Exploration and Mining in NSW* provides the following relevant actions to provide a consistent policy framework for the NSW coal industry:

- Improving Certainty – identifying areas where coal exploration and mining cannot occur.
- Supporting Responsible Coal Production – recognise existing industry investment by considering applications to extend the life of current coal mines so that existing economic benefits to the State can continue to be delivered.
- Managing Potential Impacts of Coal Production – reduce or mitigate potential environmental, social and economic impacts, including:
  - potential air quality and water resource impacts;
  - greenhouse gas emissions directly associated with coal mining (e.g. fugitive emissions);
  - potential impacts on mine-affected communities; and
  - consideration of rehabilitation and closure planning (including the beneficial use of rehabilitated mine sites).
- Diversification of Regional Economies – assist regional communities' transition from coal mining.

The Project would be consistent with the *Strategic Statement on Coal Exploration and Mining in NSW*, because:

- The Project would not be located in an area where coal exploration and mining cannot occur.
- The Project would involve the extension of the underground mining areas at the Narrabri Mine to gain access to additional areas of ROM coal reserves within MLAs 1 and 2, which are located within EL 6243. The use of existing/approved Narrabri Mine infrastructure for the Project maximises the potential benefits of previous NCOPL investment and minimises the need for new surface development areas in comparison to a greenfield mine proposal.
- This EIS considers the potential benefits and consequences to the residents of NSW, including a cost-benefit analysis. Significant returns for the NSW community would principally be generated through contributions to State royalties, Commonwealth tax revenue and Council rates.
- Consideration of the potential air quality impacts have been assessed for the Project and it was concluded that there would be no significant incremental impacts on rural dwellings in the vicinity of the Project.
- The potential impacts of the Project on groundwater and surface water resources are assessed, including measures to minimise potential impacts.
- The Project greenhouse gas emissions and greenhouse gas abatement measures have been assessed in consideration of the relevant state and national policies, programs and guidelines and this EIS demonstrates that Scopes 1 and 2 greenhouse gas emissions of the Project have been minimised to the greatest extent practicable (based on the existing knowledge of gas quantity and content).

- The Project site would be rehabilitated to include post-mining land uses that would be consistent with surrounding existing land uses.
- The Project would facilitate continued and additional local and regional employment and economic development opportunities.
- NCOPL is committed to ongoing financial support for regional community groups.

ES7 CONCLUSION

The Project is a continuation of the Narrabri Mine that would comply with relevant strategic planning policy objectives and applicable statutory requirements.

The Project would allow for continued employment of the existing operational workforce (up to approximately 520 full-time equivalent personnel) at the Narrabri Mine until 2044 (Plate ES-5). In addition, there would be multiple, short periods of development activity throughout the Project life as infrastructure development occurs, which would require an additional 20 full-time equivalent personnel.

Plate ES-5 NCOPL Employee

Engagement with members of the public and key regulatory agencies in NSW and at the Commonwealth level has informed NCOPL's design of the Project.

Potential environmental, social and economic impacts of the Project have been assessed against established thresholds of acceptability contained in relevant guidelines and policies, including for groundwater, surface water, biodiversity, noise and air quality. Potential impacts have been avoided or minimised as far as is reasonable or feasible. Mitigation measures and offset strategies are proposed where residual impacts are predicted.

The site is suitable for the proposed Project use, as underground coal mining by longwall methods is compatible with the existing, approved or likely preferred uses of land in the vicinity of the Project.

Economic benefits potentially forgone if the Project does not proceed amount to a net benefit of $599 million in NPV terms to the State of NSW. This includes an estimated $259 million in royalties and $177 million in company tax in NPV terms.

The Project would be consistent with the *Strategic Statement on Coal Exploration and Mining in NSW* (Section ES6).

In weighing up the main environmental impacts (costs and benefits) associated with the proposal as assessed and described in this EIS, the Project is, on balance, considered to be in the public interest of the State of NSW.