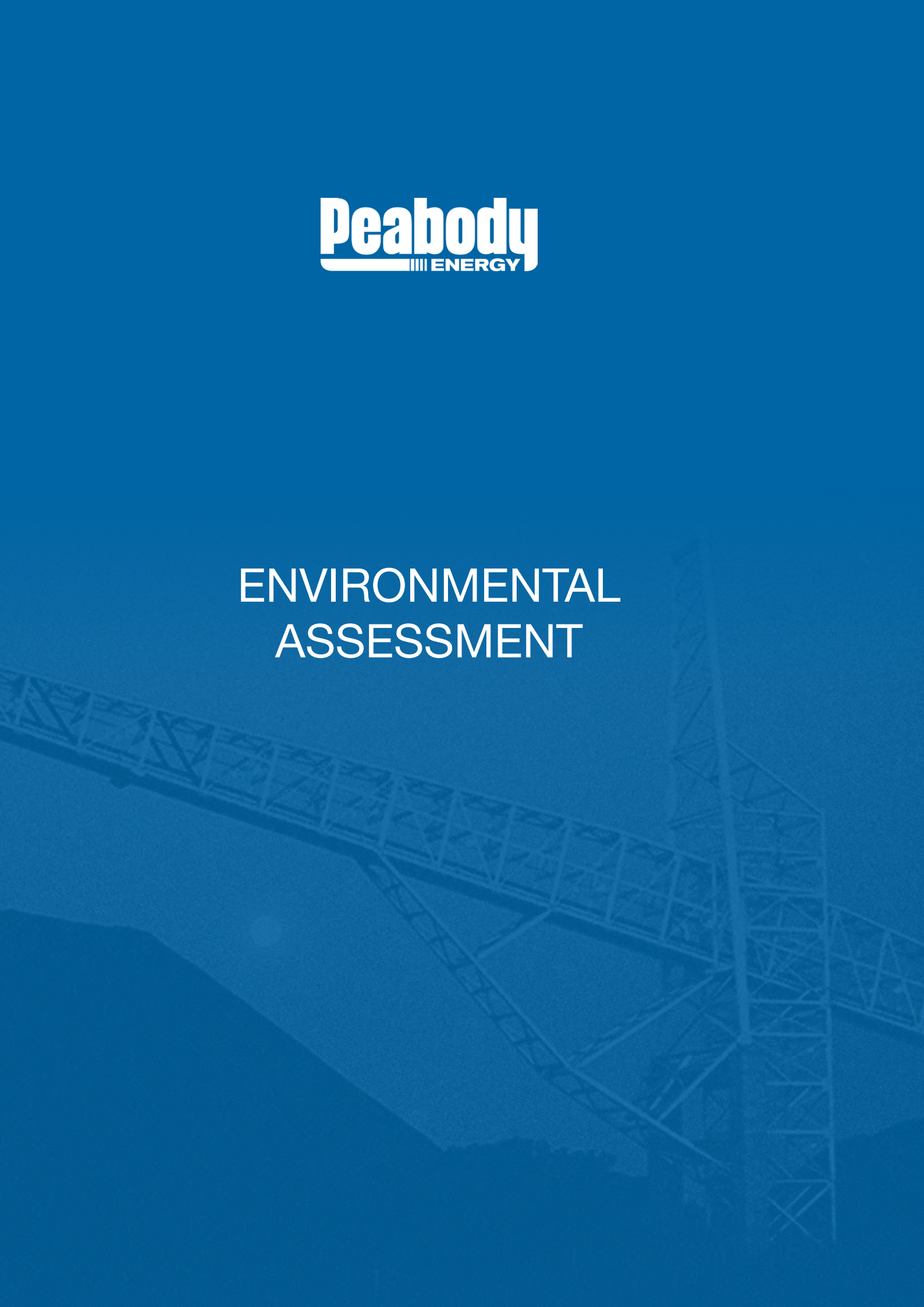
Peabody ENERGY

ENVIRONMENTAL ASSESSMENT



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1 INTRODUCTION

This document is an Environmental Assessment (EA) for a modification to the Wilpinjong Coal Mine which operates in accordance with Project Approval 05-0021, granted by the Minister for Planning in February 2006. The Project Approval has been modified previously (Section 2.1).

The Mine is owned and operated by Wilpinjong Coal Pty Limited (WCPL), a wholly owned subsidiary of Peabody Energy Australia Pty Limited (Peabody Energy).

A copy of the consolidated Project Approval 05-0021 is provided as Attachment 1.

1.1 OVERVIEW OF THE WILPINJONG COAL MINE

The Wilpinjong Coal Mine is an existing open cut coal mining operation situated approximately 40 kilometres (km) north-east of Mudgee, near the Village of Wollar, within the Mid-Western Regional Local Government Area (LGA), in central New South Wales (NSW) (Figures 1 and 2).

Construction of the Wilpinjong Coal Mine commenced in February 2006, and the mine is approved to produce up to 15 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal. Up to 12.5 Mtpa of thermal coal products from the Wilpinjong Coal Mine are transported by rail to domestic customers for use in electricity generation and to port for export.

In 2012, the Wilpinjong Coal Mine produced approximately 14.7 million tonnes (Mt) of ROM coal and approximately 10.4 Mt of saleable product coal (WCPL, 2013). In the first half of 2013 Wilpinjong Coal Mine successfully transitioned from a contract mining operation to an owner operator mine.

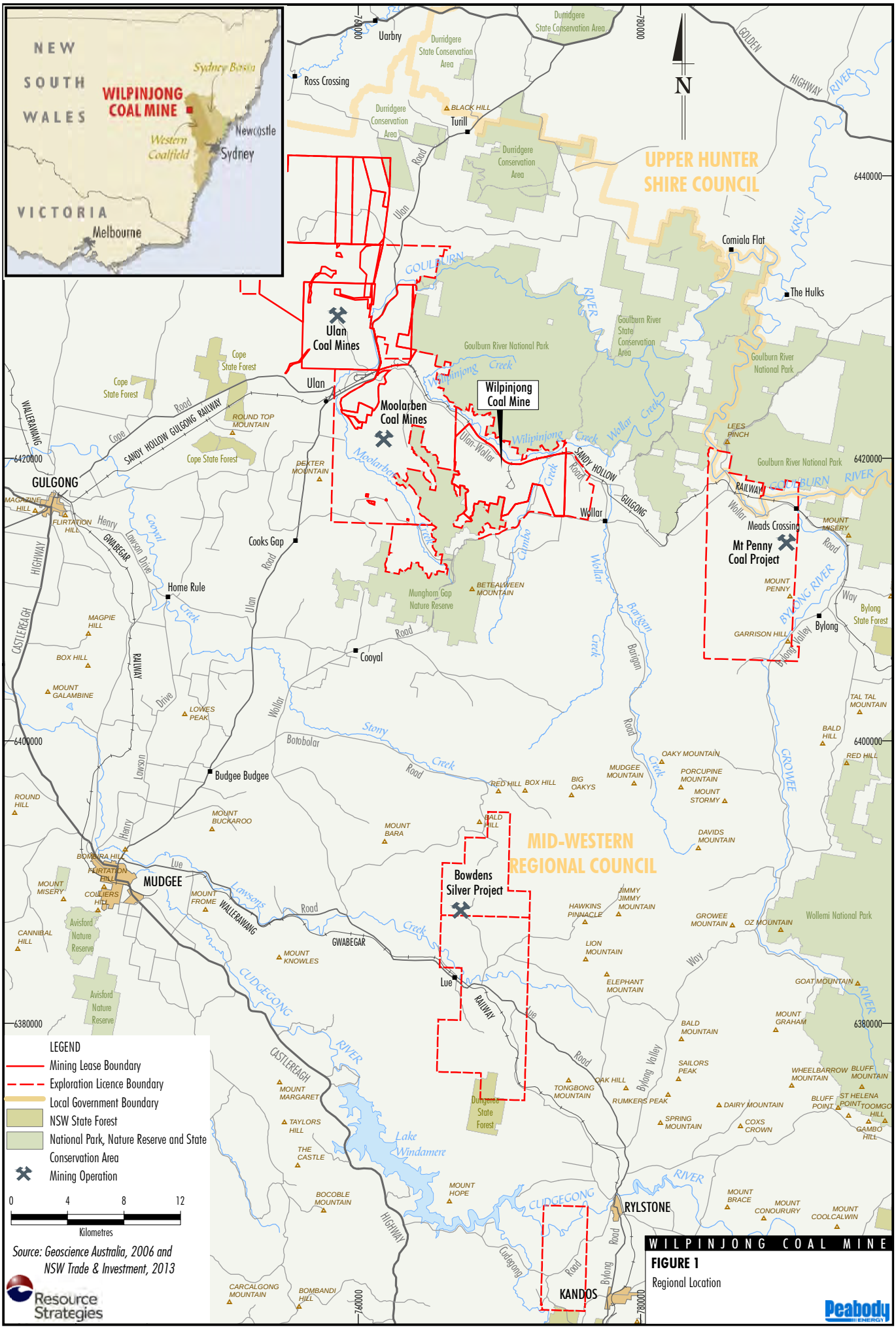
Two significant ridges separate the Wilpinjong Coal Mine from the Village of Wollar that is located to the east of the mine. Local topographic features, the Project Application area and open cut and contained infrastructure area of the Wilpinjong Coal Mine are shown on Figure 3.

Since its acquisition of the Wilpinjong Coal Mine in 2006, Peabody Energy has also acquired a range of adjacent rural properties and lands to the east and south-east of the mine. Current land ownership in the vicinity of the mine is shown on Figures 4a and 4b.

1.2 OVERVIEW OF THE MODIFICATION

Following a review of mine planning, Coal Handling and Preparation Plant (CHPP) capacity, waste rock bulking factors, planned building and demolition works on rural lands and light vehicle servicing requirements, WCPL has determined that a number of minor alterations to the approved Wilpinjong Coal Mine are required, including:

- development of incremental extensions to the existing open cut pits that would extend the open cuts by approximately 70 hectares (ha) and would result in the recovery of approximately 3 Mt of additional ROM coal over the life of the mine;
- higher rates of annual waste rock production (from 28 million bank cubic metres [Mbcm] up to approximately 33.3 Mbcm) in order to maintain approved ROM coal production;
- minor CHPP upgrades to improve fine coal reject management (installation of a belt press filter) and an increase in the rate of ROM coal beneficiation in the CHPP to approximately 9 Mtpa;
- upgrade of the existing reverse osmosis plant to a water treatment facility with the addition of pre-filtration and flocculation/dosing facilities to improve plant efficiency;
- amendment of the waste emplacement strategy to include:
  - development of an elevated waste rock emplacement landform (up to approximately 450 metres [m] Australian Height Datum [AHD]) within the footprint of Pit 2;
  - disposal of some inert building and demolition waste that is produced from off-site building demolition in the approved mine waste rock emplacements;
  - co-disposal of fine coal reject material produced by the belt press filter with coarse rejects; and
- operation of a WCPL light vehicle servicing workshop at an existing farm shed that is located in the north of the approved Project Application area.



WILPINJONG COAL MINE

FIGURE 1

Regional Location

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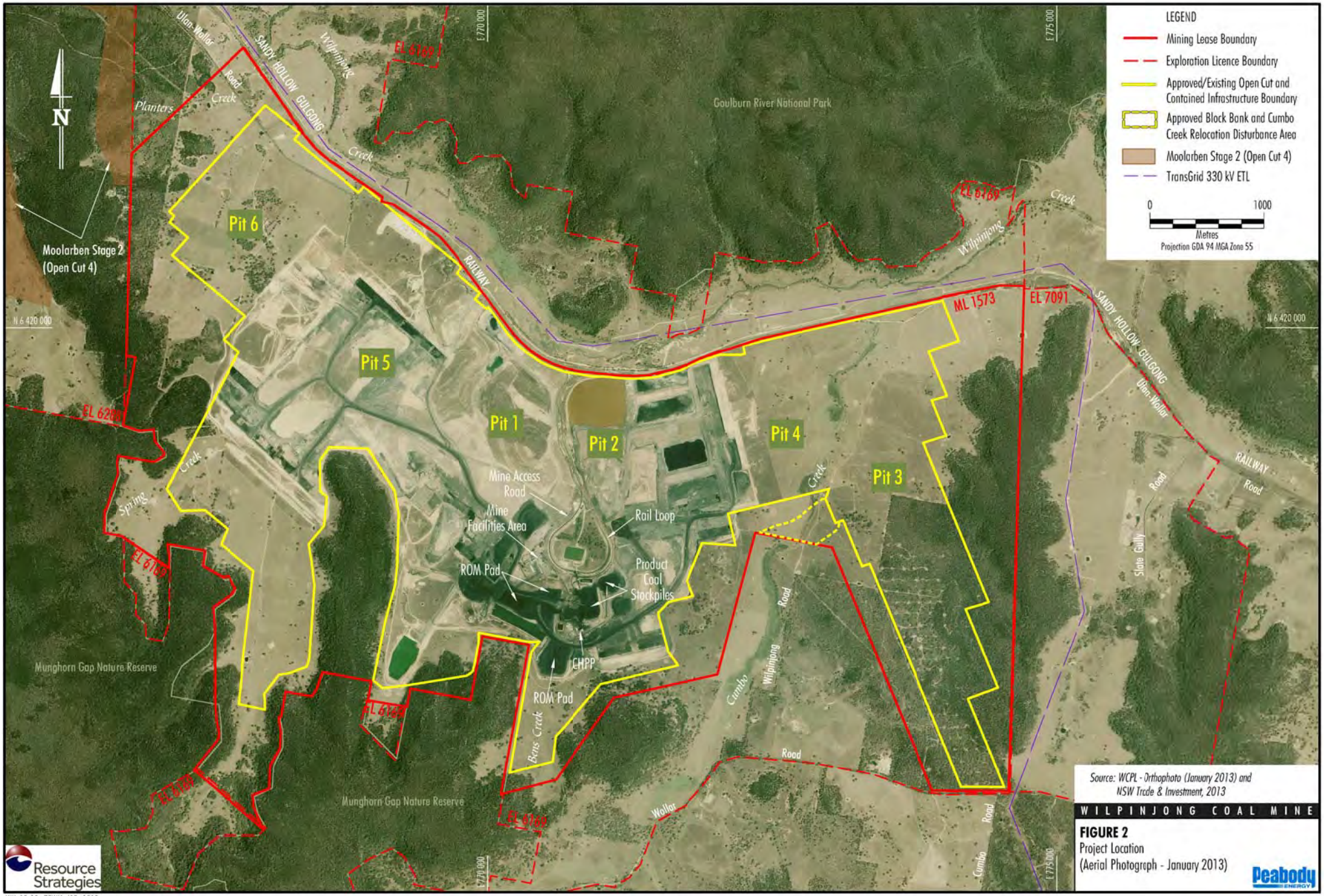

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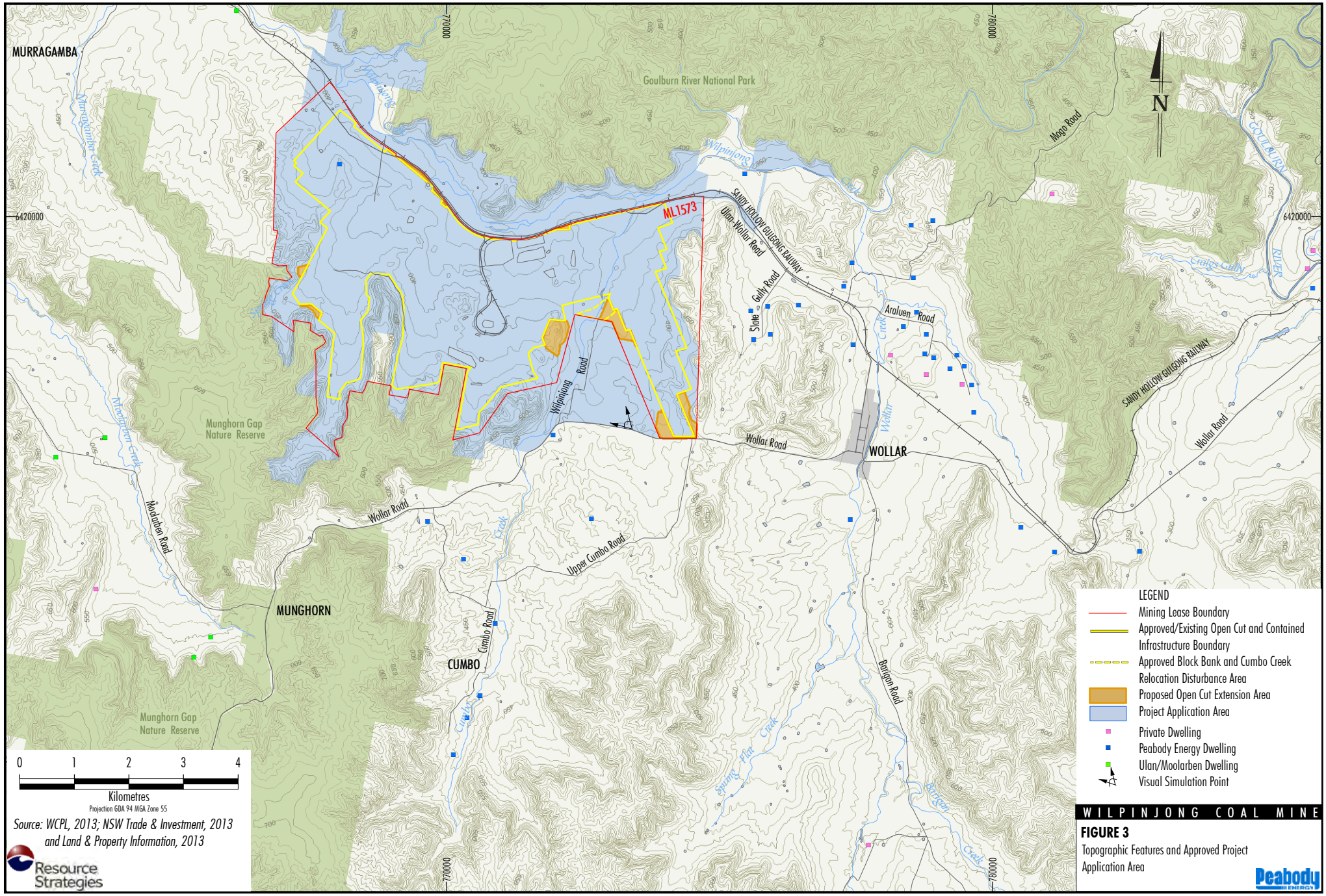

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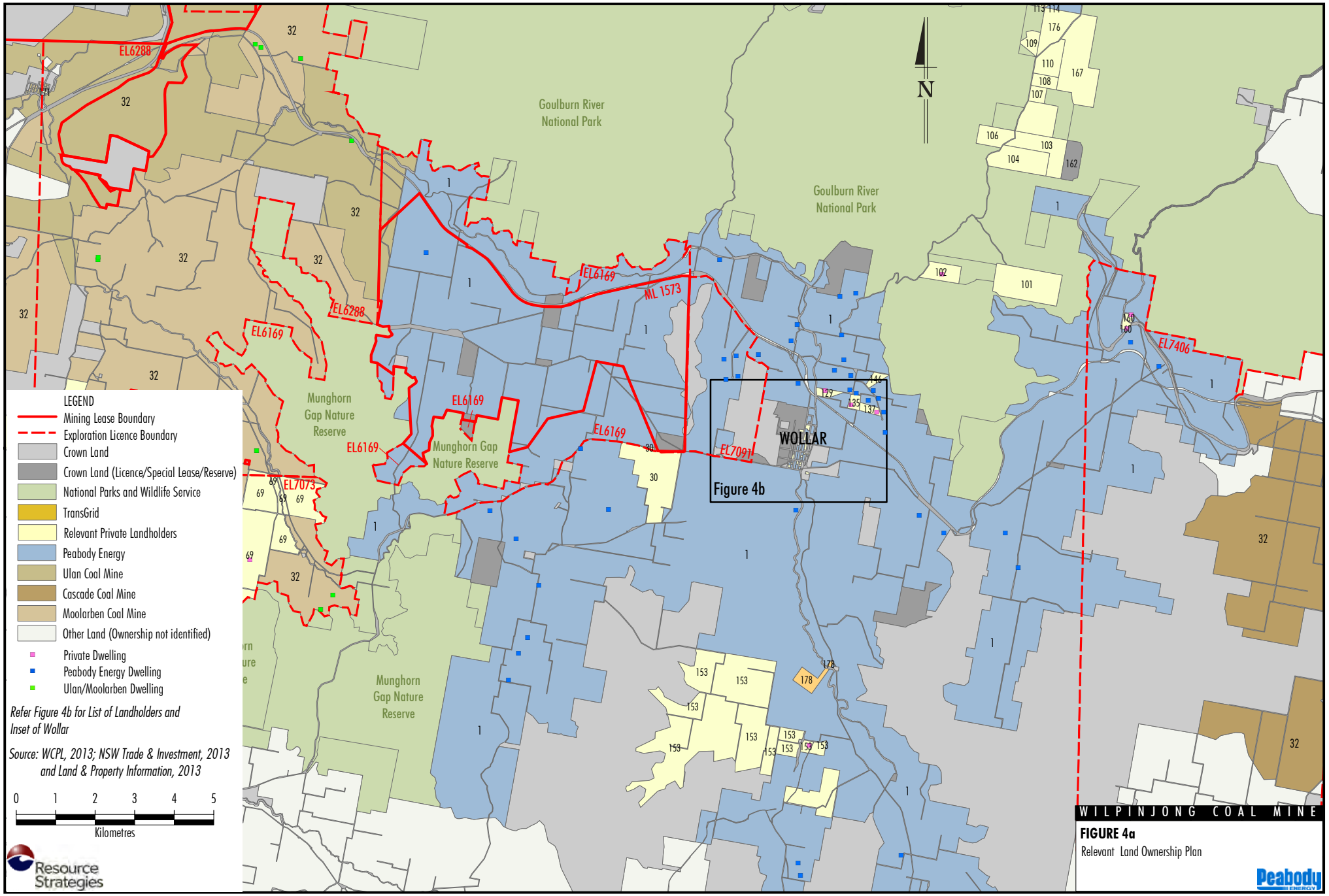

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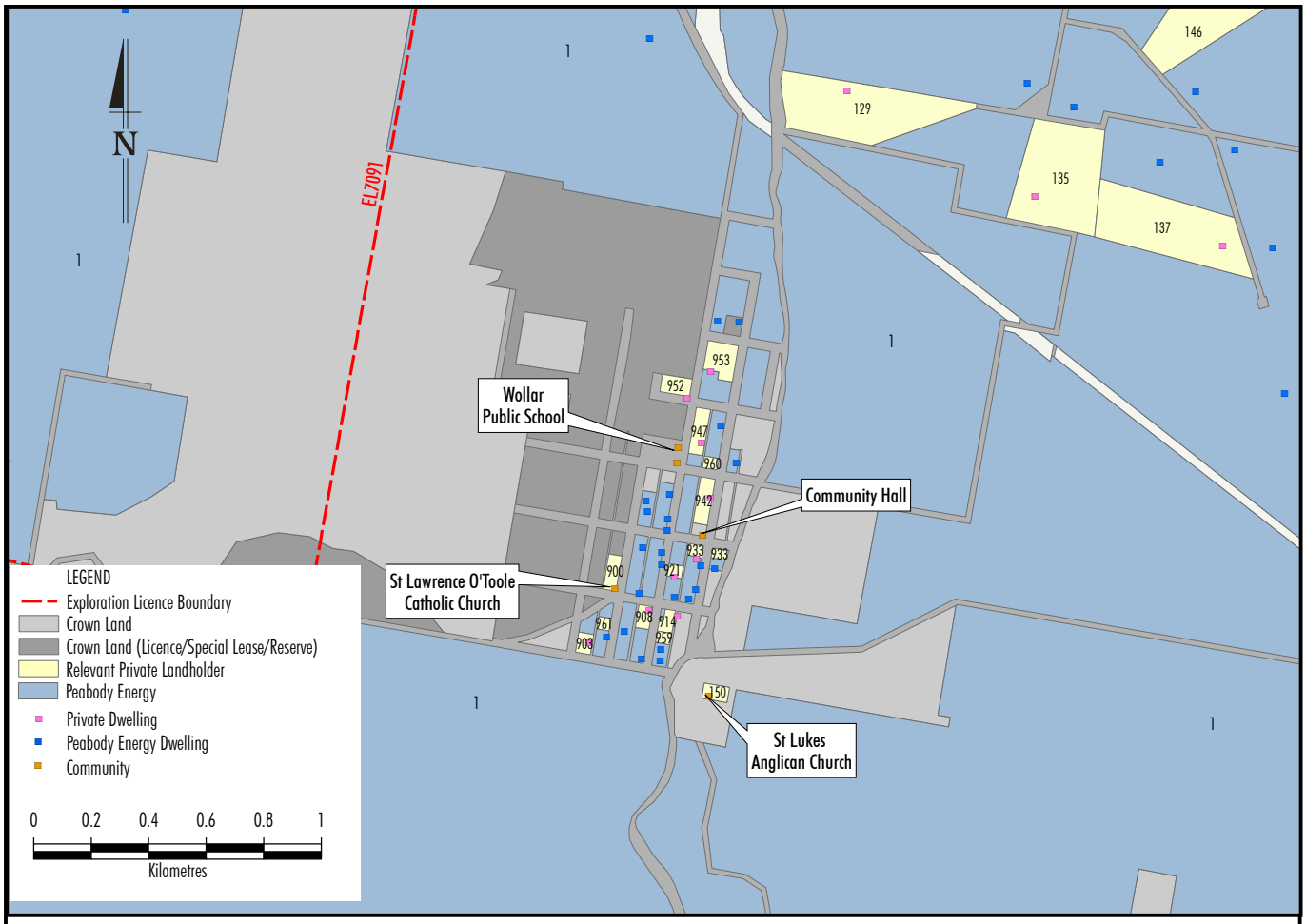

Ref No.	Landholder
1	Peabody Energy
30	William Gaffney
32	Ulan/Moolarben/Cascade Coal Controlled Land
69	DJ & JG Stokes
80	RB Cox
101	NAB Pierce
102	W Filipczyk
103	MR Molloy
104	J & I Hartig
106	JA Sales
107	RJ Lee
108	Crosse
109	MO Vaisey
113	AJ Brett & S & D Hilt
114	C Ware & N Parker
129	K & R Roser
135	K & R Roser
137	A & C Chetcuti
146	D & B Spearpoint
150	Edmund Tindale, Alexander McDonald, Will
153	Terrence William Marskell
160	B Smiles & A Smiles-Schmidt

Ref No.	Landholder
162	Special lease 1969/7 Daniel Ponton
167	G Jaques
169	J Asztalos
170	MB Cox
110	Patricia Ann Crosse
175	SF & MR Andrews
176	Shaun Rayner
178	TransGrid
900	Catholic Church
903	M Hardiman & D Hogan
908	A & A Lynch
914	Paul Warwick Nicod & Philip John Slade
921	EH Toombs
933	CR Faulkner
942	Robert & Susan Schneider
947	Scott & Jane Lillis
952	B & D O'Hara
953	B Marshall & R Muller
959	CJ Clarke
960	Scott Lillis
961	Jaques Family Investments P/L

Source: WCPL, 2013; NSW Trade & Investment, 2013 and Land & Property Information, 2013

WILPINJONG COAL MINE

FIGURE 4b

Wollar Inset and Relevant Land Ownership List
(refer to Figure 4a for Land Ownership Plan)

Resource Strategies

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The frequency of larger open cut blasts would increase as a result of the higher rates of waste rock production (Section 3.2.4), and the mining sequence would be adapted to include the additional open cut extension areas (Section 3.2.5).

The above variations to the approved Wilpinjong Coal Mine (the Modification) would not require any significant alteration to the existing approved mining operations and general supporting infrastructure.

In particular, no changes are proposed to the approved rates of production of ROM coal (15 Mtpa) or product coal (12.5 Mtpa) and the current Wilpinjong Coal Mine owner operator mobile fleet would not require augmentation.

The current operational workforce of approximately 550 WCPL employees and full-time equivalent on-site contractors would also be unchanged.

Construction of the belt press filter and augmentation of the existing reverse osmosis plant would require a temporary construction workforce of up to 20 people for a period of approximately six months in 2014.

Table 1 provides a comparative summary of the currently approved and proposed modified Wilpinjong Coal Mine. Figure 5 illustrates the general arrangement of the Wilpinjong Coal Mine incorporating the Modification.

1.3 CONSULTATION FOR THE MODIFICATION

State Government Agencies

WCPL consults with relevant State Government agencies on a regular basis in relation to the approved Wilpinjong Coal Mine.

Department of Planning and Infrastructure

A meeting was held with representatives of the Department of Planning and Infrastructure (DP&I) in November 2012 to provide an overview of the proposed Modification, environmental assessment requirements and provisional timing for lodgement of the Modification application.

WCPL subsequently provided an update on the Modification and provided an overview of draft results of the specialist studies to representatives of DP&I in June 2013.

In June 2013, the DP&I Manager Mining Projects, Major Project Assessments also visited the Wilpinjong Coal Mine site and attended a Community Consultative Committee meeting in Wollar, where the Modification was discussed and an overview of results was presented.

Environment Protection Authority

A meeting was held on-site at the Wilpinjong Coal Mine with representatives of the NSW Environment Protection Authority (EPA) in December 2012 and an overview of the Modification was provided.

Further consultation with representatives of the EPA was undertaken in June and July 2013, where WCPL provided a further update on the Modification and draft results of the specialist studies.

Office of Environment and Heritage

A representative of the National Parks and Wildlife Service (a division of the NSW Office of Environment and Heritage [OEH]) attended Wilpinjong Coal Mine Community Consultative Committee meetings in Wollar in November 2012 and in June 2013.

Further consultation with representatives of the OEH was undertaken in July 2013 to provide an overview of draft results of relevant specialist studies prepared for the Modification.

Division of Resources and Energy (within Department of Trade, Investment, Regional Infrastructure and Services)

In October 2012 a briefing on the Modification was provided to representatives of the NSW Division of Resources and Energy (DRE) within the Department of Trade, Investment, Regional Infrastructure and Services.

Further consultation with representatives of the DRE was undertaken in June 2013, where WCPL provided a further update on the Modification.

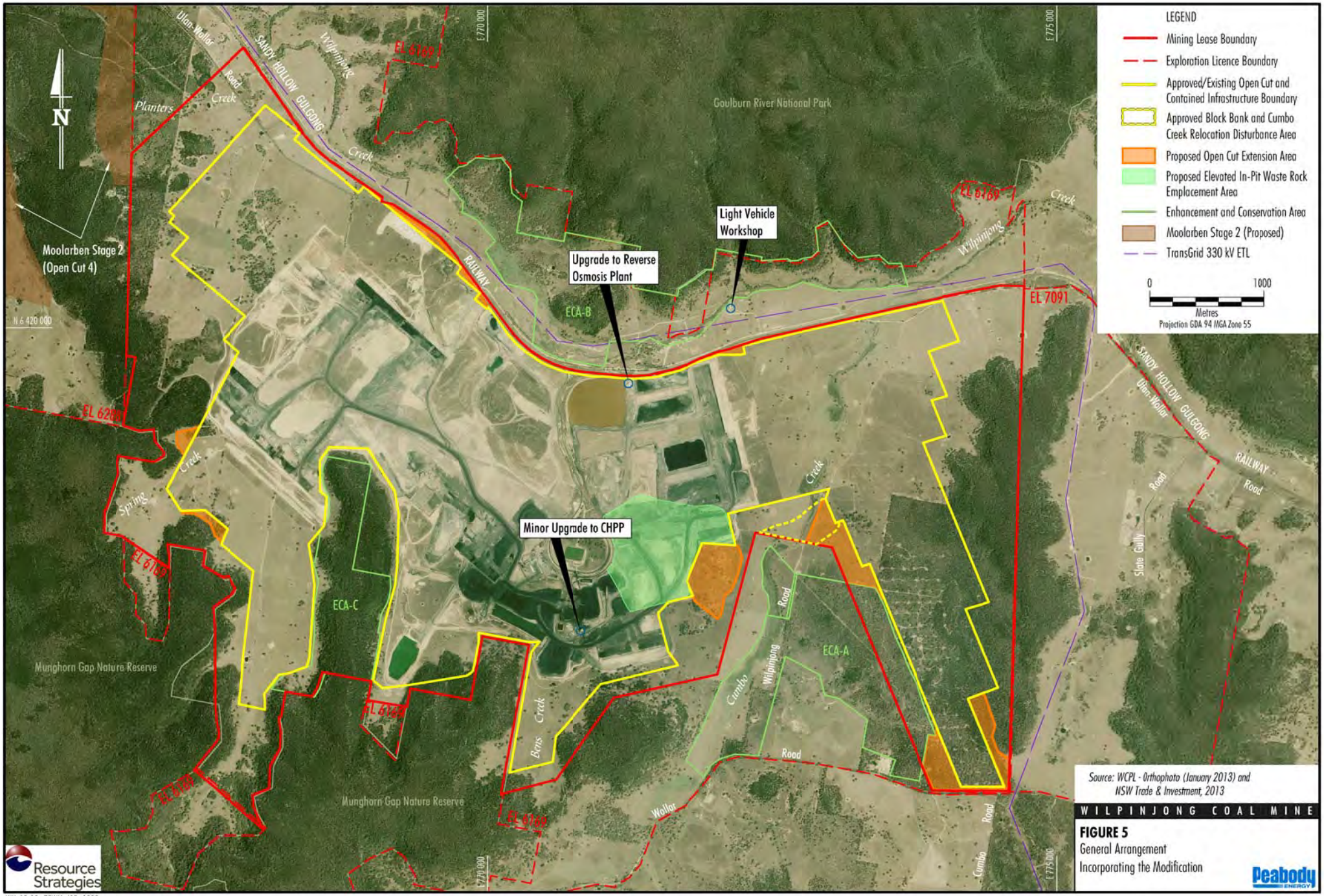
NSW Office of Water

Representatives of the NSW Office of Water (NOW) were provided an overview of the Modification in February 2013 in conjunction with consultation regarding renewal of open cut water licences for the existing approved mine.

Table 1
Summary Comparison of the Approved Wilpinjong Coal Mine and the Modification

Component	Approved Wilpinjong Coal Mine	Modified Wilpinjong Coal Mine
Mining Method	• Open cut mining operation extracting ROM coal.	• Unchanged.
	• Six open cut pits and associated contained infrastructure area.	• Minor extensions (comprising approximately 70 ha).
ROM Coal Production Rate	• Up to 15 Mtpa of ROM coal.	• Unchanged.
Total ROM Coal Mined	• 223.7 Mt.	• 208.1 Mt.*
Waste Rock Management	• Waste rock deposited predominantly within mined-out voids.	• Unchanged.
Waste Rock Production	• Annual waste rock production up to 28 Mbcm.	• Annual waste rock production up to approximately 33.3 Mbcm.
Total Waste Rock	• 366.6 Mbcm.	• 386.4 Mbcm.*
Coal Washing	• Operation of a CHPP capable of washing up to approximately 8.5 Mtpa of ROM coal.	• Up to approximately 9 Mtpa of coal washing in the CHPP and removal of the beneficiation limit from the Project Approval.
Product Coal	• Production of up to 12.5 Mtpa of product coal.	• Unchanged.
Coal Rejects (tailings and coarse rejects)	• Coal rejects placed predominantly within mined-out voids.	• Unchanged. • Tailings belt press filter to be installed to allow co-disposal of tailings with coarse reject (subject to feasibility and engineering design).
Water Supply	• Make-up water demand to be met from runoff recovered from mine operational areas, recovery from tailings disposal areas, open cut dewatering, advanced dewatering of pit areas and supply from a borefield.	• Unchanged. • Subject to feasibility studies, recovery of water from tailings via belt press filter.
Water Disposal	• Mine water treated in a reverse osmosis plant and discharged to Wilpinjong Creek in accordance with Environment Protection Licence (EPL) 12425.	• Unchanged. • Upgrade of the reverse osmosis plant to a water treatment facility (include pre-filtration and flocculation/dosing facilities to improve plant efficiency).
Project Life	• 21 years (from the date of grant of a mining lease).	• Unchanged.
Product Coal Transport	• An average of six and a maximum of 10 laden trains per day leaving the mine. • Transport via the Sandy Hollow-Gulgong Railway.	• Unchanged.

* Based on current WCPL geological modelling and may vary as further coal quality data is collected.



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In July 2013, representatives of NOW indicated that a further meeting to discuss the Modification was not required. However, a written briefing including an update on the Modification and key findings of the groundwater and surface water specialist assessments was provided to the Manager Strategic Stakeholder Liaison.

Crown Lands

WCPL met with representatives of the NSW Department of Primary Industries (DPI), Catchment and Lands (Crown Lands Division) in February and April 2013 and provided a briefing on the Modification.

Mid-Western Regional Council

The Wilpinjong Coal Mine is wholly located within the Mid-Western Regional LGA and WCPL regularly consults with Mid-Western Regional Council (MWRC) in relation to mine development, infrastructure and services to the community for the existing Wilpinjong Coal Mine.

A briefing on the Modification was provided to the key staff of the MWRC in December 2012. In addition, a representative of the MWRC attends quarterly Wilpinjong Coal Mine Community Consultative Committee meetings.

At the time of writing, a further meeting with executive representatives of the MWRC was scheduled in early August 2013 to update Council on the draft findings of specialist assessments and to discuss the current Voluntary Planning Agreement and the Ulan Road Strategy.

Local Community

A Community Consultative Committee has been established for the Wilpinjong Coal Mine in accordance with Project Approval 05-0021 (Attachment 1). The Community Consultative Committee provides a mechanism for ongoing communication between WCPL and the local community. Consultation regarding the Modification was undertaken at the Community Consultative Committee meetings in November 2012, March 2013 and June 2013.

WCPL has undertaken individual consultation with private landholders and lessees that reside in the vicinity of the mine to discuss the ongoing development of the Wilpinjong Coal Mine and the Modification.

In the period November 2012 to July 2013, WCPL met on at least one occasion with some seven Wollar resident landowners, two non-resident Wollar landowners, the owner of the remaining private property adjacent to the mine (vacant non-resident), three property owners on Araluen Road, three property owners on Barigan Road and one resident on Mogo Road to discuss the Modification. In addition, WCPL consulted with a representative of the Wollar Public School, Wollar General Store, and a number of pastoral lessees and residential tenants of Peabody Energy land in the vicinity of the mine.

In 2013, WCPL also consulted with a number of private landholders in the Wollar area regarding potential negotiated agreements and instigated a regular “Have a Chat” drop in session on the first Thursday of every month at the Wollar General Store.

At the drop in sessions, members of the local community can meet with representatives of WCPL and discuss any concerns or issues. The Modification was the subject of a number of discussions at these monthly sessions.

In November 2012 and July 2013 WCPL prepared community information leaflets (Attachment 2) that provided an overview of the proposed Modification and the associated assessment process and made the leaflets available at the Wollar General Store and provided copies of the leaflets to private landholders when meeting individually, or at the drop in sessions.

Consultation with the Aboriginal community regarding the Modification was conducted in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (Department of Environment, Climate Change and Water [DECCW], 2010a) (Section 4.10).

Key environmental issues that were raised during consultation included operational noise, spontaneous combustion (odour), blasting, traffic and management of Aboriginal heritage. Consideration of the environmental impacts of the Modification, including these issues, is provided in Section 4.

1.4 STRUCTURE OF THIS DOCUMENT

An outline of the main text sections of this EA is presented below:

Section 1	Provides an overview of the Wilpinjong Coal Mine, the Modification and the consultation undertaken in relation to the Modification.
Section 2	Provides a description of the existing Wilpinjong Coal Mine.
Section 3	Provides a description of the Modification.
Section 4	Provides an environmental assessment of the Modification and describes the existing WCPL environmental management systems and measures that would be available to manage and monitor any potential impacts.
Section 5	Describes the general statutory context of the Modification and identifies Project Approval conditions and site management documents that would require revision in support of the Modification.
Section 6	References.

Attachments 1 and 2 and Appendices A to K provide supporting information as follows.

Attachment 1	Consolidated Project Approval
Attachment 2	Community Information
Appendix A	Noise and Blasting Impact Assessment
Appendix B	Air Quality Impact Assessment
Appendix C	Groundwater Assessment
Appendix D	Surface Water Assessment
Appendix E	Terrestrial Flora Assessment
Appendix F	Terrestrial Fauna Assessment
Appendix G	Aboriginal Cultural Heritage Assessment
Appendix H	Road Transport Assessment
Appendix I	Agricultural Resource Assessment
Appendix J	Socio-Economic Assessment
Appendix K	Environmental Risk Assessment

2 EXISTING WILPINJONG COAL MINE

2.1 APPROVALS HISTORY

The Wilpinjong Coal Project Environmental Impact Statement (the EIS) (Resource Strategies, 2005) was originally prepared by WCPL in accordance with Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act), however, it was accepted by the Director-General of the Department of Planning under clause 8J(2) of the NSW *Environmental Planning and Assessment Regulation, 2000* (EP&A Regulation) as an Environmental Assessment for the purpose of Part 3A of the EP&A Act.

The Wilpinjong Coal Mine was approved under Part 3A of the EP&A Act by the NSW Minister for Planning on 1 February 2006 (Project Approval 05-0021) and has been modified on three previous occasions.

In April 2007, WCPL submitted an application to modify Project Approval 05-0021 under section 75W of the EP&A Act to address the following minor modifications to the approved Wilpinjong Coal Mine:

- increasing the permitted frequency of blasting to a maximum of two blasts per day (and five blasts per week on average over any 12 month period); and
- changing the primary mine access route to be along Ulan Road and Ulan-Wollar Road, rather than Ulan Road and Wollar Road.

This modification was approved by the NSW Minister for Planning on 30 November 2007.

In May 2010, WCPL submitted an application to modify Project Approval 05-0021 under section 75W of the EP&A Act to increase the maximum ROM coal production rate from 13 Mtpa to 15 Mtpa (the Mining Rate Modification). The change in production also involved an increased mining fleet and an increase in the average number of train movements departing the site from four to five movements per day. The Mining Rate Modification (known as 'Mod 3') was approved by a delegate of the NSW Minister for Planning on 8 September 2010.

In September 2011, WCPL submitted an application to modify Project Approval 05-0021 under section 75W of the EP&A Act to address the following modifications to the approved Wilpinjong Coal Mine (the 2011 Modification):

- increase the maximum product coal from 12 to 12.5 Mtpa;
- increase the number of laden coal trains leaving the site to six per day on average and 10 at maximum; and
- install and operate a reverse osmosis plant on-site to treat excess mine water in accordance with the site EPL 12425.

The 2011 Modification (known as 'Mod 4') was approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning and Infrastructure) on 24 August 2012.

The consolidated Project Approval, incorporating the above modifications, is provided in Attachment 1.

2.2 CONSTRUCTION

The majority of the existing Wilpinjong Coal Mine facilities were constructed in 2006/2007, including the office administration complex, ROM pad, CHPP and rail spur, rail loop and rail loading infrastructure.

Additional infrastructure construction activities have occurred as required over the life of the mine, with significant CHPP and materials handling upgrades occurring following approval of the Mining Rate Modification in September 2010.

In 2012/2013 the reverse osmosis plant and a new workshop were constructed, and major mobile plant items associated with the new owner operator fleet were assembled on-site.

2.3 OPEN CUT MINING

The approved open cut and contained infrastructure area at the Wilpinjong Coal Mine (Figure 3) comprises an area of approximately 1,920 ha. Mining at the Wilpinjong Coal Mine commenced in September 2006.

The mining operation uses bulk push dozers and hydraulic excavators to mine coal and overburden in a strip mining configuration and operates 24 hours per day, seven days per week.

Steady state mining consists of a combination of truck and excavator mining and dozer bulk pushing of blasted overburden into the previous strip void, followed by the removal of coal and interburden.

Coal and interburden are mined in a similar manner to the overburden where dozers are used to rip and push the coal/interburden, followed by truck loading using excavators. Some interburden blasting is also required, depending on the thickness and hardness of the material. Overburden and interburden that is not bulk pushed with dozers is hauled into the previous strip void using haul trucks.

Open cut blasting is undertaken in accordance with the blast limits described in Conditions 9 and 10 of Schedule 3 of the Project Approval (Attachment 1) that include limitations on the days, time, frequency and size of blasts that can be undertaken.

ROM coal is mined at a rate of up to 15 Mtpa and transported by haul trucks along internal haul roads to the ROM pad where it is directly dumped into the ROM hopper or is temporarily stockpiled and then rehandled to the hopper.

2.4 COAL HANDLING AND PREPARATION

The Wilpinjong Coal Mine produces both washed and unwashed coal products. The coal handling and processing infrastructure has been designed to accommodate the processing of raw coal and the handling of raw (bypass) and washed product coal.

Materials handling systems and the CHPP were upgraded following the approval of the Mining Rate Modification in 2010 and the current layout is shown on Figure 6.

Stockpiles located near the infrastructure area are used to stockpile ROM coal (Figures 2 and 6), with the ROM coal stockpiles having a capacity of over 1.5 Mt.

WILPINJONG COAL MINE

FIGURE 6
CHPP and Materials Handling Area

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Due to previous spontaneous combustion events on ROM coal stockpiles that were held on-site for an extended period, WCPL has put in place a risk identification system, whereby coal stockpiles that have a higher propensity to spontaneously combust are closely monitored (including physical inspections at eight hour intervals and/or use of thermal probes to identify areas of heating). In addition, after select ROM coal types have been stockpiled on-site for a designated period, they are prioritised for washing in the CHPP, to reduce the risk of spontaneous combustion events occurring in ROM coal.

Following ROM coal sizing, a slewing radial stacker deposits unwashed coal directly to two high ash and mid ash unwashed product stockpiles, or to a raw coal stockpile for processing in the CHPP. Following processing in the CHPP, two product stacking conveyors deposit washed coal to two further product stockpiles.

Wilpinjong Coal Mine has a combined capacity of approximately 500,000 tonnes for the stockpiling of washed and unwashed coal products that are reclaimed via four coal valves for loading to trains and transport off-site.

The CHPP operates up to 24 hours per day, seven days per week and the Project Approval currently allows for the beneficiation of up to 8.5 Mt of ROM coal in the CHPP per year.

2.5 PRODUCT COAL TRANSPORT

A train loading facility capable of loading coal at a rate of 4,000 tonnes per hour is located at the head of the rail loop within the mine infrastructure area. Coal is reclaimed from two alternative product feed conveyors that run the length of the product coal stockpiles.

Product coal is loaded onto trains 24 hours per day, seven days per week.

An average of six trains are loaded each day and a maximum of 10 trains per day are loaded during peak coal transport periods.

Coal is railed east to domestic power generation customers and the Port of Newcastle for export. No coal is railed west of the Wilpinjong Coal Mine.

2.6 WASTE ROCK MANAGEMENT

With the exception of initial boxcut development, overburden and interburden or partings material is progressively placed back in-pit once the coal has been mined.

A combination of temporary and permanent out-of-pit waste rock emplacements are located adjacent to the open cut mining operations. Mine waste rock emplacements behind the advancing open cut are constructed to approximate the pre-mining topography.

Spontaneous combustion events have been occurring in temporary waste rock emplacements that were constructed at the commencement of the Wilpinjong Coal Mine, before the higher spontaneous combustion propensity of some carbonaceous waste materials was identified.

WCPL now manages waste rock material that has elevated levels of carbonaceous material (e.g. E and G partings) to emplace this material on the floor of mining voids, and covers it with inert waste rock material as a component of general ROM operations.

In addition, in 2013 WCPL is undertaking a general review of carbonaceous waste material management, including:

- improved material characterisation of waste and interburden material to identify spontaneous combustion propensity;
- evaluation of alternative mining methods (e.g. dozer push or pre-strip) for key strata that has elevated spontaneous combustion propensity;
- review of the construction methods employed for waste rock emplacements including management of carbonaceous material;
- revision of the life-of-mine waste handling and emplacement strategy to incorporate any appropriate revisions to mining and emplacement methods;
- revision of the existing Spontaneous Combustion Management Plan (WCPL, 2006a) to address any management improvements; and
- implementation of a remediation strategy for existing temporary waste rock emplacements that would see these spontaneous combustion high risk areas resolved by re-mining and deposition of the material in mine voids or encapsulation by the end of 2015.

2.7 COAL REJECT MANAGEMENT

The tailings produced from the CHPP consist of fine rejects and slimes from the thickener. CHPP tailings are pumped as a slurry and deposited in purpose-built tailings dams constructed within mined out voids. Internal walls of tailings emplacements are constructed of a combination of *in situ* and dumped overburden material.

Once tailings disposal areas are near-filled, they are progressively capped with overburden material to a minimum depth of cover of 2 m prior to final profiling and rehabilitation.

CHPP coarse coal reject material is hauled back to the mining operation and deposited below the natural surface in the mined-out voids. Coarse reject material is dispersed throughout the overburden within the mine waste rock emplacements to manage its geochemical characteristics (i.e. acid generation potential).

Coarse rejects are placed so there is sufficient coverage by non-acid forming overburden to reduce oxygen movement through the rehabilitated profile, which also assists to minimise spontaneous combustion potential within the rehabilitated waste rock emplacement landform.

2.8 WATER MANAGEMENT

The water management strategy for the Wilpinjong Coal Mine is based on the containment and re-use of mine water as well as the control of sediment that may be potentially carried with runoff from disturbed areas such as the waste rock emplacements or areas cleared in advance of mining. Undisturbed area runoff is separated from disturbed area runoff by upslope diversions.

Water is required to operate the CHPP, for washdown of mobile equipment, dust suppression on haul roads and for dust emission control sprays in the ROM and product coal stockpile areas. The main water sources for the operation are:

- recovery from tailings;
- groundwater inflows into the open cut voids;
- catchment runoff and infiltration;
- groundwater extraction from licensed bores; and
- potable water imported to site.

Process water used to wash coal is recycled from the current tailings emplacement/water storage via the recycled water dam with any necessary make-up water obtained from the raw water dam located within the rail loop.

The majority of the Wilpinjong Coal Mine make-up water supply requirements to date have been met by dewatering of the open cut mining areas.

In accordance with EPL 12425, the Wilpinjong Coal Mine is also permitted to discharge up to 5 megalitres per day (ML/day) of excess mine water to Wilpinjong Creek, providing the discharge meets certain requirements, including an upper limit on electrical conductivity (EC) of 500 microSiemens per centimetre (µS/cm).

The water balance of the system fluctuates with climatic conditions and as the extent of the mining operations changes over time. The water management system is progressively developed as water management requirements evolve in accordance with the Site Water Management Plan.

As part of a review of the operational performance of the existing Wilpinjong Coal Mine water management system, WCPL is implementing a number of system upgrades to reduce the longer-term risk of spill from 'Ed's Lake'[1] under exceptionally high rainfall events. These system upgrades include increases to pumping rates and bypass of Ed's Lake as a staging storage. WCPL will also review the capacity and spill path of this storage.

2.9 GENERAL INFRASTRUCTURE

2.9.1 Site Access

The primary route from Mudgee to the site is via Ulan Road and Ulan-Wollar Road (Figures 1 and 2). Primary access to the site from Ulan-Wollar Road is via an internal sealed mine access road connecting the mine facilities area to the Ulan-Wollar Road.

For environmental monitoring, general land management, exploration activities and other ancillary activities, alternative access points to the Project Application area are also used as required.

[1] Ed's Lake is a small storage dam within the mined out northern end of Pit 1 that receives runoff from partially rehabilitated waste rock emplacements and other active mining areas.

2.9.2 Mine Facilities Area

The mine facilities area is constructed on a hardstand located to the south-west of the rail loop (Figure 2). The mine facilities area includes a workshop, storage building, office buildings (including a crib shed, bath house and first aid room), muster area and a range of service facilities (i.e. potable water, sewerage, electricity, fire services and hydrocarbon management). Car parking areas in the mine facilities area are sealed.

2.9.3 Dangerous Goods/Wastes

Hydrocarbon Storages

Hydrocarbons used on-site include fuels (i.e. diesel and petrol), oils, greases, degreaser and kerosene.

Two bunded 88,000 litre (L) and one 110,000 L diesel storage tanks are located on-site. Oil is stored in two 28,000 L self-bunded double-skinned oil storage tanks, and a 110,000 L self bunded multiple compartment hydrocarbon storage tank is also maintained for storage of coolant and oil. Two shipping containers are used for the storage of oil and grease pods. Flammable paints are stored on a containment pallet in a fenced compound, as well as in a locked cabinet inside the workshop.

Hydrocarbon storage facilities are constructed and operated in accordance with Australian Standard (AS) 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids* and the NSW *Work Health and Safety Regulation, 2011*.

The workshop infrastructure includes waste oil extraction equipment. An oil/water separator is located downslope of the workshop area, and a manually operated oil/water separator is located at the vehicle washdown bay area. All waste hydrocarbons collected in the separators are disposed of by a licensed contractor.

The hydrocarbon storage and management facilities are currently being upgraded as a component of the owner operator transition. These facilities include two new oil/water separators for the expanded workshop, hydrocarbon storage and refuelling areas and a new fuel and oil dispensing facility south of the workshop.

Explosives Storage

Explosives required for the Wilpinjong Coal Mine include initiating products and detonators, ammonium nitrate fuel oil and emulsion explosives. The explosives storage and blast reload facilities are currently located in the south-west of Pit 1.

Explosives on-site are stored and used in accordance with AS 2187.2:2006 *Explosives – Storage, Transport and Use – Use of Explosives*. AS 2187.2:2006 details the requirements for the safe storage, handling and land transport of explosives, safe storage distances from other activities and bunding requirements.

Liquid and Non-Liquid Wastes

Solid and hazardous waste generated by the mine is removed from the site and disposed of by a licensed contractor.

In accordance with EPL 12425, waste tyres are disposed of on-site in the waste rock emplacements.

Sewage is treated in an on-site sewage treatment plant which is serviced by a licensed contractor on a monthly basis. The treated effluent is used for irrigation within the rail loop and/or the CHPP area.

Waste materials are collected and sorted for recycling of paper, cardboard, metals, glass, air filters and oil filters.

2.9.4 Haul Roads

All coal is hauled on internal roads, and all product coal is transported by rail. Internal haul roads are progressively constructed between the open cut operations, mine waste rock emplacements and ROM coal stockpiles as required.

As mining advances, the coal haul road is re-established in the highwall to optimise the haul distance from the open cut operation to the ROM coal stockpile. Haul roads are regularly watered to minimise dust generation.

2.9.5 Electricity Supply and Distribution

The Wilpinjong Coal Mine receives electricity from a 66 kilovolt (kV) supply system. Power is distributed by overhead cable or underground cable where necessary.

2.9.6 Potable Water

Potable water is provided by a 35,000 L storage tank located in the mine facilities area. Potable water is delivered by truck to the storage tank. The potable water supply reticulation system services the appropriate areas around the site (e.g. office buildings, crib rooms and maintenance areas).

2.9.7 Ancillary Infrastructure

The Wilpinjong Coal Mine is supported by a range of ancillary infrastructure that are periodically relocated, modified or expanded as mining operations progress. Such components include water management features (e.g. bores, pipelines, pumps, drains and dams), environmental monitoring equipment, electricity supply, equipment such as communication towers, in-pit facilities including bulk fuel handling and personnel crib huts/ ablution facilities.

2.10 WORKFORCE

The current total combined WCPL employee and full-time equivalent on-site contractor workforce is approximately 550 people.[2]

2.11 REHABILITATION

Rehabilitation occurs progressively at the Wilpinjong Coal Mine as ancillary disturbance areas and final mine landforms become available for revegetation, to minimise the area of disturbance at any one time.

Completed tailings disposal areas are decommissioned through a capping process to create a final landform that is stable and can be rehabilitated and revegetated.

The final landform levels and topography of the backfilled mine landforms are to generally approximate the pre-mining topography and are designed with an allowance for the long-term settlement of mine overburden and tailings.

Final drainage is designed to generally integrate with the surrounding catchment and includes some permanent drainage features similar to the pre-mining topography.

The Wilpinjong Coal Mine Rehabilitation Management Plan (WCPL, 2011a) outlines the rehabilitation objectives for three key forms of rehabilitation areas at the mine (i.e. rehabilitation areas, Regeneration Areas and Enhancement and Conservation Areas [ECAs]) that would contribute to the linking of woodland vegetation across the site and surrounding reserved lands.

The rehabilitation objectives for rehabilitation areas are as follows:

- To create safe, stable, adequately drained post-mining landforms that are consistent with the local surrounding landscape.
- To produce a net increase in woodland vegetation relative to the pre-mining landscape.
- To increase the continuity of woodland vegetation by establishing links between woodland vegetation in the rehabilitation areas, Regeneration Areas and existing remnant vegetation in the Munghorn Gap Nature Reserve, Goulburn River National Park and the ECAs.
- To preserve the existing beneficial use of water resources.

The current revegetation strategy recognises the alternative land uses that exist in the region, with the aim of establishing the potential for both sustainable agriculture and woodland vegetation. Appendix 4 of Project Approval 05-0021 (Attachment 1) provides a conceptual rehabilitation plan for the approved Wilpinjong Coal Mine.

To December 2012, approximately 208 ha of rehabilitation had been undertaken at the Wilpinjong Coal Mine (WCPL, 2013).

Rehabilitation monitoring was conducted in September 2012 by Landline Consulting (2012a) across seven monitoring sites located in rehabilitation areas. Landline Consulting concluded that the rehabilitation on mine spoil areas was good, with high groundcover and herbage yields and adequate density of tree and shrub species.

Potential incremental improvements to rehabilitation techniques were identified including:

- seeding with an increased number of tree and shrub species;
- lime application in areas of strongly acid surface soils;
- additional phosphorous application; and
- annual soil fertility monitoring.

Plates illustrating areas of existing rehabilitation at the Wilpinjong Coal Mine woodland and pasture areas are provided on Figure 7.

[2] The current WCPL workforce is greater than the operational workforce described in the Mining Rate Modification (350 people). The traffic generation associated with the current operational workforce is considered in Appendix H.

Locations of Photographs - Plates A - D

Plate A Mixed Woodland/Pasture Rehabilitation Area

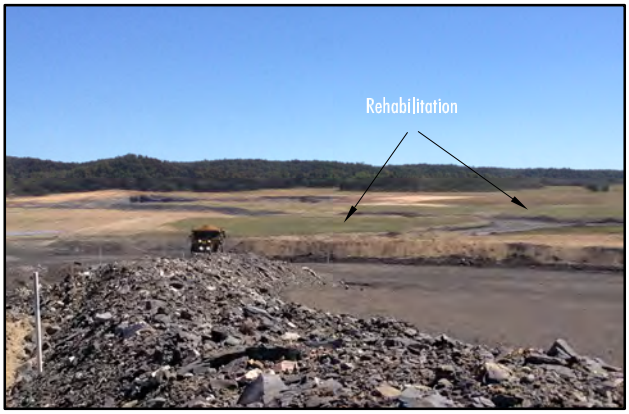

Plate B Pasture Rehabilitation Area

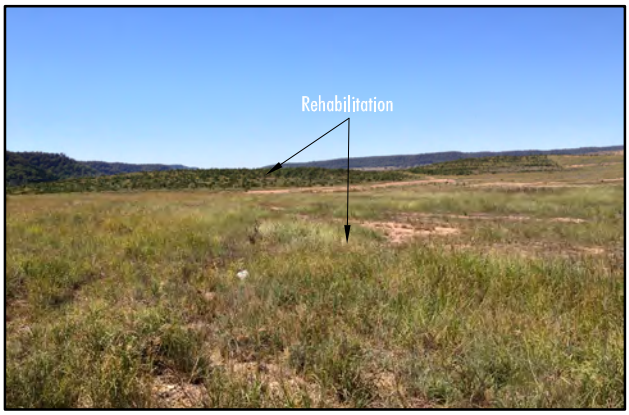

Plate C Pasture Rehabilitation Area

Plate D Mixed Woodland/Pasture Rehabilitation Area

WILPINJONG COAL MINE

FIGURE 7
Plates Illustrating Existing
Wilpinjong Coal Mine Rehabilitation

Resource Strategies

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WCPL is currently undertaking a general review of rehabilitation progress, criteria and procedures, including:

- review of final land use targets and rehabilitation planning and proposed completion criteria based on rehabilitation progress and experience to date;
- continued and expanded rehabilitation trials to examine alternative rehabilitation treatments and use of ameliorants including gypsum, lime and biosolids, and the capacity of rehabilitated pasture areas to sustain livestock grazing;
- review of the current conceptual final landform based on any revisions to final land use targets;
- continued and expanded monitoring of rehabilitation areas against updated rehabilitation completion criteria; and
- development of a Trigger Action Response Plan to address any underperforming rehabilitation areas.

The existing Rehabilitation Management Plan (WCPL, 2011a) will be updated to address any changes arising from the review.

2.12 ENHANCEMENT AND CONSERVATION AREAS

Wilpinjong Coal Mine has established three ECAs that are managed under a voluntary conservation agreement with the NSW Minister administering the NSW *National Parks and Wildlife Act, 1974* (NPW Act) and comprise approximately 514 ha of land[3].

These ECAs (namely, ECA-A, ECA-B and ECA-C) are situated on land which contains remnant vegetation and proximal grazing land, as well as known and potential Aboriginal cultural heritage sites and have recognised conservation values including an endangered ecological community.

Management measures implemented within the ECAs include enhancement strategies such as fencing, selective planting, weed and animal pest control and fire management.

[3] In accordance with Condition 37, Schedule 3 of the Project Approval, appropriate long-term security for the ECAs was established by securing a Voluntary Conservation Agreement. The boundaries of the ECAs in the Voluntary Conservation Agreement with the Minister vary in some respects to the boundaries shown in Appendix 3 of the Project Approval, including an increased total area of land set aside in the ECAs.

2.13 REGENERATION AREAS

Regeneration Areas (which at the commencement of mining predominantly comprised cleared agricultural land) have been established on areas of land that will be proximal to the Wilpinjong Coal Mine rehabilitation. The Regeneration Areas have been set aside to establish woodland vegetation and to link the mine rehabilitation areas to remnant vegetation associated with the Goulburn River National Park, Munghorn Gap Nature Reserve and ECAs.

2.14 ENVIRONMENTAL MANAGEMENT AND MONITORING

Wilpinjong Coal Mine has an Environmental Management Strategy in place that has been developed to minimise environmental impacts by providing the strategic context for environmental management of the site. Wilpinjong Coal Mine also places great emphasis on building strong relationships with its neighbours.

The Environmental Management Strategy was formulated from the requirements of Project Approval 05-0021 and sets out to:

- Identify the statutory requirements that apply to the Wilpinjong Coal Mine.
- Describe how:
  - environmental performance is monitored and managed;
  - the local community and relevant agencies will be kept informed about the operation and environmental performance;
  - complaints will be received, handled, responded to and recorded;
  - disputes will be resolved;
  - non-compliance issues will be responded to;
  - cumulative impacts will be managed; and
  - emergencies will be responded to.
- Describe the roles, responsibilities, authority and accountability of all the key personnel involved in environmental management of the Wilpinjong Coal Mine.

Management and monitoring plans and control strategies have been developed in consultation with relevant agencies as part of the Wilpinjong Coal Mine's Environmental Management Strategy. In accordance with Condition 4, Schedule 5 of Project Approval 05-0021, these plans and strategies are periodically updated. These monitoring programmes and control strategies are briefly described below:

- A Noise Management Plan (NMP) that details real-time noise monitoring, attended and unattended noise monitoring, operational noise performance and corrective action mechanisms.
- A Blast Management Plan that provides blasting management measures and a monitoring programme to measure ground vibration and airblast overpressure.
- An Air Quality and Greenhouse Gas Management Plan that summarises relevant air quality criteria, identifies potential sources of dust, provides air quality monitoring locations, presents the protocols for air quality monitoring and greenhouse gas management measures.
- A Site Water Management Plan and associated appendices that addresses the management and monitoring of surface water and groundwater resources comprising:
  - a Site Water Balance;
  - an Erosion and Sediment Control Plan;
  - a Surface Water Management and Monitoring Plan;
  - a Groundwater Monitoring Programme; and
  - a Surface and Ground Water Response Plan.
- A Rehabilitation Management that describes management strategies including landform design, topsoil management, rehabilitation management measures, management of flora and fauna, a rehabilitation monitoring programme and completion criteria.
- An Aboriginal Cultural Heritage Management Plan and North Eastern Wiradjuri Cultural Heritage Management Plan (ACHMP) to assist in the investigation, salvage and management of Aboriginal heritage sites.
- A Spontaneous Combustion Management Plan which describes the management measures to minimise spontaneous combustion through the monitoring of potential causes of spontaneous combustion and the management of any identified areas of self heating.
- A Bushfire Management Plan that describes bushfire risks, hazards and management.
- A Pollution Incident Response Management Plan that details incident response and notification/communication measures, potential pollutants, a risk assessment and potential contingency measures.

2.15 COMMUNITY CONTRIBUTIONS

WCPL financial contributions to the MWRC in accordance with Wilpinjong Coal Mine Planning Agreements and the Project Approval include:

- an initial payment of $450,000 prior to the first shipment of coal from the site;
- an annual payment of $70,000 per year for community infrastructure and road maintenance contributions;
- $20,000 per year for the period 2007 to 2009 to assist with the development of school bus lay-by areas along Ulan Road;
- a $600,000 contribution to road upgrades that was negotiated as a component of the Mining Rate Modification (Attachment 1);
- either $50,000 cash or the equivalent value in gravel to be used by MWRC for the upgrading of Ulan-Wollar Road; and
- additional annual community infrastructure and amenity contributions that are calculated using a formula in the Project Approval that correlates the relative monetary contribution to the total site workforce (currently 550 people) (Attachment 1).

Ulan Coal Mines, Moolarben Coal Mines, MWRC and WCPL are also co-funding implementation of the Ulan Road Strategy that will result in significant upgrades to Ulan Road (Section 4.11).

WCPL also makes financial and in-kind contributions to a number of non-government and community organisations in the region. WCPL financial contributions (in the form of sponsorships, donations and in kind support) to various education, community development, health, environmental, arts, culture, and youth services causes in the region in 2012 totalled over $80,000 and in 2013 is expected to total more than $100,000.

Examples of recent financial contributions have included support for Wollar rural fire brigade, various community health initiatives including, accommodation for University of Wollongong medical students in Mudgee during clinical placements, contributions to regional schools and support of the Black Nugget Cup.

2.16 COMPLAINTS

In accordance with the requirements of the Environmental Management Strategy and Project Approval (Attachment 1), WCPL records and responds to all complaints and provides a complaints register summary in the Annual Review each year.

In 2012, a total of 99 complaints were received (WCPL, 2013) from some 26 complainants. The majority of complaints received were related to noise, however other complaint subjects included issues such as odour/spontaneous combustion, dust and blasting.

In the period 1 January to 30 June 2013, a total of 75 complaints were received. The highest number of complaints was related to odour/spontaneous combustion (30), however, other complaint subjects included noise, blasting and dust.

Mine-related complaints are managed in accordance with the Complaints Response Procedure as outlined in the Environmental Management Strategy.

3 MODIFICATION

The Modification would not require any significant alteration to the existing approved Wilpinjong Coal Mine operations and general supporting infrastructure.

A description of the Modification is provided below.

3.1 CONSTRUCTION

Specific construction activities associated with the Modification (i.e. outside of the normal development activities associated with mining such as progressive development of water management infrastructure) would be limited to minor infrastructure upgrades which would be undertaken for a period of approximately six months in 2014.

These include augmentation of the reverse osmosis plant to a water treatment facility, construction of the belt press filter at the CHPP and its associated conveyors (and/or froth flotation recovery system) and establishment of the light vehicle workshop facility (in an existing building).

The construction workforce associated with these activities would be minor (up to 20 people).

3.2 OPERATIONS

3.2.1 Open Cut Extent

Following a review of WCPL ongoing infill exploration drilling results and updates to Wilpinjong Coal Mine geological models, WCPL has determined that development of minor open cut extension areas that immediately adjoin the existing approved open cut limits would result in the recovery of approximately 3 Mt of additional ROM coal over the life of the mine.

The Modification open cut extension areas would include the following minor alterations to the open cut disturbance areas (Figure 5):

- extensions to the southern and western boundaries of Pit 3;
- an extension in the south of Pit 2 that would remove a portion on an existing minor ridgeline;
- extensions to the south and west of Pit 5; and
- variations to the open cut limits to the north of the site to follow the Mining Lease (ML) 1573 boundary.

All of the open cut extensions are wholly within the boundary of ML 1573 and the approved Project Application area.

These extensions (approximately 70 ha) represent an increase of less than 5 percent (%) on the existing approved open cut and contained infrastructure area which covers approximately 1,920 ha.

In some areas, the open cut extensions overlap with ancillary disturbance areas associated with the approved mine and hence land disturbance associated with the Modification would be less than 70 ha (Section 4.8.2).

The open cut mining sequence would be adapted to include the additional open cut extension areas (Section 3.2.5). Relevant changes to the mining sequence and mining activities would be approved by the DRE via revision of the Mining Operations Plan (or similar) as required.

3.2.2 Waste Rock Production and Management

The revised Wilpinjong Coal Mine geological modelling indicates that there would be additional waste rock material within the existing approved open cut limits and the proposed extension areas. In order to maintain approved ROM coal production, higher rates of annual waste rock production would be required (from 28 Mbcm up to approximately 33.3 Mbcm). Equipment utilisation would increase, however, no additional mobile fleet would be required to move the additional waste rock.

An elevated waste rock emplacement would be constructed in the south of Pit 2 (Figure 5). This elevated emplacement would be constructed in two short campaigns in 2014 to approximately 450 m AHD, before being reshaped and lowered to approximately 430 m AHD at the end of the mine life as a component of finalising site landforms.

In addition to the general spontaneous combustion management measures outlined in Section 2.6, to minimise the risk of spontaneous combustion occurring in the elevated waste rock emplacement prior to final rehabilitation, a number of additional measures would be employed, including:

- The emplacement would be designed and constructed with designated carbonaceous material zones to avoid future exposure of the carbonaceous material (i.e. to maintain a minimum of 5 m of compacted inert material coverage over the carbonaceous material, including following final land forming).
- The emplacement would be constructed with diversion drains, lined drains and armoured drop structures to minimise erosion that could expose carbonaceous materials prior to final land forming.
- The emplacement outer batters would be temporarily rehabilitated (e.g. by aerial seeding) to minimise erosion prior to the emplacement being fully rehabilitated at the end of the mine life.

3.2.3 Disposal of Inert Building Waste

Over the next five years WCPL will be undertaking a range of renovating, building and demolition works at residences and buildings located on Peabody Energy owned lands in the vicinity of Wilpinjong Coal Mine.

As a component of this work a range of building and demolition waste materials would be produced that will require disposal. Subject to approvals being obtained, the inert portion of these wastes (up to approximately 2,000 cubic metres) would be disposed at depth in the Wilpinjong Coal Mine waste rock emplacements (e.g. at least 5 m below the final landform surface). WCPL has protocols in place for classification of waste materials during building and demolition works. Any material not classified as inert would be collected and disposed by an appropriately licensed contractor.

The on-site disposal of this waste would correspondingly reduce waste disposal rates at the MWRC landfill site and heavy vehicle movements associated with transporting the building waste on public roads for disposal.

3.2.4 Blasting Parameters and Frequency

Open cut blasting is undertaken in accordance with the blast limits described in Conditions 9 and 10 of Schedule 3 of Project Approval 05-0021 (Attachment 1), that include limitations on the days, time, frequency and size of blasts that can be undertaken.

This includes a maximum of two blasts per day, and five blasts per week when averaged over a 12 month period. In addition, blasts with a Maximum Instantaneous Charge (MIC) of greater than 400 kilograms (kg) are limited to a maximum of two blasts per week, and one blast per week when averaged over a 12 month period.

Since these Project Approval conditions were imposed, the distance from the Wilpinjong Coal Mine to the nearest private receivers has increased significantly, with the nearest private dwellings now located in Wollar (Figure 4a).

The frequency of open cut blasts with a higher MIC would increase as a result of the proposed higher rates of waste rock production for the Modification and to improve blasting efficiency as strip ratios rise (i.e. blasts with a MIC of greater than 400 kg would be limited to a maximum of three blasts per week, and two per week when averaged over a 12 month period).

To improve blasting efficiency, WCPL would also commence the combined initiation of two or three blasts that are in close proximity and can be linked (e.g. an overburden blast and an adjacent interburden blast) into one blast event. However, blasting would still be restricted to a maximum of two blast events per day and five blast events per week when averaged over a 12 month period.

When a combined blast initiation is to be undertaken, it would be designed such that only a very short delay occurs between the blasts, so that the blast event is effectively perceived as one blast by potential receivers. Blasts would continue to be designed to comply with the blasting impact assessment criteria outlined in Condition 8 of Schedule 3 of Project Approval 05-0021 (Attachment 1).

The combination of adjacent blasts into a single blast event would improve blasting efficiency and reduce blasting administrative activities such as blast notifications and/or road closures.

WCPL is seeking to update Condition 10 of Schedule 3 of the Project Approval 05-0021 to reflect these changes (Section 5.3).

3.2.5 Mine Schedule

The Modified mine schedule and comparison to the production rates from the Mining Rate Modification (Mod 3) from 2014 onwards are provided in Table 2.

The mining sequence and rate of mining would continue to be subject to review on the basis of market conditions and customer demand, coal quality or unforseen changes to mining conditions. An indicative mining sequence for the period 2014 to 2026 is provided on Figure 8 that incorporates the Modification open cut extensions, however, the mining sequence within the approved open cut extents will continue to be subject to periodic revision over the life of the mine.

The Modification does not include any extension to the approved 21 year mine life of the Wilpinjong Coal Mine or alteration of the approved ROM coal production rate (15 Mtpa).

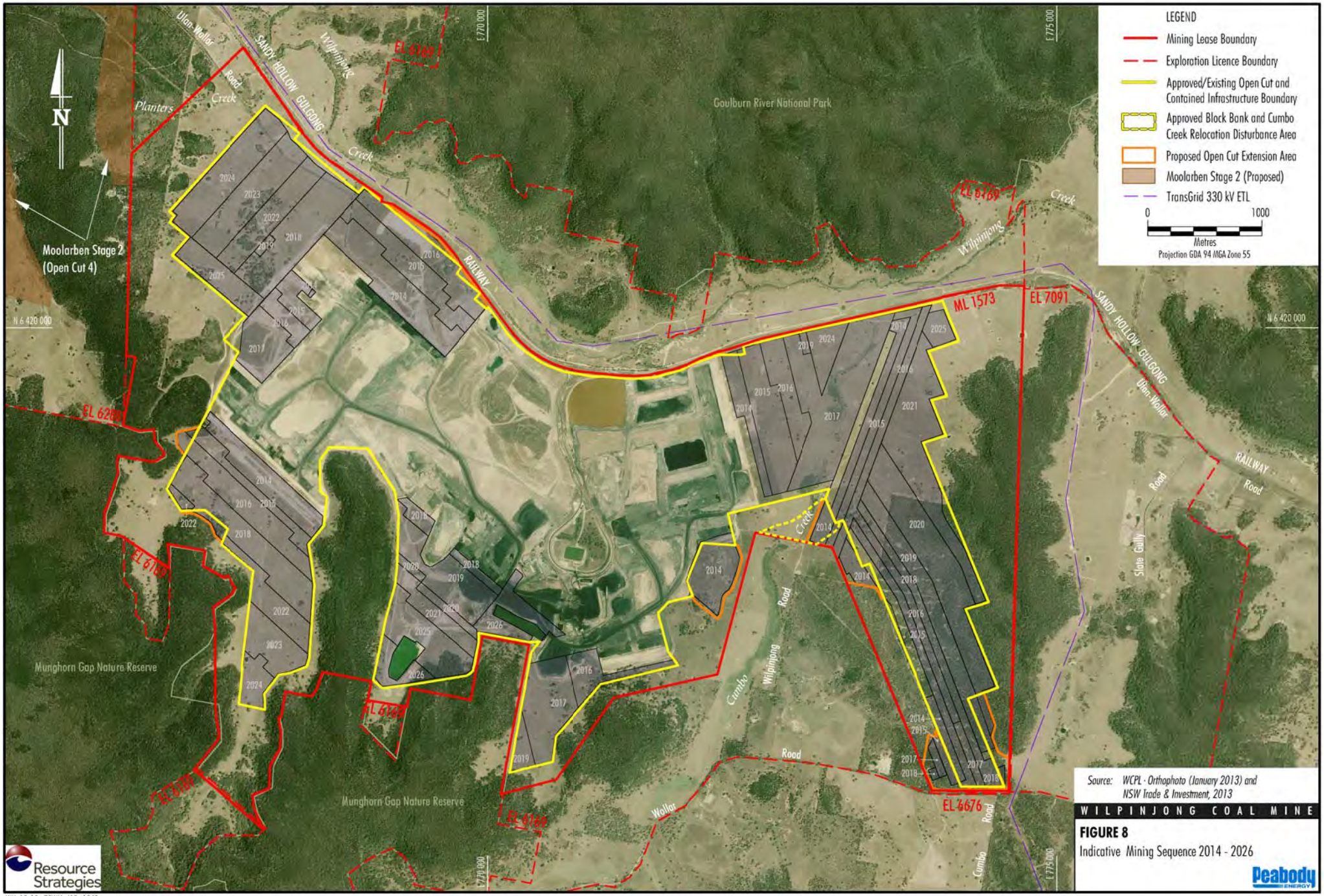
3.2.6 Mobile Fleet

The current owner operator mobile fleet would continue to be used for the Modification, and no additional mobile fleet items are required as a result of the proposed open cut extensions. As discussed in Section 4.2.1, the owner operator mobile fleet is not noise attenuated as a result of the mine being able to comply with applicable Project Approval criteria at relevant private dwellings through other management measures.

Table 2
Modified Mine Schedule 2014 to 2026

Year		Waste Rock (Mbcm)		ROM Coal (Mt)		Product Coal (Mt)	
		Mod 3	Proposed	Mod 3	Proposed	Mod 3*	Proposed
2014	9	28.0	31.9	15.0	14.9	12.0	12.2
2015	10	27.0	29.3	14.2	15.0	11.4	12.5
2016	11	24.0	28.0	13.0	15.0	10.4	11.9
2017	12	22.0	27.0	13.0	15.0	10.4	11.3
2018	13	21.0	33.3	13.0	14.7	10.4	11.0
2019	14	18.0	18.4	13.0	7.8	10.4	5.9
2020	15	15.0	17.4	12.0	7.3	9.6	5.5
2021	16	15.0	18.6	10.5	7.6	8.4	5.7
2022	17	15.0	21.0	10.1	8.0	8.1	5.8
2023	18	15.0	20.7	9.5	7.2	7.6	5.2
2024	19	15.0	20.2	9.4	7.1	7.5	5.1
2025	20	12.0	10.1	9.4	4.7	7.5	3.4
2026	21	10.0	4.7	6.2	3.2	5.0	2.3

* Note that the 2011 Modification (Mod 4) approved a maximum saleable product production rate of 12.5 Mtpa.



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3.2.7 Coal Handling and Preparation

Coal washing rates may increase above the currently consented 8.5 Mtpa over the next five years, as the CHPP (i.e. upgraded as a component of the Mining Rate Modification [Mod 3]) has some excess capacity as a result of increased operational efficiencies that have been realised. In particular, WCPL intends to make use of this additional flexibility to wash additional stockpiled coal as required to reduce the risk of spontaneous combustion for some particular coal types, whilst maintaining production to meet current supply contracts.

With the Modification, coal beneficiation of ROM coal in the CHPP would increase to approximately 9 Mtpa and WCPL intends to have the current beneficiation limit removed from the Project Approval (Section 5.3).

There are no material environmental implications arising from the removal of the CHPP beneficiation limit from the Project Approval. There is now a significant distance and a topographic ridge between the CHPP and the nearest private dwellings (Figures 2, 3 and 4a) (which was not the case when the liming condition was originally imposed). Maximum limits for both ROM coal (15 Mtpa) and saleable coal (12.5 Mtpa) production are also provided in the Project Approval.

3.2.8 Fine Coal Reject Management

Feasibility and engineering design options are being considered for different fine coal reject systems to improve coal yield and water efficiency including:

- a belt press filter and associated transfer conveyor to allow co-disposal of tailings with coarse reject and improved recovery of water from tailings; and
- a froth flotation system to improve fine coal recovery (i.e. improve CHPP coal yield and reduce tailings production).

The installation of a tailings belt press filter and a short supporting conveyor (or conveyors) at the CHPP would facilitate:

- direct dewatering of tailings following thickening at the CHPP to facilitate water recovery;
- transfer of dewatered tailings to the coarse reject bin; and
- co-disposal of tailings with coarse reject material via truck as part of normal ROM operations.

These systems, if adopted by WCPL, would comprise only very minor efficiency improvements to the existing CHPP and associated materials handling facilities and would be constructed within the existing contained infrastructure area (Figures 5 and 6). A materials handling schematic incorporating the proposed belt press filter is shown on Figure 9.

While the CHPP fine coal reject augmentations would be subject to further feasibility study and detailed engineering design, if the belt press filter is adopted, this would allow the co-disposal of tailings with coarse reject as a component of general ROM waste emplacement operations.

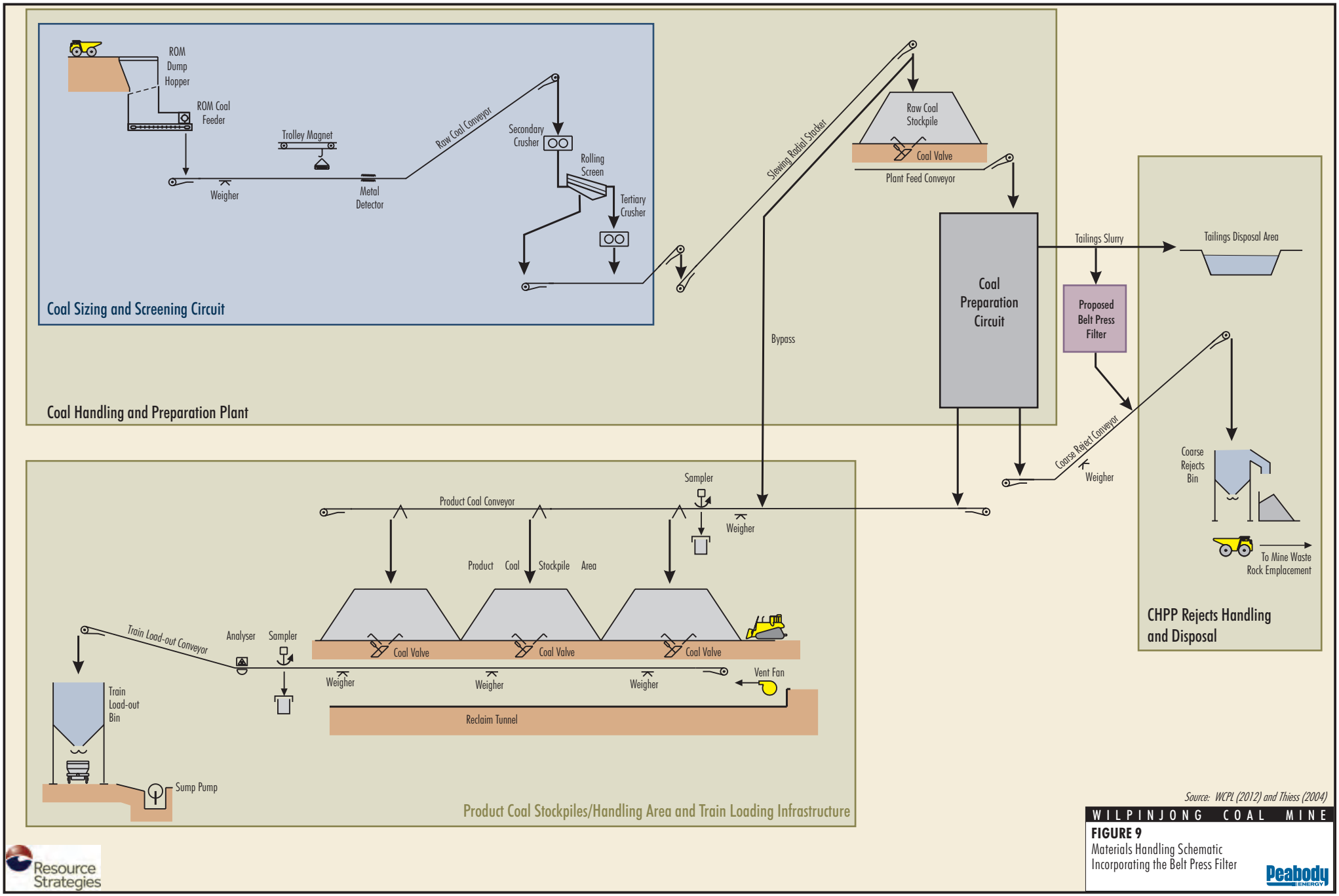
Co-disposal of dewatered tailings material would be undertaken in accordance with the existing management measures for disposal of CHPP coarse reject material, where the material is placed below the natural surface in the mined-out voids with sufficient coverage by non-acid forming overburden to reduce oxygen movement through the rehabilitated profile. This would be consistent with the current practice of covering tailings with more than 2 m of capping material prior to final profiling and rehabilitation (Section 2.7).

An operational tailings storage area would still be required over the life of the mine (i.e. for disposal of tailings when the belt press filter is undergoing maintenance, or in the event of a breakdown), however, the demand for active tailings disposal areas over the life of the mine would be reduced.

This would reduce the open cut area required to be kept open for ongoing tailings disposal and correspondingly improve the efficiency of waste emplacement operations and facilitate progressive rehabilitation. It would also significantly reduce the number of tailings disposal areas that would require rehabilitation over the life of the mine.

3.2.9 Product Coal Transport

The Modification would not change approved rates of maximum product transport (12.5 Mtpa) or the approved number of average (six) and maximum of (10) daily trains dispatched from site.



Source: WCPL (2012) and Thiess (2004)

WILPINJONG COAL MINE

FIGURE 9

Materials Handling Schematic
Incorporating the Belt Press Filter

Resource Strategies

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3.2.10 Workforce

The existing Wilpinjong Coal Mine operational workforce of approximately 550 WCPL employees and full-time equivalent on-site contractors (Section 2.10) would not require any augmentation for the Modification, as the mobile fleet and general contractor requirements would be generally unchanged.

Later in the mine life (i.e. from 2019) the operational workforce would be expected to fall to lower levels than are currently employed on-site, as the ROM coal production rate would be lower (Table 2).

3.2.11 Deliveries

It is anticipated that the increase in the rates of CHPP processing and waste rock production in combination with the proposed on-site disposal of inert building and demolition waste would result in some minor increases in heavy vehicle movements on roads in the vicinity of the Wilpinjong Coal Mine.

The proposed disposal of inert building and demolition wastes on-site of the Wilpinjong Coal Mine and the consequent elimination of the need to take this waste to the MWRC landfill site would correspondingly reduce heavy vehicle movements on local roads around Mudgee.

3.2.12 Light Vehicle Servicing

A review of light vehicle servicing requirements as a component of the owner operator transition has indicated that a light vehicle servicing workshop is required on-site. Light vehicle servicing would be limited to Wilpinjong Coal Mine vehicles.

This workshop would be established in an existing farm building within the Wilpinjong Coal Mine Project Application area (Figures 3 and 5) and would result in no additional land disturbance.

Light vehicle service contractors would operate the workshop in accordance with existing site procedures for the management of hydrocarbons and disposal of workshop waste materials.

3.3 WATER MANAGEMENT

The Modification would not include any significant changes to the approved water management system at the site, with the exception of the installation of a tailings belt press filter (Figure 10). The installation of a belt press filter would significantly reduce the make-up water demand of the CHPP.

Subject to detailed design, the existing approved reverse osmosis plant would be upgraded to a water treatment facility with the addition of pre-filtration and flocculation/dosing facilities to manage variable water quality over the life of the mine. These additional water treatment facilities would be located in the existing/approved disturbance area on either a concrete slab or in purpose built containers in the vicinity of the existing reverse osmosis plant, and would be supported by associated water transfer pipelines, storage tanks, pumps and electrical supply. These facilities would improve reverse osmosis plant efficiency to continue to meet applicable discharge criteria under EPL 12425.

A review of the water balance of the Wilpinjong Coal Mine incorporating the modified mine schedule was conducted by Gilbert & Associates (2013) (Appendix D). The water balance review considered scenarios with and without the installation of a belt press filter.

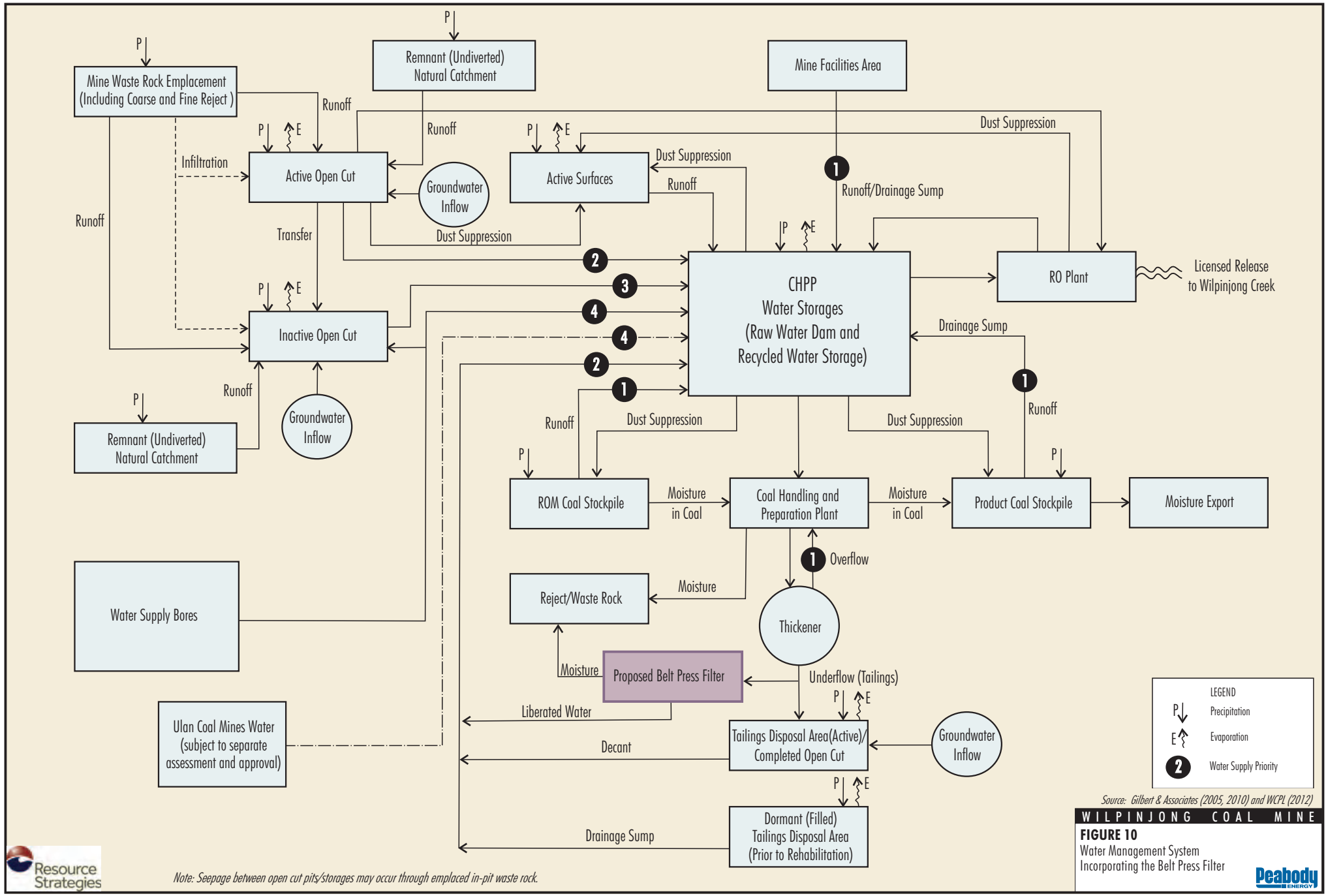
The water balance model simulates future changes in stored volumes of water on-site in response to inflows (e.g. rainfall-runoff, groundwater inflows), outflows (evaporation, CHPP make-up, dust suppression usage, licensed discharge) and pumped transfers. The modelling is completed over a large number of different daily climate “realisations” compiled from the available rainfall record and includes historical climate events in the water balance model, including high, low and median rainfall periods.

The water balance review indicates that, incorporating the proposed Modification, the average water supply reliability for CHPP supply over the remaining mine life would improve with the belt press filter (Appendix D). The corresponding average water supply reliability for haul road dust suppression would also improve (Appendix D).

WCPL will continue to undertake regular reviews of the water balance, which is inherently highly influenced by site rainfall. If stored water volume falls, WCPL can implement sourcing of water from licensed water supply bores to maintain a storage reserve.

3.4 FINAL LANDFORM

As a component of ongoing mine planning a review of the waste rock emplacement strategy has indicated a higher bulking factor of the waste rock material being mined and deposited in practice than had been anticipated at the Wilpinjong Coal Mine.



Note: Seepage between open cut pits/storages may occur through emplaced in-pit waste rock.

Source: Gilbert & Associates (2005, 2010) and WCPL (2012)

WILPINJONG COAL MINE

FIGURE 10
Water Management System
Incorporating the Belt Press Filter

Resource Strategies

Peabody ENERGY

WIL-12-12_75WMod12_005E

With the revised bulking factor, a review of the final landform design and mine sequence conducted by WCPL in early 2013 identified that alterations to the final landform would be required to accommodate the increased bulk of the mined waste rock material.

This would include a raised waste rock emplacement landform located in the south of Pit 2 (Figure 5) that would be constructed to a temporary elevation of 450 m AHD and would be temporarily rehabilitated, before being reshaped and pushed down to a maximum elevation of approximately 430 m AHD at the end of the mine life as a component of finalising site landforms (Figure 11).

In addition, some other areas of the Wilpinjong Coal Mine backfilled final landform would be constructed higher than originally anticipated, however, the revised post-mining landforms would better reflect the pre-mining topographic range (i.e. the original final landform design included some lowering of areas of the backfilled open cuts in comparison to the pre-mining topography, and this would be reduced).

In accordance with Condition 29 of Schedule 3 of Project Approval 05-0021, WCPL is preparing a Cumbo Creek Relocation Plan that outlines the vision for the approved creek relocation, hydrological and ecological baseline conditions, design specifications, a construction programme, as well as revegetation, performance and completion criteria and associated environmental monitoring. WCPL's current conceptual (but not yet final) design for the realignment of Cumbo Creek is shown on Figure 11.

The proposed variations to the final landform associated with the revised bulking factor has not altered the EIS final void concepts for the Wilpinjong Coal Mine, with two final voids being retained in the north-east of Pit 3 and south of Pit 6 (Figure 11). In accordance with Condition 39 of Schedule 3 of Project Approval 05-0021, WCPL is required to prepare a Final Void Management Plan that will provide a mechanism for the review and justification of the final location and future use of the final voids, incorporate final void design criteria/specifications and assess potential interactions between creeks and the voids.

3.5 ENHANCEMENT AND CONSERVATION AREAS

No change is proposed to the existing Wilpinjong Coal Mine ECA areas that are subject to a Voluntary Conservation Agreement with the NSW Minister administering the NPW Act (Figure 5).

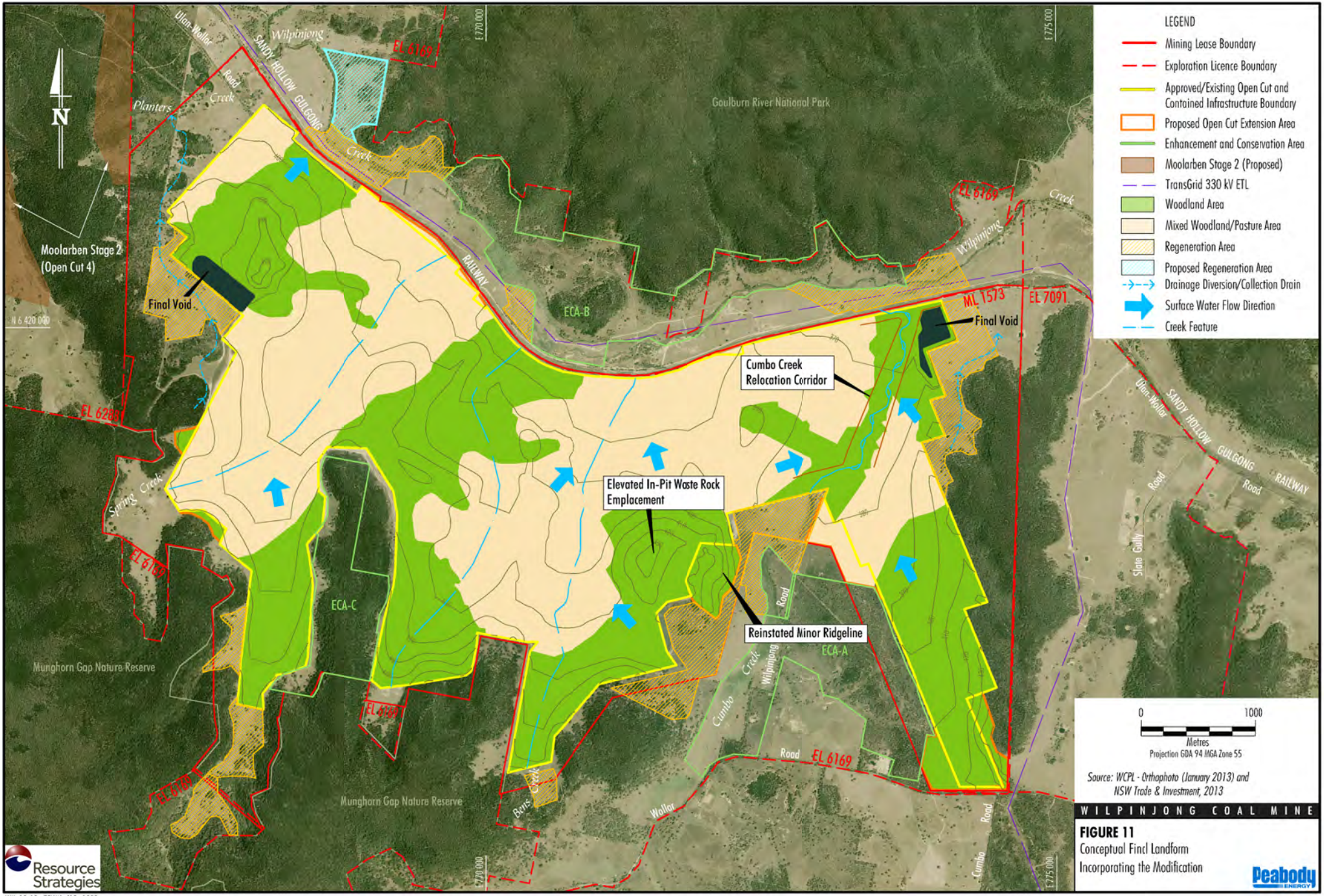
With some recent variations in the boundaries of the ECAs that are subject to a Voluntary Conservation Agreement with the NSW Minister administering the NPW Act, the adjoining Regeneration Area boundaries have changed slightly from those presented in the EIS. However, with the proposed extension to the Regeneration Areas (Section 3.6) the total area subject to enhancement or regeneration would exceed the combined area required by the Project Approval (830 ha), with the area of ECA being larger (by some 33 ha) and the Regeneration Areas correspondingly smaller (by some 27 ha) than specified in Condition 36, Schedule 3 of Project Approval 05-0021 (Attachment 1).

3.6 REGENERATION AREAS

The Modification open cut extensions would include the mining of approximately 20 ha of the Regeneration Areas in Pit 2 and Pit 3 that WCPL had previously set aside for linking woodland regeneration adjacent to the open cut mine.

Notwithstanding that an offset strategy to address the clearing of native vegetation for the Modification has been developed (Section 4.8.3) an additional Regeneration Area is also proposed to the north of the mine that adjoins the Goulburn River National Park, Wilpinjong Creek and an existing Regeneration Area in order to meet existing Project Approval conditions.

The additional Regeneration Area (approximately 27 ha) is shown on the conceptual final landform plan (Figure 11) and would be subject to the same management measures as the other Wilpinjong Coal Mine Regeneration Areas in accordance with the Rehabilitation Management Plan (WCPL, 2011a).



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4 ENVIRONMENTAL ASSESSMENT

4.1 ENVIRONMENTAL RISK ASSESSMENT

As a component of the environmental assessment of the Modification, an Environmental Risk Assessment was undertaken by WCPL to identify key potential environmental issues for further assessment in this EA (Appendix K). An Environmental Risk Assessment workshop was held in January 2013 and was facilitated by a risk assessment specialist (SP Solutions, 2013). The risk assessment team consisted of representatives with a wide variety of environmental management and operational experience with coal mining from:

- WCPL/Peabody Energy;
- HydroSimulations;
- Gilbert & Associates; and
- Resource Strategies.

The key potential environmental issues identified during the Environmental Risk Assessment are summarised in Table 3 and addressed in Sections 4.2 to 4.17, and the relevant appendices to this EA.

4.2 OPERATIONAL NOISE

A Noise and Blasting Assessment for the Modification was undertaken by SLR Consulting (2013) (Appendix A).

Aspects relating to operational noise are discussed in the subsections below.

Potential blasting impacts and transport noise impacts of the Modification are discussed in Sections 4.3 and 4.16.1 respectively.

Table 3
Key Potential Environmental Issues

Environmental Issue Subject Area	Key Potential Environmental Issue	EA Reference
Noise and Blasting	Incremental increases to mine site noise emissions and blasting impacts.	Sections 4.2, 4.3 and Appendix A
Air Quality	Incremental increases to mine site dust emissions and air quality impacts from spontaneous combustion events.	Sections 4.4, 4.5 and Appendix B
Groundwater	Incremental groundwater drawdown, reduced baseflow in creeks and potential impacts to springs.	Section 4.6 and Appendix C
Surface Water	Incremental impacts to creeks, downstream water quality impacts and suitability of mine water management infrastructure.	Sections 3.3 and 4.7 and Appendix D
Biodiversity	Incremental loss of vegetation and fauna habitat and potential impact on listed threatened species.	Sections 4.8 and 4.9 and Appendices E and F
Aboriginal Heritage	Potential incremental impacts on Aboriginal heritage items or areas of significance.	Section 4.10 and Appendix G
Road Transport	Increased traffic on public road network.	Section 4.11 and Appendix H
Rehabilitation/ Closure	Potential for incremental changes to final voids and associated water management.	Sections 3.4 and 4.7
Socio-economic	Cumulative incremental impacts with other mining projects on community infrastructure.	Section 4.15 and Appendix J

Source: After Appendix K.

4.2.1 Background

A Noise Impact Assessment for the Mining Rate Modification (Mod 3) (Section 2.1) was conducted by Heggies (2010) and indicated that:

- 13 private dwellings would be within the Noise Management Zone (1 to 5 decibels [dB] above the applicable project specific noise criteria); and
- 2 private dwellings would be within the Noise Affectation Zone (greater than 5 dB above the applicable project specific noise criteria).

All of the private dwellings predicted to be in either the Noise Management or Affectation Zone for the Mining Rate Modification are now owned by Peabody Energy and therefore the project specific noise criteria no longer apply to these properties.

Noise Monitoring Programme

The NMP describes the noise monitoring programme for the Wilpinjong Coal Mine, which consists of a combination of off-site operator-attended monitoring sites and continuous real-time monitors. Recent attended and real-time noise monitoring locations are shown on Figure 12. Figure 12 highlights that recent noise monitoring has been focussed to the east of the Mine in the vicinity of the nearest private receivers (e.g. Village of Wollar).

In accordance with the NMP, operator-attended noise monitoring is used for demonstrating compliance with noise impact assessment criteria, whilst continuous real-time monitoring (which measures both mine and other noise sources) is used as a noise management tool to assist WCPL with implementing pre-emptive noise management actions, to minimise potential noise impacts from the Wilpinjong Coal Mine.

Attended noise monitoring results show that Wilpinjong Coal Mine operations were in compliance with relevant Project Approval noise criteria during 2011 and 2012 (i.e. since the Mining Rate Modification) (Appendix A).

Noise Management Strategy

WCPL is obligated to manage noise levels from the Wilpinjong Coal Mine in accordance with the noise limits specified in Project Approval 05-0021, using reasonable and feasible mitigation measures.

The Noise Impact Assessment (Heggies, 2010) prepared for the Mining Rate Modification identified that it was potentially reasonable and feasible to replace some unattenuated mobile plant items at the Wilpinjong Coal Mine with noise attenuated mobile plant, if required in order to comply with noise limits at privately owned receivers.

To date, the obligation to meet the noise limits specified in Project Approval 05-0021 for privately owned receivers has been achieved by WCPL through a combination of the following:

- Property acquisition, which has had the effect of reducing the number of privately owned receivers that could potentially be affected by noise impacts from the mine.
- For remaining privately owned receivers, the implementation of the noise management strategy as per the NMP, including the use of real-time noise monitoring to manage noise levels during the night.

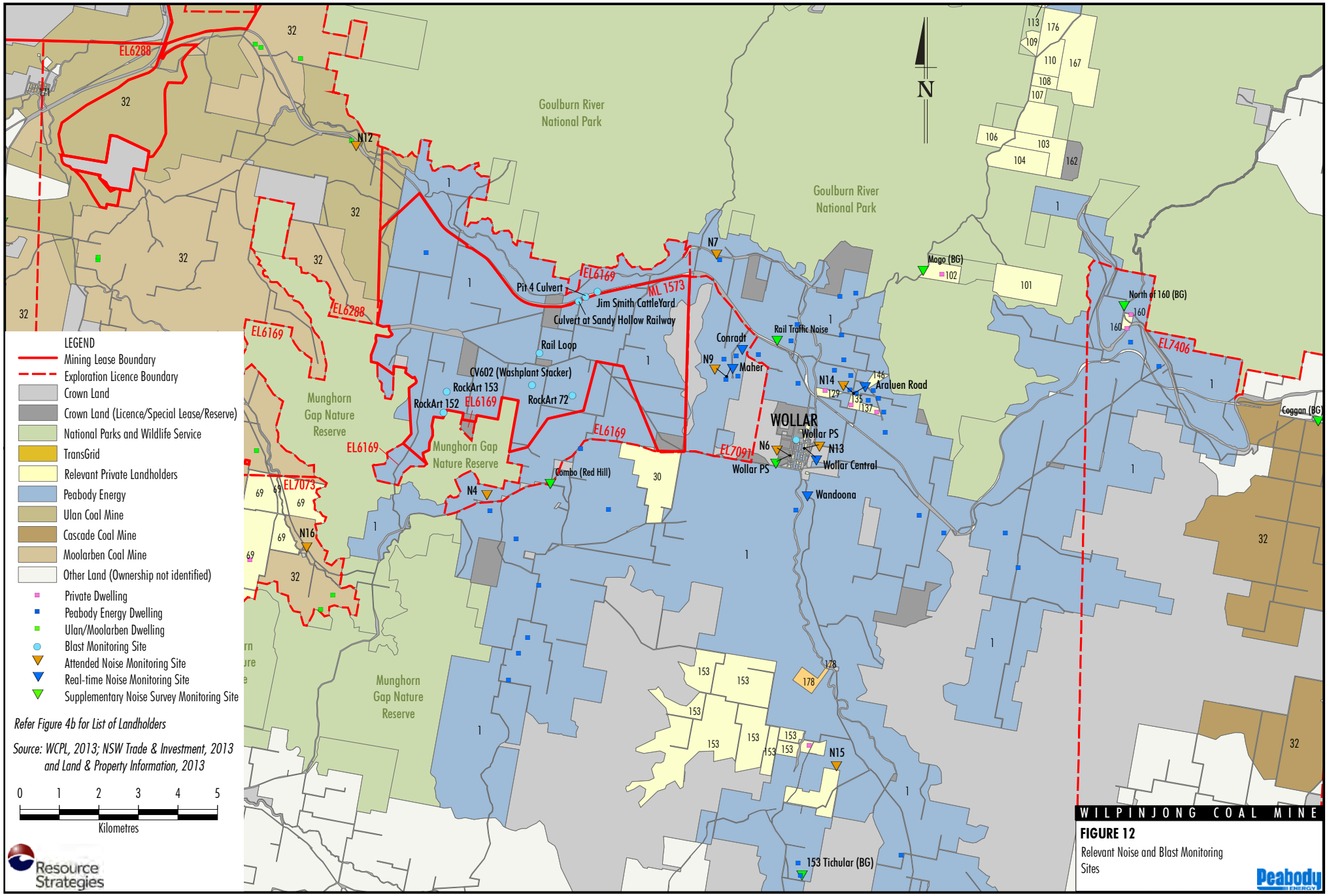
Real-time monitors are located adjacent to the mine at points indicative of local rural residential areas (Figure 12) and are periodically relocated.

The real-time system records 15 minute statistical noise data, continuous audio files and meteorological data. The continuous audio recording can also be downloaded, so that a listener can consider whether the noise being recorded is mine-related.

WCPL real-time noise investigation triggers are set at levels designed to ensure compliance with Project Approval noise limits at the nearest private receivers and are implemented between 8.00 pm and 10.00 am (i.e. when adverse weather conditions such as temperature inversions are likely to occur, and sources of extraneous noise are less prevalent).

The protocol for responding to real-time noise investigation triggers is described in the existing NMP and includes the implementation of suitable management measures, including the temporary standing-down of components of mobile plant, if required.

During the 2012 reporting period a total of 1,193 excavator hours were lost as a direct response of noise investigation triggers being exceeded (as well as associated machinery), with the majority of excavator hours lost during the winter months (Appendix A).



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Given the successful implementation of the noise management strategy for the existing operations (as demonstrated by compliance with noise impact assessment criteria in 2011 and 2012), noise attenuation of the mobile fleet on-site in order to comply with Project Approval noise criteria has not been required.

The number of noise related complaints diminished significantly in 2011/2012 in comparison with the preceding years, and the reduction in noise-related complaints coincides with the continued implementation of WCPL's proactive noise management strategy (Appendix A). In 2012 some 57 noise complaints were received (WCPL, 2013) and in the period 1 January to 30 June 2013, some 23 complaints were received in relation to noise.

4.2.2 Environmental Review

SLR Consulting conducted a noise investigation survey in December 2012 to update and validate the existing Wilpinjong Coal Mine noise model, reflect as-built features including upgraded facilities at the CHPP and materials handling areas, and to review the model calibration (Appendix A).

December 2012 supplementary noise monitoring locations are shown on Figure 12.

Assessable Meteorological Conditions

Previous operational noise assessments at the Wilpinjong Coal Mine have assessed noise impacts during temperature inversions up to 3 degrees Celsius (°C) per 100 m.

Direct temperature gradient measurement at the 60 m high temperature tower at the Wilpinjong Coal Mine has provided additional data regarding temperature gradients that occur in the area.

Based on analysis of available data, SLR Consulting identified that noise impacts during temperature gradients up to 5.5°C per 100 m were assessable. The local temperature inversion data collection has therefore introduced more noise enhancing temperature inversion conditions for noise modelling at the Wilpinjong Coal Mine (Appendix A).

The NSW *Industrial Noise Policy* assessable meteorological noise modelling parameters are presented in Appendix A.

Modelling Scenarios

The proposed open cut extensions (Figure 5) would not bring the mining operations significantly closer to potential private receivers (Figure 4a).

SLR Consulting (2013) modelled three key scenarios to assess potential noise impacts associated with the modified Wilpinjong Coal Mine, representing potential worst case noise impacts at the Village of Wollar and other private receivers to the east (2015 and 2021 scenarios) and south-west (2018 scenario) (Appendix A).

A conservative allowance for construction activities associated with the Modification that would take place in 2014 (Section 3.1) was also included in the daytime modelling for the 2015 operational scenario.

In addition, the short-term development of the upper level of the elevated waste rock emplacement in the south of Pit 2 that is expected to occur in 2014 (Figure 5) was also conservatively assessed as coinciding with 2015 operations (Appendix A).

Identification of Reasonable and Feasible Mitigation Measures

Preliminary noise modelling conducted by SLR Consulting for the modified Wilpinjong Coal Mine operations indicated that exceedances of the project specific noise limit of 35 A-weighted decibels (dBA) 15 minute equivalent continuous noise level ($L_{Aeq\ (15\ minute)}$) by up to 3 dBA could occur during the night-time at some private receivers in the Village of Wollar in 2015, under the modelled adverse meteorological conditions (Appendix A).

The preliminary noise modelling indicated that in the absence of real-time noise controls, exceedances of the project specific noise limit at private dwellings in the Village of Wollar would occur during approximately 12% of night-time periods (10.00 pm to 7.00 am), or approximately 5% of available operating hours in 2015 (Appendix A).

Modelling indicates that compliance with the project specific noise limit could be achieved at the Village of Wollar with the stand-down of some equipment during adverse weather conditions at night, including the following three alternative measures (Appendix A):

- stand-down of the ROM coal haulage fleet (i.e. haul trucks);

- stand-down of the ROM coal excavation fleet (i.e. excavators and supporting equipment); and
- stand-down of the waste rock excavation fleet (i.e. excavators and supporting equipment).

The stand-down of fleet items by WCPL during operations to achieve the project specific noise limit at private dwellings in the Village of Wollar under adverse weather conditions would be determined, as required, in accordance with the existing NMP response protocol and relevant operational priorities at the time.

WCPL incorporates allowances for environmental downtime in its forward mine planning and budgeting. The operational cost associated with the stand-down of equipment during relevant adverse weather conditions to achieve the project specific noise limit at the Village of Wollar in 2015 is considered to be reasonable to WCPL, as it would directly benefit a number of private dwellings in the Village.

The noise assessment results therefore incorporate allowance for real-time noise controls (e.g. equipment stand-downs) under relevant adverse meteorological conditions to achieve continued compliance with project specific noise levels in the Village of Wollar.

The modelling conducted by SLR Consulting also predicts that, in the absence of the implementation of real-time noise controls, the development of the upper levels of the elevated waste rock emplacement (Figure 5), if coincident with adverse meteorological conditions could increase operational night-time intrusive noise levels by up to 1 dBA at the nearest private dwellings (Appendix A).

WCPL would continue to implement real-time noise controls during the short-term development of the elevated in-pit waste rock emplacement to meet its obligation to comply with the noise limits specified in Project Approval 05-0021.

This may result in a temporary increase in the frequency or duration of equipment stand-downs during the short-term campaign construction of the upper levels of the emplacement in 2014 (Appendix A).

Potential Impacts

Noise modelling conducted by SLR Consulting for the Modification identified that four private dwellings (69, 129, 135 and 137 – Figures 4a and 4b) would be within the Noise Management Zone due to the modified Wilpinjong Coal Mine operations (Table 4).

WCPL does not propose to implement real-time noise controls to meet the project specific noise limits at these four private dwellings outside of the Village of Wollar as:

- The predicted exceedances are generally marginal (1 - 2dBA) and in one case moderate (3 dBA) and exceedances of this magnitude are not likely to be noticeable, or noticeable to only some people (Appendix A).
- The additional operational cost associated with the additional stand-down of equipment to comply at these rural dwellings is not considered to be reasonable by WCPL, as the benefit of the equipment stand-down for each condition would only be realised at a small number (e.g. one or two) private receivers.
- WCPL is currently consulting with these private receivers to determine potential management strategies (which may include at receiver mitigation and/or negotiated agreements).

WCPL intends to seek project approval noise limit conditions for these four residences that reflect the predicted noise levels in the event that agreements or other acceptable mitigation strategies cannot be negotiated with these receivers.

Table 4
Private Dwellings in Predicted Noise Management and Noise Affectation Zones

Noise Management Zone		Noise Affectation Zone
1 to 2 dBA above Project Specific Noise Limit	3 to 5 dBA above Project Specific Noise Limit	>5 dBA above Project Specific Noise Limit
69 - DJ & JG Stokes 129 – K & R Roser 137 - A & C Chetcuti	135 – K & R Roser	-

After: Appendix A.

Notwithstanding the above, three of the private dwellings to the east of the mine (129, 135 and 137) are likely to also benefit from the commitment to stand-down equipment to meet project specific noise limits at the Village of Wollar, under some adverse meteorological conditions (Appendix A).

No private dwellings were identified as being in the Noise Affectation Zone for the Wilpinjong Coal Mine incorporating the Modification (Appendix A).

In addition, no exceedances of applicable project only or cumulative amenity criteria are predicted at private receivers, or the two churches, community hall and public school in the Village of Wollar when the predicted noise emissions of the Moolarben Coal Mines (including the proposed Stage 2) and Ulan Coal Mines were considered (Appendix A).

Indicative contour diagrams of the predicted night-time noise emissions of the modified Wilpinjong Coal Mine operations for 2015 and 2021 under adverse meteorological conditions are presented on Figures 13 and 14 respectively.

Figure 13 represents the noise levels that are predicted after the application of real-time controls to achieve project specific noise levels at private dwellings in the Village of Wollar in 2015.

Operational noise levels in the Goulburn River National Park and Munghorn Gap Nature Reserve from the Wilpinjong Coal Mine incorporating the Modification would be generally comparable to the approved mine (Appendix A). Consideration of potential operational noise impacts on private vacant land is provided in Appendix A.

4.2.3 Mitigation Measures, Management and Monitoring

WCPL would continue to implement the noise mitigation measures and real-time noise management system, and associated response protocols, detailed in the NMP for the Wilpinjong Coal Mine incorporating the Modification.

In addition, the NMP would be reviewed and, if necessary, revised for the Modification to include:

- Updated noise monitoring network to reflect current land ownership and any revisions that may be required to target compliance with the Project Approval noise limits during the short-term development of the elevated in-pit waste emplacement.
- Updated noise trigger investigation protocols if necessary to reflect current site procedures.
- Where real-time monitors are located in the vicinity of compliance locations (e.g. private receivers), conduct a review of the identification/characterisation of mine related noise by the real-time monitoring system by comparing observed mine related noise identified during operator attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system).

4.3 BLASTING

4.3.1 Background

The existing Wilpinjong Coal Mine Blast Management Plan describes the blast management regime for the Wilpinjong Coal Mine, which consists of blast emission monitoring at a key private receivers, infrastructure and heritage sites (Figure 12).

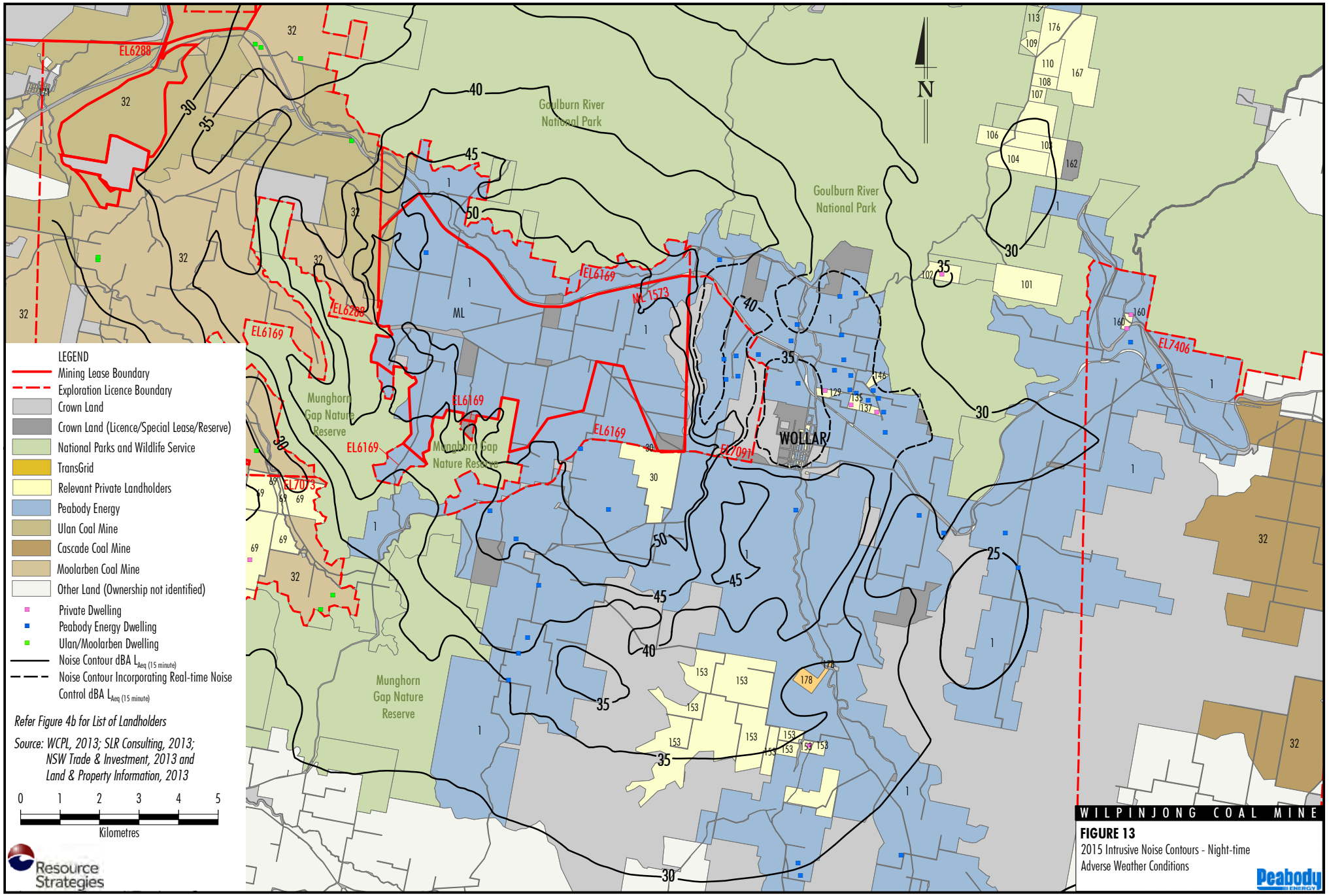
Review of 2011 and 2012 blast monitoring results indicates one exceedance of the relevant airblast or ground vibration limits, which occurred at a private receiver (however this property is now owned by Peabody Energy) (Appendix A).

4.3.2 Environmental Review

WCPL is seeking to vary the frequency of larger MIC blasts and to amend blast management to allow the combination of individual adjacent blasts into a single combined blast event as a component of the Modification (Section 3.2.4). This would improve the efficiency of blasting and blasting administration.

Potential impacts associated with blasting in the Modification open cut extension areas were assessed by SLR Consulting (2013) (Appendix A).

Relevant ground vibration and airblast criteria were not predicted to be exceeded at any private receiver and predicted vibration safe working distances at varying blast MIC levels for Aboriginal rock art sites and general infrastructure are provided in Appendix A.



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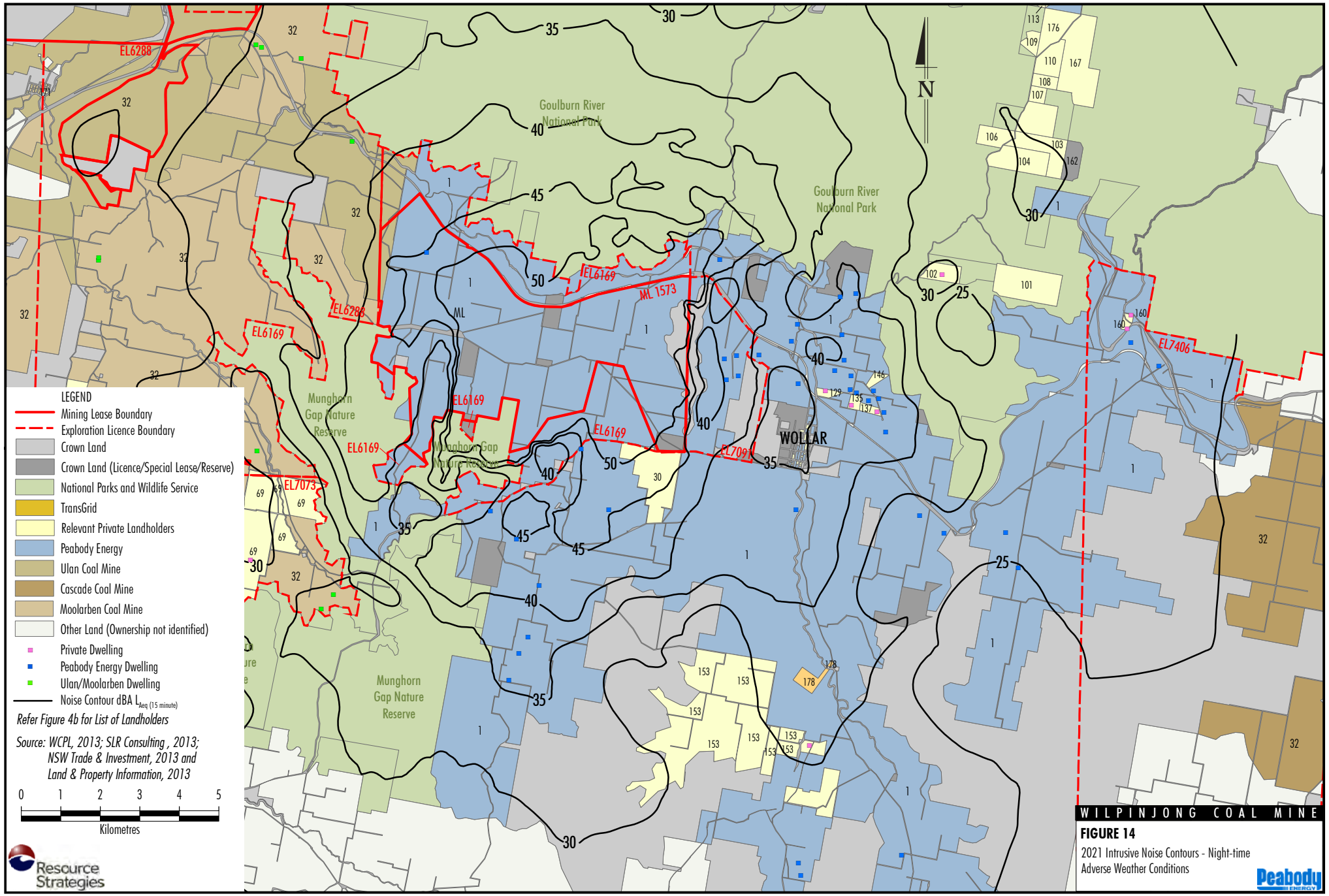

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Blasting would continue to be conducted in accordance with the management and monitoring measures outlined in the Blast Management Plan and where necessary, blast MIC levels would be adjusted to achieve relevant criteria for proximal infrastructure and rock art sites.

4.3.3 Mitigation Measures, Management and Monitoring

The Blast Management Plan would continue to be implemented for the Wilpinjong Coal Mine incorporating the Modification.

In addition, the Blast Management Plan would be reviewed and, if necessary, revised for the Modification to include:

- An updated blast monitoring network to reflect current land ownership.
- A review of the blast management protocol for any blasting within 500 m of Aboriginal rock art site WCP72, such that potential blast impacts are managed to maintain the structural integrity of this site.
- Updated site laws for ground vibration and airblast to reflect ongoing review of the site based prediction equations based on blast monitoring results.

Consistent with the blast management measures that are currently applied for proximal infrastructure, prior to mining in close proximity to the TransGrid 330 kV electricity transmission line suspension towers to the south-east of Pit 3 (Figure 5), WCPL would consult with TransGrid to identify appropriate vibration criteria for the closest suspension tower and establish blast monitoring and apply blast management measures as required in accordance with the Blast Management Plan.

4.4 DUST AND PARTICULATE MATTER

An Air Quality Impact Assessment for the Modification was undertaken by Todoroski Air Sciences (2013) and is presented as Appendix B.

This assessment also quantified potential greenhouse gas emissions of the Wilpinjong Coal Mine incorporating the Modification, and the results of this assessment are provided in Section 4.16.2 and Appendix B.

4.4.1 Background

An Air Quality and Greenhouse Gas Assessment for the Mining Rate Modification was undertaken by PAEHolmes (2010). No exceedances of the applicable annual dust deposition or suspended particulate matter (i.e. dust) air quality assessment criteria were predicted at the nearest private receivers (PAEHolmes, 2010).

Three private dwellings were predicted to experience potential exceedances of the 24-hour average particulate matter with diameter less than 10 micrometres (µm) (PM_{10}) assessment criteria (PAEHolmes, 2010). These three dwellings have since been acquired by Peabody Energy and are no longer privately owned.

Air Quality Monitoring Programme

An air quality monitoring programme commenced in 2004 prior to the commencement of mining, which includes the measurement of dust deposition (grams per square metre [g/m^2]) and concentrations of PM_{10} and total suspended particles (TSP) (micrograms per cubic metre [$\mu g/m^3$]). Recent air quality monitoring sites are shown on Figure 15 and include a combination of monitoring of PM_{10} concentrations using High Volume Air Samplers (HVAS) and Tapered Element Oscillating Microbalances (TEOMs) as well as dust gauges. Figure 15 illustrates that recent particulate monitoring has been focussed to the east of the Mine in the vicinity of the nearest private receivers (e.g. Village of Wollar).

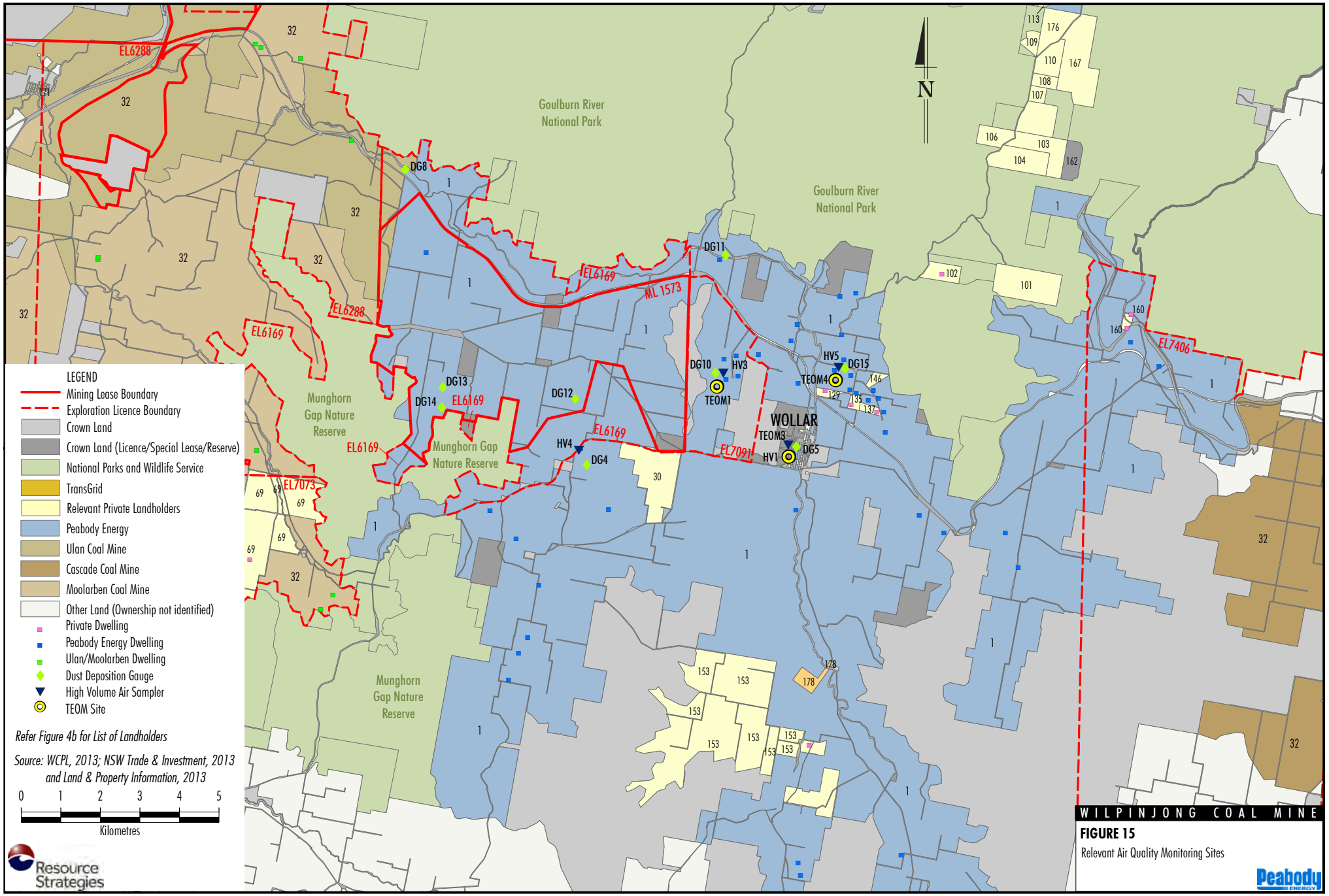
Annual average PM_{10} concentrations have been below the assessment criterion of 30 $\mu g/m^3$ at all PM_{10} monitoring sites for all years (Appendix B).

There have been isolated instances where 24-hour average PM_{10} concentrations have exceeded the assessment criterion of 50 $\mu g/m^3$, however, these instances have generally coincided with widespread dust events (e.g. the 2009 dust storms) indicating the exceedances have not been caused by Wilpinjong Coal Mine operations (Appendix B).

Appendix B provides a detailed summary of PM_{10}, TSP and dust deposition monitoring data.

Air Quality Management

Project Approval 05-0021 requires WCPL to regularly assess real-time air quality monitoring and meteorological monitoring data to ensure that Wilpinjong Coal Mine mining operations are relocated, modified and/or stopped as required to ensure compliance with relevant air quality criteria.



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WCPL currently implements general dust mitigation measures (e.g. haul road watering) as part of operations to minimise potential dust emissions in accordance with the Wilpinjong Coal Mine Air Quality and Greenhouse Gas Management Plan and pollution reduction programme requirements under EPL 12425.

In addition, WCPL implements a real-time air quality management system to assist in the implementation of pre-emptive management actions and to avoid potential non-compliances.

This involves monitoring of instantaneous (i.e. 5 minute) and 24-hour average PM_{10} concentrations, and the implementation of a response protocol in the event that internal performance indicators are exceeded. The response protocol includes the modification or cessation of dust generating activities (i.e. excavation of material) as required.

In 2012, approximately 240 excavator hours were lost as a result of the implementation of the air quality response protocols (WCPL, 2013).

4.4.2 Environmental Review

Todoroski Air Sciences (2013) has completed a review of the potential air quality impacts of the Wilpinjong Coal Mine incorporating the Modification (Appendix B).

Dust concentrations and deposition rates have been modelled using the EPA approved CALPUFF/CALMET modelling system for two key periods of the modified mining operations representing the maximum year of waste mining operations (2018) (including mining activities in the south of Pit 3 in close proximity to the Village of Wollar) and a later year where mining operations would be concentrated in the east-northeast of the mine (2021).

The potential impacts for the modified Wilpinjong Coal Mine alone (i.e. project only impacts) were considered, as well as the potential cumulative impacts of the modified Wilpinjong Coal Mine and other sources (including potential emissions from the Ulan and Moolarben Coal Mines and non-mining emissions) (Appendix B).

Air quality modelling results for the modified Wilpinjong Coal Mine indicate (Appendix B):

- The annual average dust deposition assessment criteria of 2 g/m² per month (project only) and the 4 g/m² per month (cumulative) would not be exceeded at any private receiver in either 2018 or 2021.
- The annual average PM_{10} assessment criterion of 30 µg/m³ would not be exceeded at any private receiver in either 2018 or 2021, when considering potential project only and cumulative impacts.
- The annual average TSP assessment criterion of 90 µg/m³ would not be exceeded at any private receiver in either 2018 or 2021, when considering potential project only and cumulative impacts.
- The 24-hour average PM_{10} criterion of 50 µg/m³ would not be exceeded any private receiver in either 2018 or 2021 due to potential impacts from the project only.

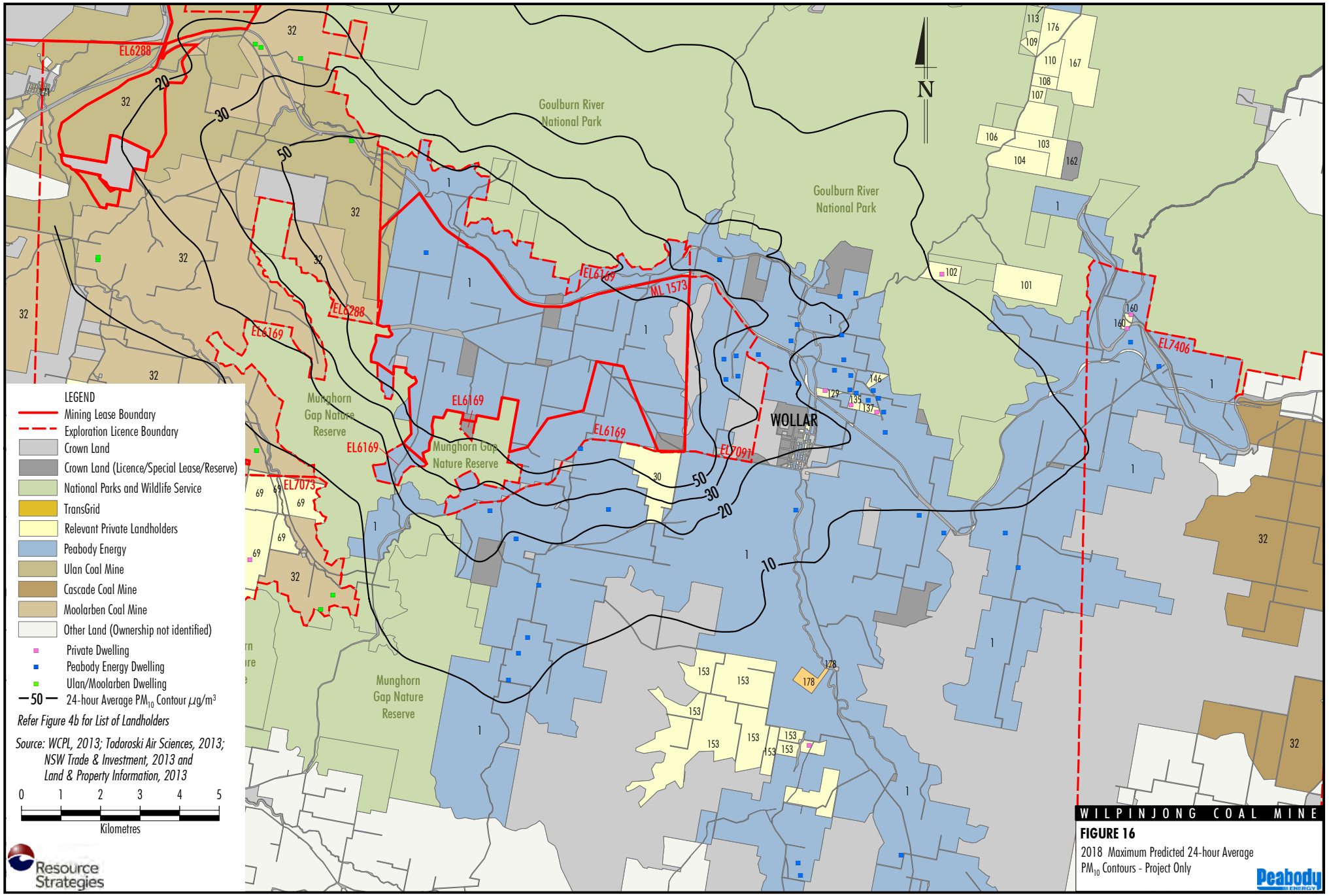
Figures 16 and 17 show predicted maximum project only 24-hour average PM_{10} concentrations for 2018 and 2021, respectively.

In accordance with the Approved Methods a *Level 1 Assessment - Maximum Impact* approach was used to assess potential cumulative 24-hour PM_{10} impacts at private receptors in the Village of Wollar (Appendix B).

This approach involves adding the maximum monitored level of PM_{10} (i.e. from HVAS or TEOM data) on any day during the air quality modelling period with the maximum predicted project only levels due to the modified mine.

This is considered highly conservative as the monitored levels include any contribution from the existing Wilpinjong Coal Mine operations, which would be recounted in the predicted levels from the modified Wilpinjong Coal Mine. In addition, the highest monitored level would not necessary occur on the same day as the highest predicted level (Appendix B).

The Level 1 Assessment indicated that private receivers would experience cumulative impacts below the 24-hour average assessment criterion of 50 µg/m³ in both 2018 and 2021 (Appendix B).



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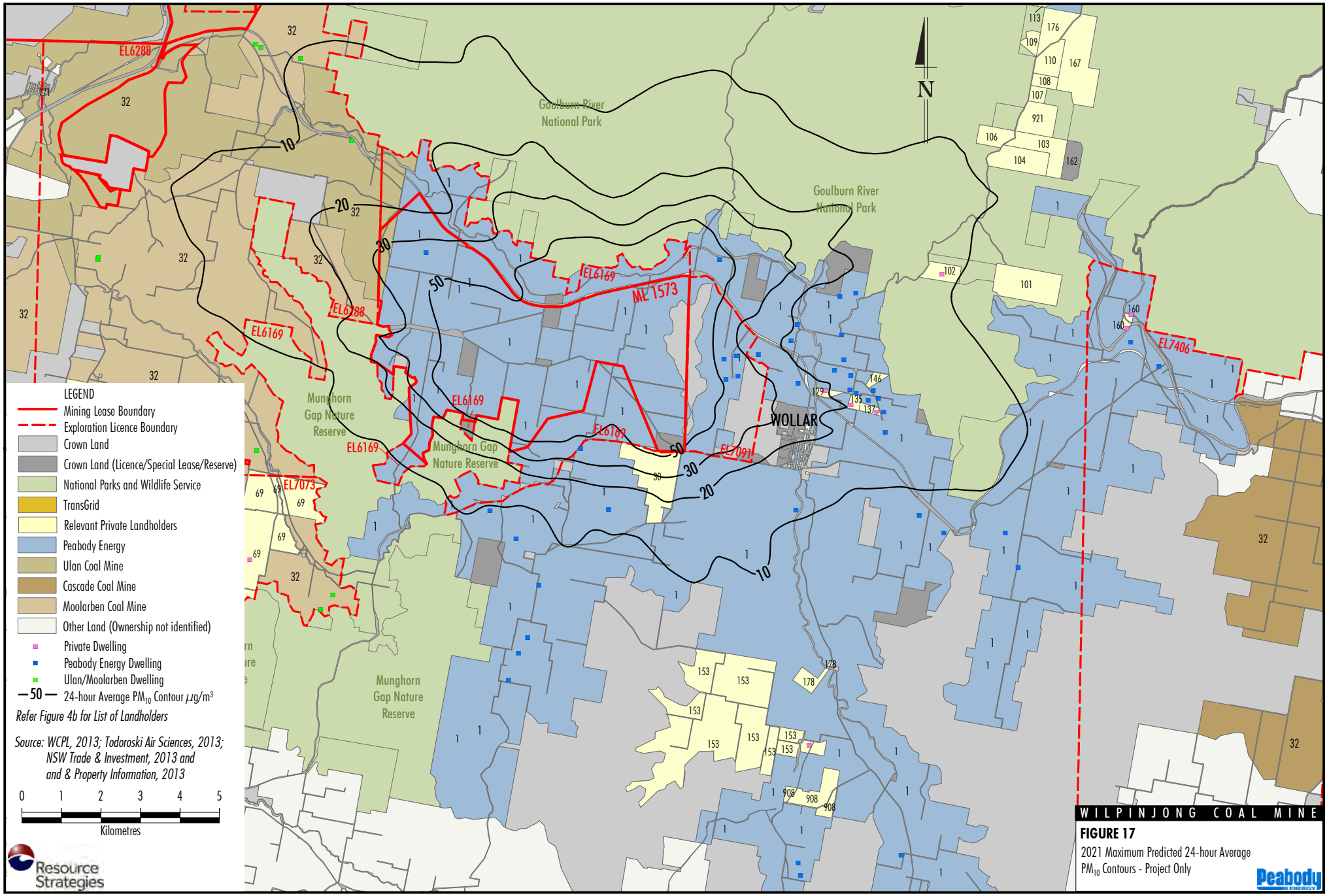

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Relative to the existing operations, the proposed modifications to the mining activities at the Wilpinjong Coal Mine are unlikely to lead to any significant change in dust levels at receptors (Appendix B).

Notwithstanding the above, it is noted that there is the potential for elevated background dust from regional events such as bushfires and dust storms.

During periods of elevated background dust levels (i.e. exceeding WCPL internal performance indicators) the real-time air quality management system and response protocols described above would be implemented to target compliance with 24-hour average air quality criteria at privately owned receivers, as per existing operations at the Wilpinjong Coal Mine and as outlined in the Air Quality and Greenhouse Gas Management Plan. This may include, as required, the shutdown of mobile equipment.

4.4.3 Mitigation Measures, Management and Monitoring

The Air Quality and Greenhouse Gas Management Plan and pollution reduction programme in accordance with EPL 12425 would continue to be implemented for the Wilpinjong Coal Mine incorporating Modification. This would include the continued implementation of the real-time air quality monitoring system and response protocols.

In addition, the Air Quality and Greenhouse Gas Management Plan would be reviewed and, if necessary, revised for the Modification to include an updated air quality monitoring network reflecting current land ownership.

4.5 SPONTANEOUS COMBUSTION

4.5.1 Background

Spontaneous combustion events at the Wilpinjong Coal Mine have historically been associated with both ROM coal stockpiles and carbonaceous material located in temporary waste rock emplacements (Sections 2.4 and 2.6).

While these events have been managed in accordance with the Spontaneous Combustion Management Plan, they have at times resulted in perceptible odour and/or associated environmental complaints from nearby private receivers (Figure 4a) and/or users of Ulan-Wollar Road.

The coal stockpile spontaneous combustion events arose due to stockpiling of ROM coal for an extended period, and this is now avoided by close monitoring and priority washing of select ROM coal types after they have been stockpiled on-site for a designated period (Section 2.4).

The management of carbonaceous waste rock material on-site is currently being reviewed and a comprehensive remediation strategy is being applied to existing temporary waste rock emplacements that would see the spontaneous combustion high risk materials in these landforms managed by re-mining and deposition of the material at depth in mine voids, or encapsulation, by the end of 2015 (Section 2.6).

In consultation with the EPA, following spontaneous combustion events on-site in early 2012, WCPL initiated short-term monitoring of selected gases, volatile organic compounds and polycyclic aromatic hydrocarbons in the Village of Wollar to the east and Cooks Gap to the west of Wilpinjong Coal Mine.

A review of the results of the monitoring between March and June 2013 completed by Pacific Environment Limited (2013) indicates that for the pollutants monitored, with the exception of one ten-minute period when an elevated sulphur dioxide result was recorded at Cooks Gap (which was likely to be related to equipment malfunction), all monitored pollutant levels were below the relevant criteria identified in the report.

The monitoring included detection of hydrogen sulphide that has a rotten egg odour and is typically associated with spontaneous combustion events. The 1-hour average hydrogen sulphide concentrations at both Wollar Village and Cooks Gap were significantly below the relevant guidelines for ambient air in the monitoring period (Pacific Environment Limited, 2013).

Hydrogen sulphide odour can be easily detected at concentrations much lower than are harmful to health, with its smell being easily perceptible at concentrations well below 1 part per million (ppm) in air (Pacific Environment Limited, 2013). There were occasions when a complaint coincided with a higher measured hydrogen sulphide concentration, however, the majority of odour complaints were received when no hydrogen sulphide was detected by the monitor (Pacific Environment Limited, 2013). Notwithstanding, Pacific Environment Limited (2013) indicated that it was possible that there are members of the local population that are extremely sensitive to hydrogen sulphide odour at concentrations below the level at which the monitors can detect it.

Pacific Environment Limited (2013) concluded that while it is difficult to determine pollutant sources the Wilpinjong Coal Mine was not indicated as the primary source of any pollutant, and low concentrations were measured for all pollutants.

4.5.2 Environmental Review

The Modification would not significantly alter the potential for spontaneous combustion events to occur at the Wilpinjong Coal Mine, as the coal, waste rock and partings material being mined would be from the same geological formations, and the existing management measures would continue to be applied.

However, the elevated waste rock emplacement in the south of Pit 2 (Figure 5), if not constructed with reference to the placement of carbonaceous waste material would have the potential to generate spontaneous combustion events (as has occurred in existing temporary waste emplacements) prior to the emplacement being reshaped and lowered to approximately 430 m AHD at the end of the mine life as a component of finalising site landforms.

To minimise the risk of spontaneous combustion occurring in the elevated waste rock emplacement prior to final rehabilitation occurring, a number of management measures would be employed, including (Section 3.2.2):

- the emplacement would be designed and constructed with designated carbonaceous material zones to avoid future exposure of the carbonaceous material (i.e. to maintain a minimum of 5 m of compacted inert material coverage over the carbonaceous material, including following final land forming);
- the emplacement would be constructed with diversion drains, lined drains and armoured drop structures to minimise erosion that could expose carbonaceous materials prior to final land forming; and
- the emplacement outer batters would be temporarily rehabilitated (e.g. by aerial seeding) to minimise erosion prior to the emplacement being fully rehabilitated at the end of the mine life.

4.5.3 Mitigation Measures, Management and Monitoring

WCPL is undertaking a general review of carbonaceous waste material management, on-site including (Section 2.6):

- improved material characterisation of waste and interburden material to identify spontaneous combustion propensity;
- review of the construction methods employed for waste rock emplacements including management of carbonaceous material; and
- revision of the existing Spontaneous Combustion Management Plan (WCPL, 2006a) to address any management improvements.

Any improvements to carbonaceous material management and mitigation measures that arise from this review would also be applied to the design, construction and monitoring of the elevated waste rock emplacement that would be developed in the south of Pit 2 as a component of the Modification (Figure 5).

4.6 GROUNDWATER

4.6.1 Background

Hydrogeological Regime

The Wilpinjong Coal Mine area and surrounds contain sedimentary rocks, including coal measures, of Permian and Triassic age. The dominant outcropping lithology over the Wilpinjong Coal Mine is Permian Illawarra Coal Measures. The siltstones and sandstones of the Triassic Narrabeen Group form elevated, mesa-like and deeply incised plateaus associated with the Goulburn River National Park and the Munghorn Gap Nature Reserve.

HydroSimulations has identified two distinct groundwater systems in the Wilpinjong Coal Mine area:

- Alluvial groundwater system – associated primarily with Wilpinjong Creek.
- Porous rock groundwater system - primarily the Illawarra Coal Measures.

Alluvial Aquifers

Alluvial deposits are associated with Wilpinjong and Cumbo Creeks in the Wilpinjong Coal Mine area. Wilpinjong Creek is conceptualised by HydroSimulations (Appendix C) as a gaining system under natural conditions, with groundwater expected to discharge upwards from the Permian rocks to the alluvium associated with Wilpinjong Creek.

NOW has identified a portion of the alluvial aquifer associated with Wilpinjong Creek downstream of the Wilpinjong Coal Mine as 'highly productive' (Figure 18).

Porous Rock Aquifers

The porous rock aquifers consist of the Narrabeen Group sandstones and the Illawarra Coal Measures, consisting of coal seams, conglomerate, mudstones and siltstones.

None of the identified groundwater systems are significant aquifers (Appendix C). The most permeable units are the Ulan Seam and Marrangaroo Conglomerate, while the sandstones of the Narrabeen Group are of lower permeability and are elevated above the Wilpinjong Coal Mine. The Illawarra Coal Measures also include low permeability mudstones and siltstones.

Recharge to the groundwater systems would occur primarily from rainfall and runoff infiltration, and lateral groundwater flow especially from the elevated Narrabeen Group to the alluvium of Wilpinjong Creek. Seepage faces would be expected along the cliff faces bordering the north of Wilpinjong Creek after rainfall events (Appendix C).

Springs are likely to occur along the foothills of the sandstone escarpments. Field inspections of the Modification open cut extension areas by Hunter Eco as part of flora surveys and separately by WCPL personnel identified no evidence of springs or soaks in these areas.

Observed Groundwater Drawdowns

HydroSimulations (Appendix C) conducted a comparison of the drawdown predictions and simulated hydrographs from the EIS predictions (Australasian Groundwater and Environmental Consultants Pty Ltd [AGE], 2005a) with observed groundwater changes.

The observed drawdowns in coal seam monitoring bores were in good agreement with predicted drawdowns, with some difference in the onset due to the difference between the EIS and actual mine schedules (Appendix C).

Groundwater Monitoring and Management

WCPL implements a Site Water Management Plan, including a Groundwater Monitoring Programme (WCPL, 2006b) and Surface and Ground Water Response Plan (WCPL, 2006c) to monitor and manage groundwater on-site. The Surface Water and Ground Water Response Plan includes:

- groundwater investigation triggers, including a process to deal with a groundwater-related complaint;
- groundwater impact investigation protocol; and
- response plan, in the event that an investigation conclusively attributes an adverse impact to an existing groundwater supply user to Wilpinjong Coal Mine operations.

The Wilpinjong Coal Mine groundwater monitoring sites are shown on Figure 18.

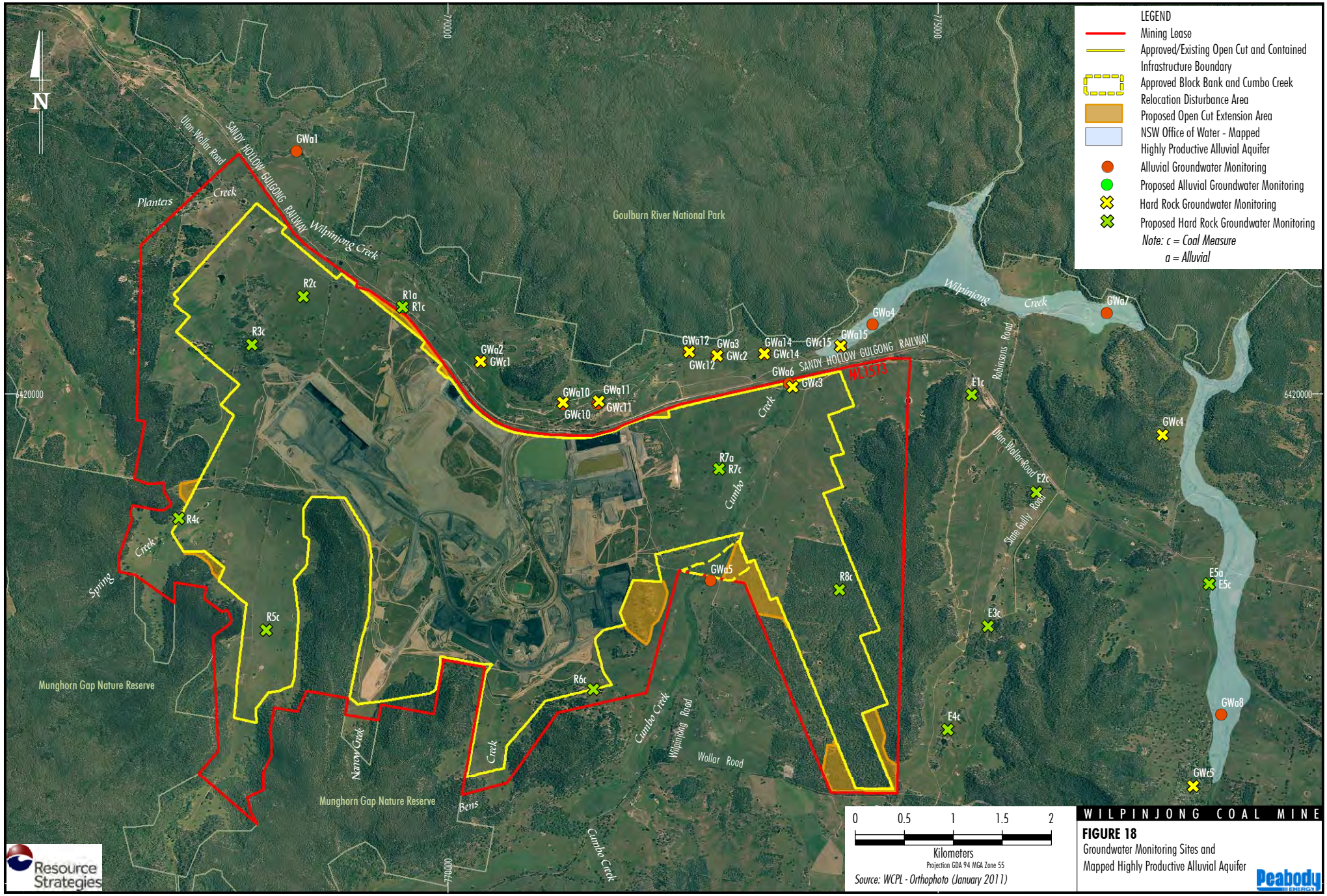
4.6.2 Environmental Review

A Groundwater Assessment for the Wilpinjong Coal Mine, incorporating the Modification, has been prepared by HydroSimulations (2013) and is presented in Appendix C.

The original numerical groundwater model used by AGE (2005a) has been converted by HydroSimulations to a more suitable software platform for water balance interrogation (converted from PMWIN to Groundwater Vistas software).

The key findings of the Groundwater Assessment (Appendix C) are:

- The Modification would have no discernible impact on stream baseflows, beyond the effects of approved mining.
- The Modification would have no discernible impact on groundwater upflow from the Permian sediments to overlying alluvium, beyond the effects of approved mining.
- The Modification would cause imperceptible additional drawdown at any of the alluvium or coal bores in the monitoring network.



WILPINJONG COAL MINE

FIGURE 18

Groundwater Monitoring Sites and Mapped Highly Productive Alluvial Aquifer

Peabody ENERGY

WIL-12-12_75WMod12_209C

- The Modification would not contribute to any measurable incremental cumulative effect (including the effects of the Moolarben Coal Project Stage 2).
- The Modification could not be considered to have a significant impact on the recovery of groundwater levels, beyond the effects of approved mining.
- The Modification could not be considered to have a significant impact on groundwater quality, beyond the effects of approved mining.

Pit Inflows

The Modification would add about 4 megalitres per annum (ML/annum) to peak groundwater inflows to the pits for the currently approved mine plan, resulting in a peak inflow of 2,038 ML/annum in year 2015 (Appendix C). The Modification would make a negligible contribution to the volumes to be licensed pit by pit. WCPL and Peabody Energy hold adequate licence entitlement to account for the potential take of water associated with the approved operations and the minor incremental change associated with the Modification (Section 5.3).

The average pit inflows are estimated to be about 974 ML/annum over the remainder of the Wilpinjong Coal Mine life incorporating the Modification (Appendix C).

Groundwater Users

Potential end of mining drawdown from the Wilpinjong Coal Mine, including the Modification, is not expected to exceed 1 m at any privately owned land (Appendix C). Therefore there would be negligible effect on other groundwater users.

Notwithstanding, WCPL would continue to implement the approved Surface and Ground Water Response Plan.

Aquifer Interference Policy

An assessment of the Modification against the minimal impact considerations in the NSW *Aquifer Interference Policy* (the AIP) was conducted as part of the Groundwater Assessment (Appendix C). The Groundwater Assessment concluded that the Modification is within the 'Level 1' minimal impact considerations outlined in the AIP.

Further discussion on the AIP is provided in Section 5.2.

Consideration of impacts on water resources required by the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) is provided in Section 5.1.3.

4.6.3 Mitigation Measures, Management and Monitoring

Groundwater monitoring and management for the Wilpinjong Coal Mine incorporating the Modification would continue to be conducted in accordance with the Groundwater Monitoring Programme and Surface and Ground Water Response Plan.

WCPL is currently implementing a programme to install 13 new groundwater monitoring piezometers to extend groundwater monitoring at the Wilpinjong Coal Mine and surrounds (Figure 18).

The Groundwater Monitoring Programme would be reviewed and, if necessary, revised for the Modification to include these augmentations to the groundwater monitoring network.

4.7 SURFACE WATER

4.7.1 Background

Hydrology

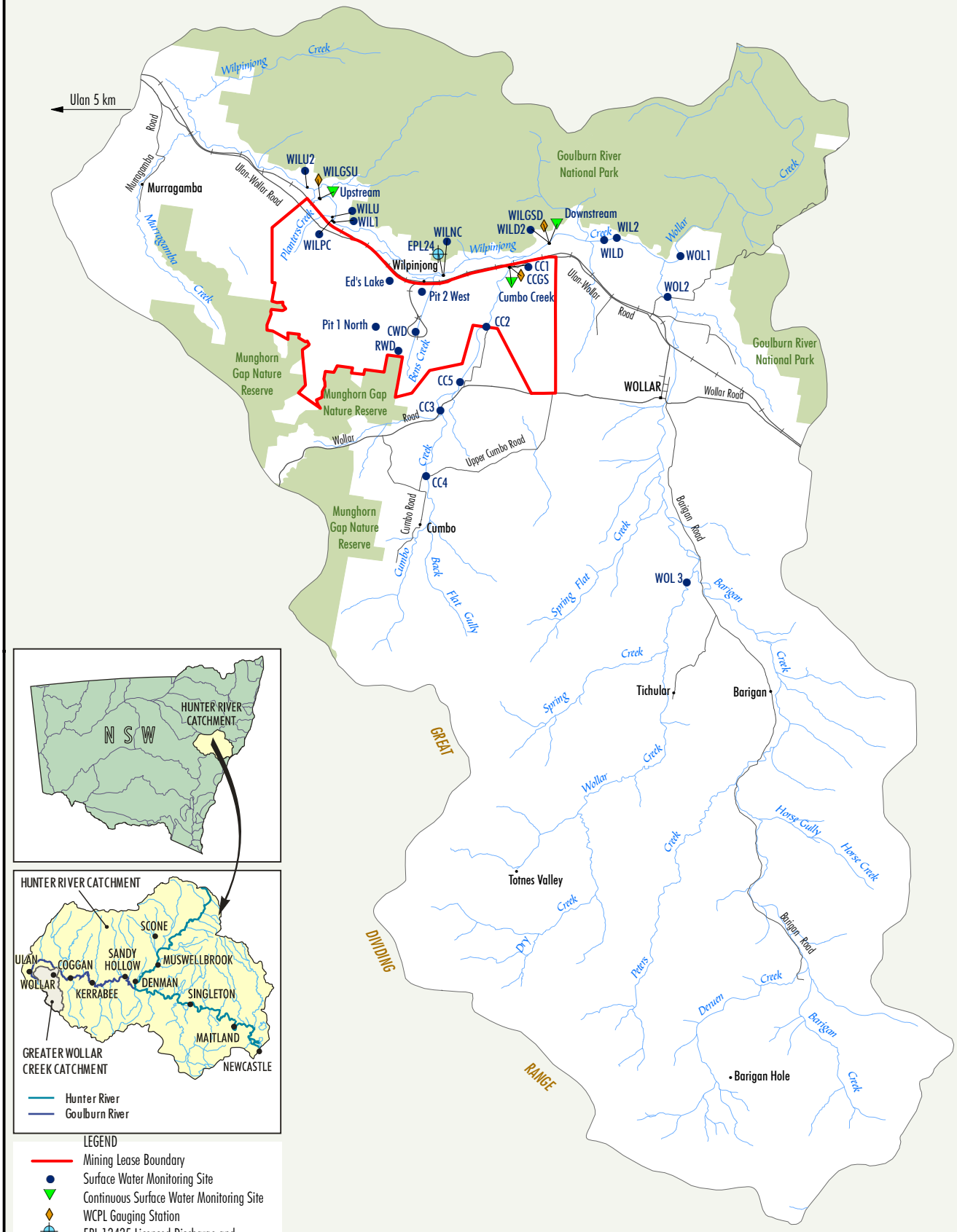
The Wilpinjong Coal Mine is located in the greater Wollar Creek catchment which drains to the Goulburn River approximately 12 km to the north-east of the Wilpinjong Coal Mine area. The greater Wollar Creek catchment consists of a number of tributaries including Wilpinjong Creek, Spring Flat Creek and Barigan Creek (Figure 19).

At a local level, the Wilpinjong Coal Mine lies in the Wilpinjong Creek catchment and is drained by a number of local tributary watercourses (Figure 19). Wilpinjong Creek flows into Wollar Creek approximately 4 km downstream of the confluence of Cumbo and Wilpinjong Creeks.

Wilpinjong Creek is incised into the valley floor and forms a series of semi-permanent soaks fed primarily from drainage from the surrounding alluvial plain and colluviums which are recharged by runoff from the adjacent elevated sandstone plateau (Appendix D).

The tributaries of Wilpinjong Creek within the Wilpinjong Coal Mine area range from small ephemeral and semi-perennial spring fed streams in the upper reaches near the Munghorn Gap Nature Reserve to wide ill-defined ephemeral creeks in the lower reaches near Wilpinjong Creek (Appendix D).

GREATER WOLLAR CREEK CATCHMENT



LEGEND

- Mining Lease Boundary
- Surface Water Monitoring Site
- Continuous Surface Water Monitoring Site
- WCPL Gauging Station
- EPL 12425 Licensed Discharge and Monitoring Point

0 1 2 3 4 5

Kilometres

Projection GDA 94 MGA Zone 55

Resource Strategies

Source: Department of Land and Property Information, 2013 and After DIPNR, 2003

WILPINJONG COAL MINE

FIGURE 19

Wollar Creek Catchment and Relevant Surface Water Monitoring Locations

Peabody ENERGY

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Cumbo Creek, a tributary of Wilpinjong Creek, drains an area of some 70 square kilometres (km^2) including some of the eastern parts of the Wilpinjong Coal Mine. The approved Wilpinjong Coal Mine includes the relocation of Cumbo Creek (Figure 11).

On the basis of available recorded data, Gilbert & Associates (Appendix D) concluded there has been no discernible change in Wilpinjong Creek, Cumbo Creek or Wollar Creek pH, EC and sulphate concentrations since the commencement of mining at the Wilpinjong Coal Mine.

Site Water Management and Monitoring

Surface water monitoring and management at the Wilpinjong Coal Mine is conducted in accordance with the Site Water Management Plan, including the approved Erosion and Sediment Control Plan (WCPL, 2006d), Surface Water Management and Monitoring Plan (WCPL, 2006e) and Surface and Ground Water Response Plan (WCPL, 2006c).

The Wilpinjong Coal Mine surface water monitoring sites are shown on Figure 19.

4.7.2 Environmental Review

A Surface Water Assessment for the Modification was undertaken by Gilbert & Associates (2013). The Surface Water Assessment is presented in Appendix D.

Site Water Management

The existing Wilpinjong Coal Mine and proposed Modification water management systems are described in Sections 2.8 and 3.3, respectively. A site water balance has been conducted for the Wilpinjong Coal Mine, including the Modification, that demonstrates the site water management system would continue to operate effectively (Section 3.3 and Appendix D).

Only minor changes to conceptual upslope diversions would result from proposed Modification open cut extensions (Appendix D). The final locations and form of upslope diversion works would continue to be subject to progressive detailed design in accordance with the approved Erosion and Sediment Control Plan for the Wilpinjong Coal Mine incorporating the Modification.

Stream Flows

The Wilpinjong Coal Mine results in changes to flows in local creeks due to:

- progressive extension of the open cut and associated capture and re-use of drainage from operational disturbance areas;
- changes to groundwater baseflow contributions to local creeks; and
- controlled releases from the licensed discharge point under EPL 12425.

The potential impacts of the Modification on flows in local creeks are summarised below.

The Modification would result in an additional approximate 0.5 km^2 of catchment area being captured within the site water management system (Appendix D). This area is approximately 0.2% of the total pre-mining catchment of Wilpinjong Creek upstream of Wollar Creek. Gilbert & Associates (Appendix D) consider the incremental effect of the catchment area changes proposed as part of the Modification would be negligible in terms of change in streamflow in both Wilpinjong and Cumbo Creeks.

As described in Section 4.6.2, the Modification would have no discernible impact on stream baseflows, beyond the effects of approved mining (Appendix C).

The maximum predicted flow loss in Wilpinjong Creek in the EIS was 11% of average annual flow downstream of the Wilpinjong Coal Mine to upstream of the Wollar Creek confluence (Resource Strategies, 2005). Gilbert & Associates (Appendix D) calculated that the maximum predicted flow loss in Wilpinjong Creek for the Wilpinjong Coal Mine, including the Modification, is also approximately 11% on an average annual basis. Therefore, there is negligible difference in predicted flow loss in Wilpinjong Creek as a result of the Modification (Appendix D).

The Goulburn River at the Wollar Creek confluence has an estimated catchment area of 1,149 km^2 and therefore the effect of the minor catchment area reductions which would be caused by the Modification would be negligible at this point, both when considered in isolation and cumulatively with the Ulan Coal Mines, the Moolarben Coal Mines and the proposed Moolarben Coal Project Stage 2 (Appendix D).

The Modification would not change the EIS final void concepts for the Wilpinjong Coal Mine (Section 3.4 and Figure 11). Therefore there would be no change in the catchment area excised post-mining.

Surface Water Quality

In accordance with EPL 12425, the Wilpinjong Coal Mine is permitted to discharge up to 5 ML/day of excess mine water to Wilpinjong Creek, providing the discharge meets certain requirements, including an upper limit on EC of 500 µS/cm.

Wilpinjong Creek displays typical behaviour with EC reducing with increasing flow rate (Appendix D). Under most conditions, licensed discharge would lead to some decrease in Wilpinjong Creek salinity, with an average EC of 5,400 µS/cm at site WILGSD (Figure 19) over the period of record. During high flow periods in Wilpinjong Creek, licensed discharge would be subject to significant dilution and the resulting downstream increase in salinity would be negligible (Appendix D).

Surface Water Users

There are no known water access licences on, or privately owned land bordering, Wilpinjong and Wollar Creeks downstream of the Wilpinjong Coal Mine area. Therefore there would continue to be no impacts on private water users on these creeks from the Wilpinjong Coal Mine, including the Modification.

4.7.3 Mitigation Measures, Management and Monitoring

Surface water monitoring and management for the Wilpinjong Coal Mine incorporating the Modification, would continue to be conducted in accordance with the Site Water Management Plan.

The Surface Water Management and Monitoring Plan would be reviewed and, where necessary, updated to include:

- a network of electromagnetic flow meters and water levels sensors to assist in water balance monitoring and prediction;
- updated storage curves for key storages to maintain accurate estimates of stored water volumes based on recorded water levels;
- quarterly analysis of copper and zinc at water quality sampling points on Wilpinjong, Cumbo and Wollar Creeks; and
- the results of the extension of flood modelling upstream along Wilpinjong Creek adjacent to Pit 5 and Pit 6, including the required level of any flood bunds adjacent to these pits.

4.8 FLORA

4.8.1 Background

A flora survey and assessment was conducted by FloraSearch (2005) for the Wilpinjong Coal Mine in 2004. Areas of remnant vegetation were systematically surveyed using quadrats and spot sampling sites to compile a comprehensive species list and to detect threatened flora species which may have been present.

Remnant vegetation in the Wilpinjong Coal Mine area is dominated by eucalypt woodland and forests. Widespread and common tree species included Narrow-leaved Ironbark (*Eucalyptus crebra*), Coast Grey Box (*E. moluccana*), Black Cypress Pine (*Callitris endlicheri*) and Rough-barked Apple (*Angophora floribunda*), which associate with other species. Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*), White Box (*E. albens*) and Grey Gum (*E. punctata*) were also dominant tree species.

Two vegetation communities recorded by FloraSearch (2005) in the Wilpinjong Coal Mine area (Community 1 [Yellow Box and Blakely's Red Gum Woodlands] and Community 5a [Grassy White Box Woodlands]) represent communities listed under both the NSW *Threatened Species Conservation Act, 1995* (TSC Act) and the EPBC Act as:

- White Box-Yellow Box-Blakely's Red Gum Woodland Endangered Ecological Community (Box-gum Woodland EEC), listed under the TSC Act.
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands Critically Endangered Ecological Community (Box-gum Woodland CEEC), listed under the EPBC Act.

Community 5a (Grassy White Box Woodland) was characterised by low levels of grasses and herbs and had been subject to heavy grazing by livestock.

One threatened flora species, Cannon's Stringybark (*Eucalyptus cannonii*), was recorded by FloraSearch (2005) outside of the Wilpinjong Coal Mine disturbance area.

Rehabilitation Management Plan and Bushfire Management Plan

The Rehabilitation Management Plan (WCPL, 2011a) and Bushfire Management Plan (EcoLogical, 2011) have been developed to facilitate the management of biodiversity at the existing approved Wilpinjong Coal Mine.

The Rehabilitation Management Plan includes a vegetation clearance protocol, threatened species management protocol, progressive site rehabilitation, habitat enhancement, weed and animal pest control and site access restrictions.

The Rehabilitation Management Plan also describes the implementation of the ECAs, including revegetation, regeneration and protection of the ECAs.

4.8.2 Environmental Review

A Flora Assessment was prepared for the Modification by Hunter Eco (2013) and is presented in Appendix E.

Supplementary Flora Surveys

Baseline flora surveys were conducted in the Modification open cut extension areas and surrounds over five days in January and May 2013.

The vegetation was systematically surveyed using quadrats and random meanders. Vegetation mapping was conducted using quadrat data and rapid data points. Further detail on sampling methods is provided in Appendix E.

As a component of the flora surveys, previous relevant flora surveys, database records (e.g. NSW BioNet records and the EPBC Protected Matters Search Tool) and other scientific studies and literature were reviewed, and where appropriate, included in the assessment of existing vegetation.

Vegetation Communities

Vegetation communities were mapped in the Modification open cut extension areas generally using the vegetation mapping units developed by FloraSearch (2005).

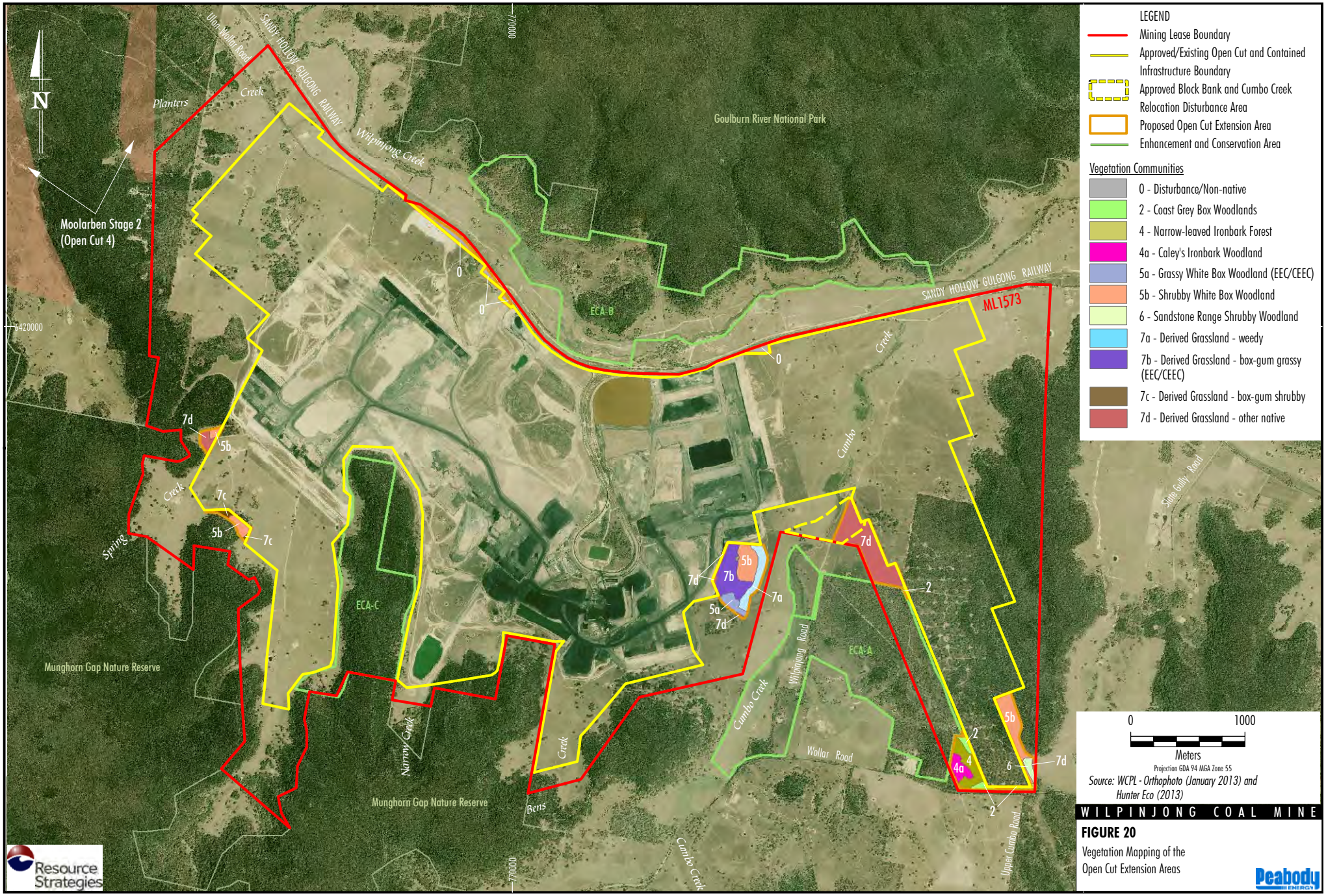
Vegetation communities mapped by Hunter Eco (Appendix E) are shown on Figure 20 and described in Table 5.

Table 5
Native Vegetation Communities Recorded in Modification Open Cut Extension Areas

No.	Community	Species	Area (ha)
2	Coast Grey Box Woodland	*E. moluccana* ± *E. crebra* ± *A. floribunda*	3.5
4	Narrow-leaved Ironbark Forest	*E. crebra/C. endlicheri* ± *E. macrorhyncha* ± *A. floribunda* ± *E. caleyi*	5.3
4a	Caley's Ironbark Woodland	*E. caleyi/C. endlicheri*	3.0
5a	Grassy White Box Woodland (EEC/CEEC)	*E. albens* ± *E. moluccana* ± *C. endlicheri*	2.2
5b	Shrubby White Box Woodland	*E. albens* ± *C. endlicheri* ± *A. floribunda* ± *E. moluccana* ± *E. crebra*	14.5
6	Sandstone Range Shrubby Woodland	*E. punctata/E. sparsifolia/C. endlicheri*	1.3
7b	Derived Grassland – box-gum grassy (EEC/CEEC)	*Convolvulus erubescens, Calotis lappulacea, Elymus scaber, Austrostipa scabra* subsp. *scabra*	8.4
7c	Derived Grassland – box-gum shrubby	*Calotis lappulacea, Austrostipa scabra* subsp. *scabra, Sporobolus creber*	1.1
7d	Derived Grassland – other native	-	12.4
TOTAL*			51.7

Source: After Hunter Eco (2013).

* Excludes land previously disturbed and/or approved for disturbance and grassland with greater than 50% weed cover.



WILPINJONG COAL MINE

FIGURE 20

Vegetation Mapping of the Open Cut Extension Areas

Peabody ENERGY

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Threatened Ecological Communities

A small patch (2.2 ha) of Community 5a (Grassy White Box Woodland) was recorded within the proposed extension in the south of Pit 2 (Figure 20) as is considered to represent Box-gum Woodland EEC/CEEC.

The surrounding cleared and predominately native grassland (Community 7b [Derived Grassland – box-gum grassy]) (8.4 ha) (Figure 20) was conservatively assumed to have been derived from the grassy woodland community and therefore also represent Box-gum Woodland EEC/CEEC (Appendix E).

No other occurrences of threatened ecological communities were recorded in the Modification open cut extension areas.

Threatened Flora Species and Populations

No threatened flora species or threatened flora populations were recorded in the Modification open cut extension areas by Hunter Eco (Appendix E) or FloraSearch (2005).

Potential Impacts

The Modification open cut extension areas would involve direct disturbance of approximately 51.7 ha of native vegetation (29.8 ha of woodland and 21.9 ha of grassland) (Table 5). Each component of the Modification open cut extension areas are situated at the edge of the approved mine disturbance area and therefore would not create habitat fragmentation (Appendix E).

Hunter Eco (Appendix E) concluded that the Modification would not have a significant impact on threatened flora species and ecological communities with the implementation of the proposed management measures and biodiversity offset (Section 4.8.3).

Hunter Eco (Appendix E) considered cumulative impacts including the Modification. The Modification would result in a net gain in biodiversity with the proposed biodiversity offset strategy described in Section 4.8.3 (Appendix E).

Consideration of impacts on nationally threatened flora species and ecological communities required by the EPBC Act is provided in Section 5.1.3.

4.8.3 Mitigation Measures, Management, Monitoring and Offset

Flora management for the Wilpinjong Coal Mine incorporating the Modification would continue to be conducted in accordance with the Rehabilitation Management Plan and Bushfire Management Plan.

Biodiversity Offset Strategy

Flora and Fauna Values within the Modification Biodiversity Offset

The biodiversity offset for the Modification comprises two parcels of freehold land owned by Peabody Energy, approximately 3 km east and 12 km north-east of ML 1573 (Figure 21).

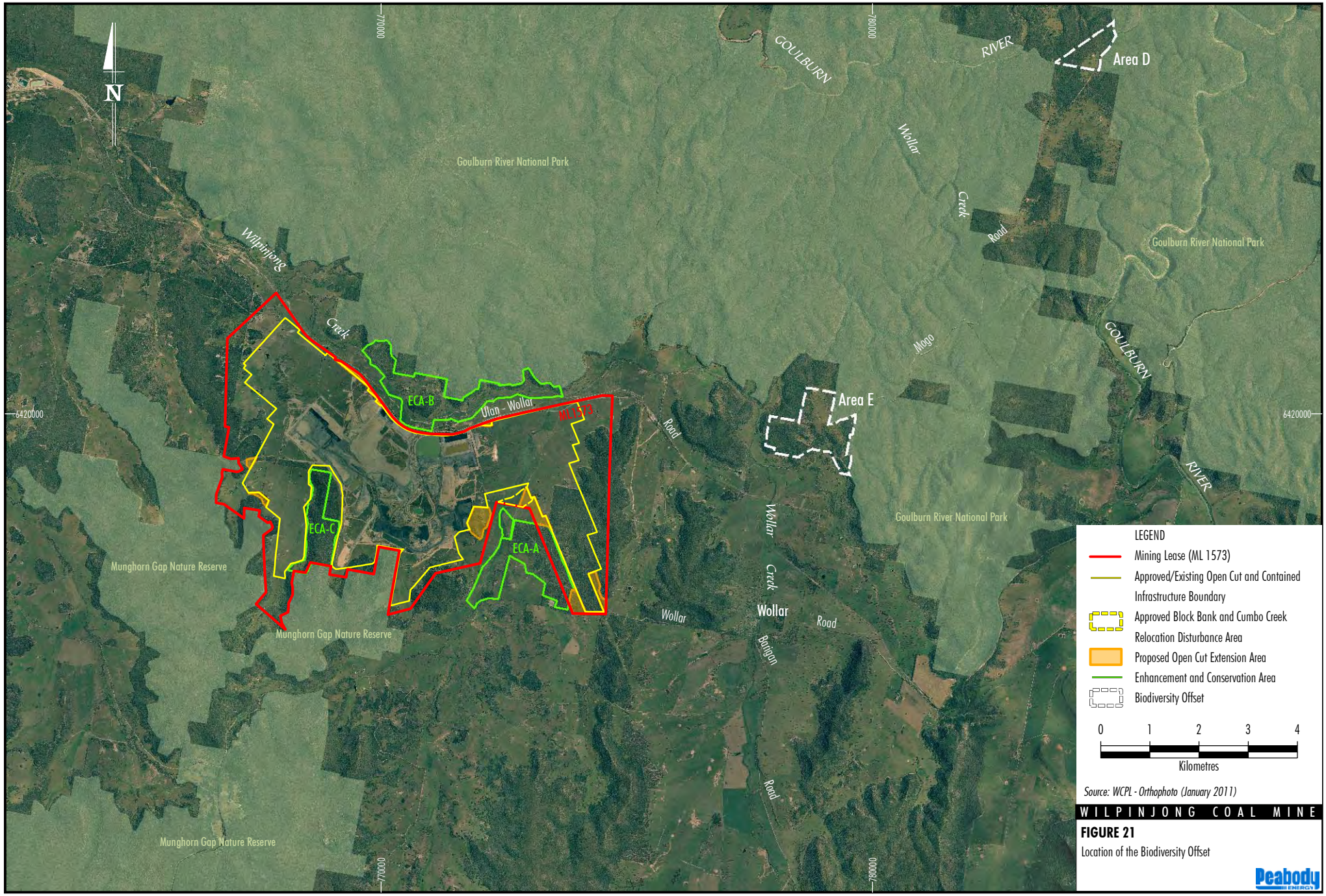
The biodiversity offset is situated in the same Catchment Management Authority (CMA) sub-region as the Wilpinjong Coal Mine (the Upper Hunter sub-region of the Hunter Central Rivers CMA Region). Both parcels of land adjoin Goulburn River National Park, and prior to their purchase by Peabody Energy had been subject to some level of clearing for agricultural purposes (e.g. cattle grazing).

The biodiversity offset (approximately 211 ha) comprises approximately 193 ha of existing forest/woodland, 14 ha of shrubby regeneration and 4 ha of derived native grasslands.

As described in Section 4.8.2, vegetation communities were mapped in the Modification open cut extension areas generally using the vegetation mapping units developed by FloraSearch (2005). No suitable regional vegetation classification and mapping was available for the Wilpinjong Coal Mine area and the biodiversity offset (Appendix E).

Hunter Eco undertook statistical analysis using all plot data from both the Modification open cut extension areas and the biodiversity offset. From this analysis, Hunter Eco made several conclusions:

- Several of the individual communities mapped by FloraSearch (2005) at the Wilpinjong Coal Mine at a local scale could not be statistically distinguished from one another.
- The shrubby white box communities were statistically separated from the grassy white box communities.
- The communities that are allocated as being part of the Box-gum Woodland EEC/CEEC are statistically similar.



WILPINJONG COAL MINE

FIGURE 21

Location of the Biodiversity Offset

Peabody ENERGY

WIL-12-12_75WMod12_221A

- The majority of the local woodland communities from both the Modification open cut extension areas and the biodiversity offset are statistically similar.

On the basis of this analysis, Keith Class (Keith, 2004) is used when comparing the Modification open cut extension areas with the biodiversity offset.

A comparison of vegetation present within the biodiversity offset and the Modification open cut extension areas based on Keith Class is provided in Table 6 (including vegetation classes). Table 7 presents a comparison of the area of Box-gum Woodland EEC/CEEC recorded in the biodiversity offset and in the Modification open cut extension areas (which are subsets of the areas presented in Table 6).

The biodiversity offset very likely contains areas of derived grassland that equate to the Box-gum Woodland EEC/CEEC (as they are located immediately adjoining the woodland form of the EEC/CEEC). However these have been conservatively excluded from the EEC/CEEC calculations in Table 7. In contrast, within the Modification open cut extension areas, derived grassland adjacent to the woodland form of the Box-gum Woodland EEC/CEEC has been conservatively included in the EEC/CEEC calculations (Tables 6 and 7).

As described in Section 4.8.2, the Modification would clear approximately 10.6 ha of Box-gum Woodland EEC/CEEC (comprising 8.4 ha of grassland and 2.2 ha of woodland). Approximately 47.8 ha of Box-Gum Woodland EEC/CEEC has been mapped at the biodiversity offset (excluding areas of derived grassland that may equate to the EEC/CEEC) (Table 7). Detailed descriptions and vegetation mapping of each of the communities recorded in the biodiversity offset are provided in Appendix E.

Hunter Eco considers the native vegetation in the Modification open cut extension areas and the biodiversity offset to be an acceptable like-for-like match at the Keith Class level and also at the local community level for the EEC/CEEC.

Biodiversity Monitoring Services (2013) recorded a range of vertebrate fauna species during surveys of the biodiversity offset. There were many similarities between the vertebrate species present within the biodiversity offset and the Modification open cut extension areas.

Vertebrate fauna species in the biodiversity offset are represented by amphibians, reptiles, woodland and forest birds and arboreal and ground dwelling mammals (Appendix F).

As described in Section 4.9, several threatened fauna species have been recorded either within the Modification open cut extension areas or their surrounds by the EIS and other past surveys (i.e. Mount King Ecological Surveys [2005] and OEH records). Actual records or potential habitat for all threatened fauna species recorded within the Modification open cut extension areas or their surrounds have also been recorded in the biodiversity offset or immediate surrounds.

Ecological gains from the biodiversity offset would include:

- Similar vegetation communities/fauna habitats in the Modification open cut extension areas would be conserved/enhanced in the biodiversity offset.
- The biodiversity offset is suitably located to benefit flora and fauna populations (biodiversity values) potentially impacted by the Modification.
- Although the proposed biodiversity offset is considered to sufficiently offset the residual impacts of the Modification irrespective of the proposed management measures, the ecological value of the biodiversity offset has the ability to improve through management measures, such as weed and pest control, restricting stock and select tubestock planting, that would reduce competition and disturbance processes and improve available habitat resources.
- All threatened species recorded within or near the Modification open cut extension areas are either known to occur or have the potential to occur within the biodiversity offset.
- The biodiversity offset is located within the same CMA sub-region and Interim Biogeographic Regionalisation for Australia (IBRA) region as the Modification.
- Both parcels of land that comprise the biodiversity offset adjoin the Goulburn River National Park and would complement the existing reserve system.
- Substantial areas of Box-gum Woodland EEC/CEEC occur in the biodiversity offset.
- The biodiversity offset is positioned adjacent to largely undisturbed natural vegetation, it is not isolated in the landscape, and its high connectivity would help its long-term viability.

Table 6
Vegetation within the Modification Open Cut Extension Areas and the Biodiversity Offset

Code	Community	Class (Keith [2004])	Modification (ha)	Biodiversity Offset (ha)
2	Coast Grey Box Woodland	Coastal Valley Grassy Woodlands	3.5	35.2
15	Narrow-leaved Ironbark – Box Woodland			
16	Rough-barked Apple Woodland	North Coast Dry Sclerophyll Forests	-	1.6
9	Broombush Scrub	Pilliga Outwash Dry Sclerophyll Forests	-	3.3
4	Narrow-leaved Ironbark Forest	Western Slopes Dry Sclerophyll Forests	24.1	101.9
4a	Caley's Ironbark Woodland			
5b	Shrubby White Box Woodland			
6	Sandstone Range Shrubby Woodland			
12	Grey Gum - Narrow-leaved Stringybark Forest			
13	Ironbark-Bloodwood-Redgum Woodland			
5a	Grassy White Box Woodland (EEC/CEEC)	Western Slopes Grassy Woodlands	24.1	55.2
7b	Derived Grassland - box-gum grassy (EEC/CEEC)	Derived Native Grassland (Biodiversity Offset)		
7c	Derived Grassland - box-gum shrubby			
7d	Derived Grassland - other native			
8	Blakely's Red Gum Woodland (EEC/CEEC)			
14	Inland Grey Box Woodland			
17	Yellow Box Woodland (EEC/CEEC)			
18	Shrubby Regeneration	-	-	13.6
TOTAL			51.7[1]	210.8[2]

Source: After Hunter Eco (2013).

EEC: *White Box Yellow Box Blakely's Red Gum Woodland* endangered ecological community (TSC Act).

CEEC: *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* critically endangered ecological community (EPBC Act).

1 Excludes approximately 17.8 ha of Derived grassland – weedy, approved mine disturbance and a dam.

2 Excludes a 0.2 ha dam.

Table 7
Box-gum Woodland EEC/CEEC – Modification and Biodiversity Offset

Box-gum Woodland EEC/CEEC	Modification (ha)	Biodiversity Offset (ha)
Woodland	2.2	47.8
Grassland	8.4	0
TOTAL	10.6	47.8

Source: After Hunter Eco (2013).

Note: The woodland and grassland forms listed are different conditions of the Box-gum Woodland EEC/CEEC (i.e. the grassland areas are derived from woodland through historic clearing). As discussed above, the biodiversity offset very likely contains areas of derived grassland that equate to the Box-gum Woodland EEC/CEEC. However these have been conservatively excluded from the EEC/CEEC calculations in this table. In contrast within the Modification open cut extension areas, derived grassland adjacent to the woodland form of the Box-gum Woodland EEC/CEEC has been conservatively included in the EEC/CEEC calculations.

The proposed biodiversity offset is therefore considered to be a suitable offset against the residual flora and fauna impacts associated with the Modification.

Security of the Biodiversity Offset

WCPL intends to reach an agreement with the NSW Government so that the biodiversity offset can be permanently added to the adjoining Goulburn River National Park. However, WCPL recognises that the formal process of incorporating the area into the National Park may take some time, and as a result an interim conservation arrangement could be made to ensure protection and management of the biodiversity offset (e.g. a voluntary conservation agreement with the NSW Minister for the Environment).

Management of the Biodiversity Offset

A biodiversity offset strategy would be prepared by a suitably qualified person(s) to facilitate the management of the biodiversity offset area. The biodiversity offset strategy would be developed within six months of approval of the Modification and be incorporated into the existing Wilpinjong Coal Mine Environmental Management Strategy (e.g. as part of the Rehabilitation Management Plan that currently guides management of the existing ECAs).

Management measures proposed to enhance the flora and fauna values of the biodiversity offset would be detailed in the biodiversity offset strategy and would include:

- promotion of natural regeneration and revegetation;
- stock control;
- selective active revegetation and habitat enhancement;
- control of weeds; and
- pest management.

The two parcels of land that comprise the biodiversity offset contain a number of access tracks, dwellings and internal fencing, as well as tanks for stock watering. The continued use of this infrastructure versus their removal would be determined in consultation with DP&I and OEH depending on the protection mechanism used to secure the land for conservation, and possible beneficial uses of the existing infrastructure.

4.9 FAUNA

4.9.1 Background

Mount King Ecological Surveys (2005) conducted fauna surveys for birds, mammals, reptiles and amphibians for the Wilpinjong Coal Mine in autumn and spring 2004. Bat fauna were surveyed separately by Greg Richards and Associates (2005).

Remnant vegetation in the Wilpinjong Coal Mine area provides habitat for a number of woodland birds. No cave structures were identified in the Wilpinjong Coal Mine disturbance area. There are caves located in the Munghorn Gap Nature Reserve and Goulburn River National Park, as well as rock shelters/caves in sandstone escarpments and rock shelters associated with isolated tors on slopes proximal to the Wilpinjong Coal Mine (Resource Strategies, 2005).

Several threatened fauna species have previously been recorded at the Wilpinjong Coal Mine and surrounds by Mount King Ecological Surveys (2005), Greg Richards and Associates (2005) and Resource Strategies (2005), as follows:

- Square-tailed Kite;
- Little Eagle;
- Glossy Black-cockatoo;
- Gang-gang Cockatoo;
- Little Lorikeet;
- Turquoise Parrot;
- Masked Owl;
- Brown Treecreeper (eastern subspecies);
- Speckled Warbler;
- Black-chinned Honeyeater (eastern subspecies);
- Regent Honeyeater;
- Painted Honeyeater;
- Hooded Robin (south-eastern form);
- Diamond Firetail;
- Squirrel Glider;
- Yellow-bellied Sheathtail-bat;
- Eastern Freetail-bat;
- Little Bentwing-bat;
- Eastern Bentwing-bat;
- Large-eared Pied Bat; and
- Eastern False Pipistrelle.

The Rehabilitation Management Plan (WCPL, 2011a) and Bushfire Management Plan (EcoLogical, 2011) have been developed to facilitate the management of biodiversity at the existing approved Wilpinjong Coal Mine.

4.9.2 Environmental Review

A Fauna Assessment was prepared for the Modification by Biodiversity Monitoring Services (2013) and is presented in Appendix F.

Supplementary Fauna Surveys

Supplementary fauna surveys of the Modification open cut extension areas were conducted over six days from 26 November 2012 to 1 December 2012.

Three detailed and five observational sites were surveyed using a variety of methods including Elliot traps, tree-mounted traps, cage traps, hair funnels, infrared cameras, bat echolocation recorders, bird surveys, spotlighting, call playback, herpetological surveys, identification of faunal traces and opportunistic observations (Appendix F). Further detail on sampling methods is provided in Appendix F.

As a component of the fauna surveys, previous relevant fauna surveys, database records (e.g. NSW BioNet records, Australian Museum records, Birds Australia records and the EPBC Protected Matters Search Tool) and other scientific studies and literature were reviewed, and where appropriate, included in the assessment of fauna habitat and diversity.

Fauna Habitat

The Modification open cut extension areas comprise two key habitat types (grassland and woodland). The grassland areas have been heavily disturbed by past clearing and grazing. Some areas retain native groundcover species while other areas are heavily weed infested (Appendix F).

The woodland areas vary from low disturbance to high disturbance due to selective logging, grazing and rubbish dumping. Overall, the woodland areas provide more habitat opportunities than the grassland areas, although they are not in pristine condition (Appendix F).

Native Fauna

A total of 116 native fauna species were recorded during the supplementary survey, comprising six amphibians, six reptiles, 84 birds and 20 mammals (Appendix F).

The faunal assemblage is similar to that recorded during the previous surveys for Wilpinjong Coal Mine (Appendix F).

The following threatened fauna species were located by the fauna surveys of the Modification open cut extension areas (Appendix F):

- Little Eagle;
- Brown Treecreeper (eastern subspecies);
- Speckled Warbler;
- Grey-crowned Babbler (eastern subspecies);
- Diamond Firetail;
- Eastern Bentwing-bat;
- Large-eared Pied Bat;
- Eastern False Pipistrelle; and
- Eastern Cave Bat.

Introduced Fauna

One introduced bird and seven introduced mammal species were located during the survey, including the Common Starling, Red Fox, Brown Hare, Rabbit, Pig, Cattle, Sheep and Goat (Appendix F).

Potential Impacts

The Modification would result in the loss of approximately 29.8 ha of native woodland habitat and 21.9 ha of native grassland (Table 5). The woodland vegetation to be cleared by the Modification open cut extensions is located on the edge of historical farmland and constitutes several small areas rather than one large area. The vegetation to be cleared is located immediately adjacent to the existing/approved Wilpinjong Coal Mine open cut pits (Figure 5) and the Modification would not materially affect edge effects, connectivity or movement corridors (Appendix F).

There is a small amount of steep slope habitat (rocky outcrops) within the proposed southern extent of Pit 3 that would be disturbed by the Modification. Although there are steep slopes within this area, little rocky outcrop habitat occurs (Appendix F). No watercourses or wetland would be affected by the Modification (Appendix F).

In consideration of the above and the implementation of the proposed management measures and biodiversity offset strategy, Biodiversity Monitoring Services (Appendix F) concluded that no threatened fauna or their habitats, are likely to be significantly impacted by the Modification.

Biodiversity Monitoring Services (Appendix F) considered cumulative impacts including the Modification, and concluded the loss of habitats for native fauna is relatively small in comparison with the extent of the native vegetation and associated habitats within the region. Significant cumulative impacts are considered unlikely in consideration of the scale of the Modification, the extent of existing native vegetation/habitat in the region (including reserves and offsets) and the proposed biodiversity offset (Appendix F).

Consideration of impacts on nationally threatened fauna species and migratory species required by the EPBC Act is provided in Section 5.1.3.

4.9.3 Mitigation Measures, Management, Monitoring and Offset

Fauna management for the Wilpinjong Coal Mine incorporating the Modification would continue to be conducted in accordance with the Rehabilitation Management Plan and Bushfire Management Plan.

The biodiversity offset strategy for the Modification is provided in Section 4.8.3, including a description of the ecological gains for fauna.

Biodiversity Monitoring Services (2013) recorded a range of vertebrate fauna species during surveys of the biodiversity offset. There were many similarities between the vertebrate species present within the biodiversity offset and the Modification open cut extension areas. Vertebrate fauna species in the biodiversity offset are represented by amphibians, reptiles, woodland and forest birds and arboreal and ground dwelling mammals (Appendix F).

Actual records or potential habitat for all threatened fauna species recorded within the Modification open cut extension areas or their surrounds have also been recorded in the biodiversity offset or immediate surrounds.

4.10 ABORIGINAL HERITAGE

4.10.1 Background

A number of Aboriginal cultural heritage surveys, assessments and salvage programmes have been previously undertaken within the vicinity of the Modification open cut extension areas and surrounds.

A comprehensive survey and assessment was undertaken by Navin Officer Heritage Consultants (2005) across a 2,510 ha area as part of the EIS. Navin Officer Heritage Consultants (2005) recorded a total of 224 Aboriginal sites and potential archaeological deposits (PADs), including artefact scatters, isolated artefacts, rock shelters with artefacts, PADs and/or art, and scarred trees (Appendix G).

A number of the items recorded were scarred trees of only 'possible' Aboriginal origin, and other places/values that do not comprise Aboriginal objects under the NPW Act were recorded (Appendix G).

Archaeological investigations undertaken at the Wilpinjong Coal Mine, Moolarben Coal Mines and Ulan Coal Mines and surrounds have resulted in the identification of a large number of artefact occurrences and rock shelter sites with archaeological deposits and/or rock art or grinding grooves, along with many shelters with PADs (Appendix G).

Higher density artefact sites represent more focused occupation and such contexts appear to include elevated, well-drained and low gradient flats, terraces, spur crests, ridge crests and simple slopes adjacent to watercourses, particularly higher order watercourses.

The management of Aboriginal heritage at the Wilpinjong Coal Mine is conducted in accordance with the measures outlined in the ACHMP.

These measures include surface and subsurface salvage of artefacts, storage of salvaged artefacts and avoidance and monitoring or sandstone overhangs. The ACHMP also includes measures for the management of Wilpinjong Coal Mine ancillary disturbance areas and previously unrecorded Aboriginal sites.

4.10.2 Environmental Review

An Aboriginal Cultural Heritage Assessment (ACHA) was prepared for the Modification by South East Archaeology (2013) and is presented in Appendix G.

The ACHA for the Modification has been undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a) (Appendix G).

The ACHA included consultation with eight Aboriginal parties (Appendix G). Table 8 summarises the main stages of the Aboriginal cultural heritage consultation programme undertaken for the Modification, with further detail provided in Appendix G.

Consultation with Aboriginal groups regarding the existing Wilpinjong Coal Mine and the proposed Modification has been extensive and involved various methods including advertisements, meetings, written and verbal correspondence, archaeological survey attendance and site inspections.

Survey Design

The archaeological and cultural surveys were undertaken to ground truth sites previously recorded within the Modification open cut extension areas, in addition to identifying any new sites and determining the visible extent of artefact scatter sites.

The survey sampled the geographic context of the investigation area, with individual survey areas based on specific combinations of landform element and slope.

Archaeological Findings

Twelve previously unrecorded open artefact sites were identified during the surveys conducted for the Modification.

When considered with previously recorded sites, a total of 24 Aboriginal sites or values are known to occur directly within or immediately adjacent to the Modification open cut extension areas, including:

- twenty-two open artefact sites;
- one possible Aboriginal scarred tree; and
- one possible cultural value/association.

A detailed description of identified sites is provided in Appendix G.

Archaeological and Cultural Heritage Values

As part of the ACHA, archaeological significance was assessed in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010b).

South East Archaeology (Appendix G) concluded that one site was of high significance within a local context, four sites were of low to possibly moderate significance within a local context, 18 sites were of low significance within a local context and one site was of nil significance[4]. None of the sites are assessed as being of significance within a regional context. Further details on the significance of the sites are presented in Section 7 of Appendix G.

Separate to the archaeological significance assessment, registered Aboriginal parties were requested to provide comment in regard to the cultural significance of the Modification open cut extension areas and the sites within or adjacent to it. Based on the comments received:

- All sites and places are considered to be of high cultural significance, with no differentiation of the comparative value between any site or place.
- The rock art site WCP72 (adjacent to both the approved open cut and contained infrastructure area and a Modification open cut extension area) is considered to be of contemporary cultural significance.

The potential impacts of the Modification on Aboriginal cultural heritage would be associated with direct disturbance (e.g. as a result of the open cut earthworks, water management, access roads, etc.) and indirect disturbance that may adversely impact on Aboriginal heritage (e.g. blast vibration).

Direct Disturbance

The Modification would result in potential impacts to 17 open artefact sites, one scarred tree and one cultural value/association which are of nil, low or low to possibly moderate significance within a local context as described above.

The Modification would also result in impacts to sub-surface deposits of artefacts, particularly site WCP1 (the site of high significance within a local context). This site is within the approved disturbance footprint of the Cumbo Creek diversion and therefore the Modification would not result in any additional impacts to this site.

[4] Of the previously recorded sites, one site was of high significance, three sites were of low to possibly moderate significance, seven sites were of low significance and one site was of nil significance.

Table 8
Summary of Aboriginal Heritage Consultation Programme

Date	Consultation Conducted
18 October 2012	Letters requesting the names of Aboriginal stakeholders that may have had an interest in the consultation process were sent to the Office of the Registrar (*Aboriginal Land Rights Act, 1983*), Native Title Services Corporation Limited, National Native Title Tribunal, Dubbo OEH, MWRC, Mudgee Local Aboriginal Land Council (LALC) and the Hunter-Central Rivers CMA.
7 November 2012	Letters seeking registrations of interest were sent to Aboriginal parties or groups identified by the above step.
9 November 2012	Public advertisement published in the Mudgee Guardian inviting interested Aboriginal parties or groups to register an interest in the consultation process.
30 November 2012	Invitation to registered Aboriginal parties to attend an information session regarding the Modification and the proposed methodology for the ACHA.
3 December 2012	Provision of a proposed methodology for undertaking the ACHA to all registered Aboriginal parties for their review and comment; and the provision of details regarding field survey and induction requirements. Included request for cultural knowledge/significance of the area and/or known sites of Aboriginal heritage.
December 2012 - January 2013	Feedback from the registered Aboriginal parties in regard to the proposed methodology received, and consideration given to all comments.
4 December 2012	Record of names of registered Aboriginal parties provided to the OEH and the Mudgee LALC in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a).
18 December 2012	Information session held for all registered Aboriginal parties to present information regarding the Modification and the proposed methodology. Reconnaissance inspection made of mine site and portions of the investigation area. Discussion included request for cultural knowledge/significance of the area and/or known sites of Aboriginal heritage.
21 December 2012	Invitation to registered Aboriginal parties to attend the Aboriginal cultural heritage survey.
23 January – 25 January 2013	Aboriginal cultural heritage survey conducted over a three day period. Cultural significance of the area and Aboriginal heritage sites discussed with the Aboriginal representatives.
29 January – 13 February 2013	Notification to registered Aboriginal groups of additional survey dates and invitation to attend.
4 March – 5 March 2013	Additional Aboriginal cultural heritage survey conducted over a two day period. Cultural significance of the area and Aboriginal heritage sites discussed with the Aboriginal representatives.
11 June 2013	Draft ACHA issued to the registered Aboriginal parties for review, including survey results, archaeological and cultural significance assessment (based on feedback received during consultation and fieldwork), potential impacts and proposed mitigation and management measures. The letter specifically requested cultural knowledge/significance of the area and/or known sites of Aboriginal heritage.
17 June 2013	Invitation to registered Aboriginal parties to attend a meeting on 28 June 2013 to discuss the findings, provide any information on cultural knowledge/significance and provide an opportunity to comment on the draft ACHA, and a site inspection of key archaeological sites/areas.
28 June 2013	Meeting and site inspection held for all registered Aboriginal parties.
June/July 2013	Phone calls made to all registered Aboriginal parties to request comments (either verbal or written) on the draft ACHA.
July 2013	Comments received from registered Aboriginal parties on the draft ACHA were considered and included in the ACHA.

Source: After Appendix G.

Indirect Disturbance

Blasting associated with the mining process results in the generation of ground vibration (Section 4.3). Blast vibration can potentially cause damage to rock based features such as overhangs and platforms if the magnitude is sufficient and the specifics of the rock feature do not allow for movement and/or release of vibration stresses. None of these site types were recorded (or are likely to occur) in the Modification open cut extension areas.

Site WCP72 (adjacent to both the approved open cut and contained infrastructure area and a Modification open cut extensions area) would be avoided by direct disturbance, although is a rock overhang and therefore potentially susceptible to vibration.

A blasting assessment undertaken by SLR Consulting (2013) indicates that the maximum vibration occurring at site WCP72 associated with the Modification (i.e. 85.8 millimetres per second) would be well below the relevant damage criteria based on observable damage (Dowding, 1985) (i.e. 460 millimetres per second) (Appendix A). Notwithstanding, this site would continue to be monitored as described/required by the existing Blast Management Plan.

Overall and Cumulative Impacts

South East Archaeology concluded that the impacts of the Modification on Aboriginal heritage would be low within a local context and very low within the regional context (Appendix G).

South East Archaeology (Appendix G) also concluded that the cumulative impacts of the Modification (i.e. in combination with other mining projects in the region such as the adjacent Moolarben Coal Mines and nearby Ulan Coal Mines) would also be very low.

4.10.3 Mitigation Measures, Management and Monitoring

The management of Aboriginal heritage within the Modification open cut extension areas would be guided by a revision of the existing ACHMP that would be undertaken in consultation with the Aboriginal community (i.e. the Aboriginal parties/groups included in the Modification ACHA).

Specific mitigation and management measures are proposed for the open artefact site WCP1, including surface collection, broad area and localised hand excavation and surface scrapes. These measures are further detailed in Sections 10 and 11 of Appendix G.

In addition, the protocol for the ongoing involvement of Aboriginal stakeholders would be reviewed in consultation with the registered Aboriginal parties/groups as a component of the revision of the ACHMP.

Consistent with current site procedures in the ACHMP, if any previously unrecorded Aboriginal sites are identified during the course of the development of the Modification they would be managed in accordance with the management measures for similar site/artefact types previously identified.

4.11 ROAD TRANSPORT

4.11.1 Background

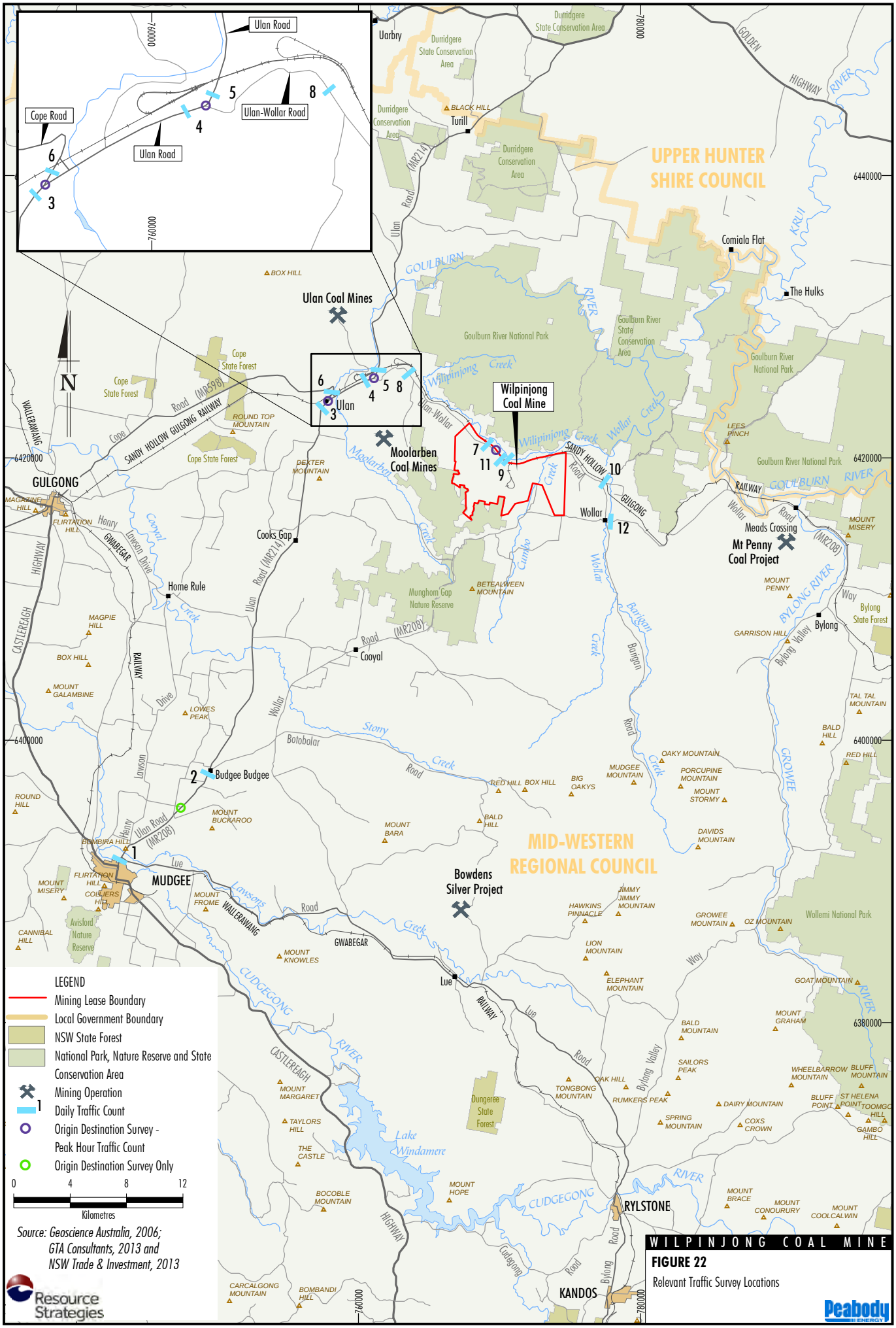
The following key roads are of relevance to the Wilpinjong Coal Mine (Figure 22):

- Main Road 208 (MR208) – extends between Mudgee and Sandy Hollow through Budgee Budgee, Wollar and Bylong and passes to the south of the Wilpinjong Coal Mine. MR208 is known as Ulan Road, Wollar Road and Wollar-Bylong Road.
- Main Road 214 (MR214) – extends north from Budgee Budgee to Cassilis. MR214 is known as Ulan Road and Ulan-Cassilis Road.
- Main Road 598 (MR598) – provides an east-west link between Gulgong and Ulan. MR598 is known as Cope Road.
- Ulan-Wollar Road – a local rural road which provides an east-west connection between the villages of Ulan and Wollar.

The primary route from Mudgee to the site is via Ulan Road (MR208 and MR214) and Ulan-Wollar Road (Figure 22).

Primary access to the site from Ulan-Wollar Road is via an internal sealed mine access road connecting the mine facilities area to the Ulan-Wollar Road.

WCPL has previously funded the upgrading of approximately 6 km of Ulan-Wollar Road between Ulan and the Wilpinjong mine access road.



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MWRC is also currently sealing approximately 2 km of Ulan-Wollar Road immediately to the east of the Wilpinjong Coal Mine access road with funding provided by WCPL.

WCPL encourages car pooling by employees to minimise traffic movements on the public road network and implements measures to minimise the interaction of mine traffic with the operation of the school bus on Ulan Road.

Ulan Road Strategy

The Ulan Road Strategy reviewed the condition and performance of Ulan Road and recommended upgrades and maintenance required to meet and maintain Ulan Road at the required design standards in accordance with the Project Approval 05-0021.

The Ulan Road Strategy upgrade and maintenance requirements that WCPL is co-funding with Ulan Coal Mines, Moolarben Coal Mines and MWRC include (DP&I, 2013):

- Upgrade of approximately 20.6 km of Ulan Road to meet design standards.
- Upgrade of some 23 intersections, including the intersection of Cope Road (MR598) and Ulan Road (MR214).
- Road safety upgrades, including the installation of wire rope barriers on some sections of the road and enhanced delineation.
- Heavy rehabilitation of some 7.8 km, and light rehabilitation of some 13.6 km of Ulan Road.
- Reseals to some 61.7 km of Ulan Road.
- General maintenance of Ulan Road over the next 20 years.

4.11.2 Environmental Review

A Road Transport Assessment for the Modification was undertaken by GTA Consultants (2013) and is presented as Appendix H.

The Road Transport Assessment includes consideration of the potential cumulative impacts of the Ulan Coal Mines, Moolarben Coal Mines and proposed Mt Penny Coal Project.

While the traffic increases associated with the Modification would only be modest, as the workforce of the Wilpinjong Coal Mine has materially increased over the period since the Mining Rate Modification (Section 2.10) a comprehensive road transport assessment has been completed (Appendix H).

Existing Traffic Volumes and Distribution

Traffic volumes and distribution in the vicinity of the Wilpinjong Coal Mine and on Ulan Road were determined by traffic surveys conducted in December 2012, including automatic tube counts, peak period turning movement surveys (Ulan Road/Cope Road, Ulan Road/Ulan-Wollar Road and Ulan-Wollar Road/Wilpinjong Coal Mine Access Road) and origin-destination survey (Figure 22) with the results presented in Appendix H. These 2012 survey results would incorporate some growth in the Wilpinjong Coal Mine workforce that occurred since approval of the Mining Rate Modification (Section 2.10).

The average weekday traffic volumes at the surveyed locations typically demonstrated a similar pattern in the variation in traffic volumes throughout the day, with a reasonably distinct morning peak hour (generally 6.00 am to 7.00 am), and a less well defined evening peak. The exceptions to this were the two locations on Ulan-Wollar Road to the east of the Wilpinjong Coal Mine (Sites 9 and 10) and the location on Wollar-Bylong Road (Site 12), where no distinct pattern occurred through day, due to low surveyed volumes (Appendix H).

The automatic tube counts indicate that the surveyed locations would be expected to experience good levels of service with regard to roadway efficiency and delays during the busiest hours. Analysis of intersection results indicate that the three surveyed intersections operate at good levels of service during the morning and evening peak hours, with spare capacity and short delays to most vehicles (Appendix H).

Changes in Traffic Volumes

Construction activity during 2014 would attract up to 20 additional employees and would also be expected to generate some additional heavy vehicle movements into and out of the Wilpinjong Coal Mine.

It is anticipated that the Modification would result in some limited increase in heavy vehicle deliveries to the site as a result of the increases in the rates of CHPP processing and waste rock production and the proposed on-site disposal of inert building material (Section 3.2.3).

The on-site disposal of inert building material and the consequential elimination of the need to take this waste to the MWRC landfill would also have the benefit of reducing heavy vehicle movements on local roads around Mudgee.

The Modification would result in only modest changes in traffic levels on the local road network (Appendix H).

Potential Impacts

The Road Transport Assessment determined that the operational conditions on the surrounding roads would remain good with the combined influences of the Modification and the other changes to the road environment (such as background traffic growth and other traffic-generating developments) (Appendix H).

The surveyed intersections would continue to operate at satisfactory levels of service, with sufficient capacity to accommodate the additional traffic in 2014 with spare capacity and short delays to most vehicles (Appendix H).

GTA Consultants (Appendix H) concluded that no significant impacts on the performance, capacity, efficiency and safety of the road network are expected to arise as a result of the Modification.

4.11.3 Mitigation Measures, Management and Monitoring

The planned changes to Ulan Road described in the Ulan Road Strategy are expected to improve the capacity, efficiency and safety of Ulan Road (Section 4.11.1). No additional measures would be warranted by the very minor changes expected to result from the Modification (Appendix H).

WCPL would continue to encourage car pooling by employees to minimise traffic movements and work with MWRC, Ulan Coal Mines and Moolarben Coal Mines to implement the Ulan Road Strategy.

4.12 LAND RESOURCES

4.12.1 Background

Landforms and Topography

Landforms in the general Wilpinjong Coal Mine area are characterised by the narrow floodplains associated with tributaries of the Goulburn River, the undulating foothills, ridges and escarpments of the Great Dividing Range and the dissected landforms of the Goulburn River National Park.

Elevations in the vicinity of Wilpinjong Coal Mine range from approximately 350 m AHD at Wilpinjong Creek to approximately 610 m AHD on ridges to the immediate south of the Wilpinjong Coal Mine.

Land Use

Land use in the vicinity of the Wilpinjong Coal Mine is characterised by a combination of coal mining operations, conservation areas, agricultural land uses and the Village of Wollar.

Land use in the Modification open cut extension areas includes mining-related infrastructure, remnant vegetation and cleared grazing land. The cleared grazing land is under unimproved pasture. No grazing is currently conducted in most of these areas, however, some limited grazing is undertaken in the south of Pit 5. Some dryland cropping has occurred in previous decades in the north-western Modification open cut extension area in the vicinity of Ulan-Wollar Road (Appendix I).

Soil Characteristics

Soil landscapes are mapped across the Wilpinjong Coal Mine area in the *Soil Landscapes of Dubbo 1:250,000 Sheet* (Murphy and Lawrie, 1998).

The Ulan Soil Landscape unit is dominant across much of the Wilpinjong Coal Mine, with the Barigan Creek Soil Landscape unit dominant in the Cumbo Creek corridor and the Lees Pinch Soil Landscape unit associated with ridgelines in the south (Appendix I). The descriptions of these units indicate the presence of soil conditions that generally are sub-optimal for plant growth (Appendix I).

A field soil survey of the Wilpinjong Coal Mine area was conducted by JAMMEL Environment & Planning Services in 2004 and included 46 soil pits (Resource Strategies, 2005). The major soil types encountered during the field survey were red podzolic, yellow podzolic, earthy sands, brown earths, yellow solodic soils, lithosols and alluvials.

Soil Management and Rehabilitation

Land preparation, soil stripping, soil resource management and rehabilitation at the Wilpinjong Coal Mine are conducted in accordance with the Mining Operations Plan and Rehabilitation Management Plan.

4.12.2 Environmental Review

An Agricultural Resources Assessment for the Modification was undertaken by McKenzie Soil Management (2013) and is presented in Appendix I.

Site Inspection and Survey

A site inspection and soil survey was conducted as part of the Agricultural Resource Assessment and included seven soil test pits in the Modification open cut extension areas.

The soils identified in the soil survey represented Dermosols and Kurosols which correlate to podzolic soils under the Great Soil Group classification (Appendix I). The soil types identified have the following characteristics (Appendix I):

- Dermosols are characterised by a lack of strong texture contrast between the topsoil and subsoil and moderately to strongly structured subsoil.
- Kurosols have a clear or abrupt textural subsoil, the upper 0.2 m of which is strongly acidic.

The Modification open cut extensions areas were classified as being most aligned with the Barigan Creek Soil Landscape unit, with the exception of a portion of the southern extension of Pit 3 which was classified as the Lees Pinch Soil Landscape unit (Appendix I).

McKenzie Soil Management (Appendix I) classified all of the pits surveyed in the Modification open cut extensions areas as Class 4 under the Land and Soil Capability classification scheme, which is defined as (OEH, 2012):

> ***4 - Moderate capability land:*** *Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.*

The soil pit in the proposed extension to Pit 2 has the potential to meet the tests for biophysical strategic agricultural land outlined in the *Interim protocol for site verification and mapping of biophysical strategic agricultural land* (Interim Protocol) (NSW Government, 2013).

Although this soil pit may be indicative of a larger area outside the Modification open cut extension areas with the potential to be biophysical strategic agricultural land, it is worth noting (Appendix I):

- The soil pit is classified as Class 4 under the Land and Soil Capability classification scheme and therefore does not meet the test for biophysical strategic agricultural land in the *Upper Hunter Strategic Regional Land Use Plan* (NSW Government, 2012a).
- The majority of the proposed extension to Pit 2 has greater than 10% slope and would not meet the criteria for biophysical strategic agricultural land under the Interim Protocol or the *Upper Hunter Strategic Regional Land Use Plan*.
- The soil pit is located within the existing ML 1573 and adjoining an active open cut coal mine.
- The extension area is not currently used for any significant agricultural production.

Potential Impacts

The Modification would result in the disturbance of approximately 40 ha of grazing land located within ML 1573 (including 5.5 ha of grazing land already approved for disturbance). The western extension to Pit 2 (approximately 17 ha) and the variations to the open cut limits to the north of the site (approximately 6 ha) would be rehabilitated to mixed pasture/woodland, while the remainder of the Modification open cut extension areas would be rehabilitated to woodland (Figure 11).

The Modification open cut extension areas are not considered by McKenzie Soil Management (Appendix I) to be highly productive agricultural land, given the soil limitations for plant growth and the previous agricultural activities conducted (beef cattle production on rain-fed unimproved pasture).

The potential impacts on agricultural enterprise as a result of the Modification would be minimal based on the poor agricultural potential of all of the soil in its current state (Appendix I).

Potential impacts of the Modification on visual amenity are assessed in Section 4.13.

4.12.3 Mitigation Measures, Management and Monitoring

McKenzie Soil Management (Appendix I) considers that there is the potential to boost agricultural productivity in the Modification open cut extension areas relative to current status with the application of best practice techniques to strip, stockpile, ameliorate, re-apply and revegetate topsoil and subsoil and has made a number of recommendations for best practice soil management (Appendix I).

The Rehabilitation Management Plan would be revised to incorporate the Modification and the recommendations made by McKenzie Soil Management (Appendix I).

4.13 VISUAL

4.13.1 Background

A Visual Impact Assessment was prepared for the EIS by EDAW Gillespies Australia (2005) and described the visual impacts of the Wilpinjong Coal Mine in the context of the sensitivity of surrounding viewpoints.

Key potential viewpoints included a number of private dwellings in the sub-regional setting (1 - 5 km) and local roads (Ulan-Wollar Road and Wollar Road) and the Sandy Hollow-Gulgong Railway.

All of the private dwellings assessed as potential sensitive viewpoints for the EIS have been acquired by Peabody Energy and there are no longer any private rural dwellings that have direct views of the Wilpinjong Coal Mine.

The Village of Wollar is separated from the Wilpinjong Coal Mine by substantial vegetated ridgelines (Figure 3).

The level of visual impact from the approved mine from local viewpoints varies with the progress of the open cuts. Within the local setting, views of the Wilpinjong Coal Mine from Ulan-Wollar Road and the Sandy Hollow–Gulgong Railway include temporary elevated waste rock emplacements, open cut pits, infrastructure, progressive rehabilitation of mine landforms and mobile equipment lay down areas.

The existing visual impacts from landforms in the central area of the mine will reduce over time as the temporary waste rock emplacements are re-mined and deposited in the open cut voids and current active waste rock emplacement and tailings storage areas are progressively revegetated.

Views of the Wilpinjong Coal Mine from Wollar Road are largely limited by intervening topography and native vegetation between the road and the Mine, including vegetation in ECA-A.

Direct views of night-lighting sources occur from Ulan-Wollar Road. Direct views of night lighting from Wollar Road are largely screened by intervening topography and vegetation, however, lighting on taller infrastructure such as the materials handling infrastructure is visible.

Visual management measures, including progressive rehabilitation and revegetation species selection are included in the Rehabilitation Management Plan.

4.13.2 Environmental Review

The Modification primarily involves incremental extensions to existing open cut pits and these would be generally consistent with the nature and scale of the approved Wilpinjong Coal Mine.

Notwithstanding, elements of the Modification considered to have the potential to have more material visual impacts include the following:

- removal of part of a minor ridgeline associated with the open cut extension to the south of Pit 2; and
- construction of the elevated waste rock emplacement in the south of Pit 2 (Figure 5), that would initially be constructed to approximately 450 m AHD, before being pushed down at the end of the mine life to approximately 430 m AHD.

The removal of the ridgeline and the development of the elevated waste rock emplacement would both occur in 2014.

The other incremental open cut extensions and minor infrastructure upgrades (Figure 5) would not be expected to significantly alter the visual impacts of the approved Wilpinjong Coal Mine from potentially sensitive viewpoints.

Existing remnant native vegetation along the southern boundary of Pit 3 (i.e. between the pit and Wollar Road) would be retained as an existing visual screen to limit direct views of the open cut.

Visual Impact Assessment

The potential visual impacts of the removal of the section of minor ridgeline and construction of the elevated waste rock emplacement from Ulan-Wollar Road and Sandy Hollow–Gulong Railway would not be significant. These elements of the Modification would be some 1.1 km to 2 km from the road and rail corridors and would be viewed in the context of the approved Wilpinjong Coal Mine, which includes infrastructure, active open cut pits and waste rock emplacement areas in the foreground from these low sensitivity viewpoints.

A visual simulation was prepared from a location on Wollar Road (Figure 3) where views of the minor ridgeline are currently available. The existing view and three visual simulations are presented on Figures 23a and 23b:

1. Removal of the minor ridgeline prior to the raised waste rock emplacement reaching maximum elevation.
2. Elevated waste rock emplacement at maximum elevation, prior to any revegetation.
3. Post-mining simulation, to illustrate the conceptual landform following the completion of mining and rehabilitation activities.

The EIS identified the visual sensitivity of Wollar Road as low to moderate. The visual impact of the removal of the minor ridgeline and elevated waste rock emplacement at the Wollar Road viewpoint is considered to be low from Wollar Road, as these features, where visible, would be located approximately 1.2 km from the road and would form a small part of the total view.

Notwithstanding, WCPL would temporarily rehabilitate the elevated waste rock emplacement prior to final rehabilitation, and would re-instate the minor ridgeline as a component of the final landform (Figure 11).

When mobile equipment is constructing the upper levels of the elevated waste rock emplacement lighting on the emplacement would be visible from Wollar Road, Ulan-Wollar Road and the Sandy Hollow-Gulgong Railway. This would occur over two short-term construction campaigns in 2014.

4.13.3 Mitigation Measures, Management and Monitoring

WCPL propose to temporarily rehabilitate the elevated waste rock emplacement following construction with aerial seeding (Section 3.2.2).

Visual impacts associated with the elevated waste rock emplacement would progressively reduce once the vegetative cover begins to establish.

Reshaping and rehabilitation of the landform would also be a component of closure and final rehabilitation works. Final revegetation would utilise native plant species selected in accordance with the Rehabilitation Management Plan.

In addition to the above, in 2014 WCPL would establish additional native vegetation along the east-west section of Wollar Road in the vicinity of ECA-A (Figure 5) that would limit potential views of the Wilpinjong Coal Mine from Wollar Road, once established.

It is noted that the final simulation (Figure 23b) does not include revegetation that would occur within Regeneration Areas, ECA-A or any visual screening vegetation on Wollar Road, that in practice would limit potential views of the rehabilitated landform, post-mining.

4.14 BUILDING AND DEMOLITION WASTE DISPOSAL

4.14.1 Background

As discussed in Section 3.2.3, WCPL will be undertaking a range of renovating, building and demolition works at residences and buildings located on Peabody Energy owned lands in the vicinity of Wilpinjong Coal Mine. As a component of this work a range of non-hazardous building and demolition waste materials would be produced that will require disposal. The inert portion of these wastes (up to approximately 2,000 cubic metres) would be disposed at depth in the Wilpinjong Coal Mine waste rock emplacements (e.g. at least 5 m below the final landform surface).

Existing View - From Wollar Road

Simulation 1 – Ridgeline Removed - From Wollar Road

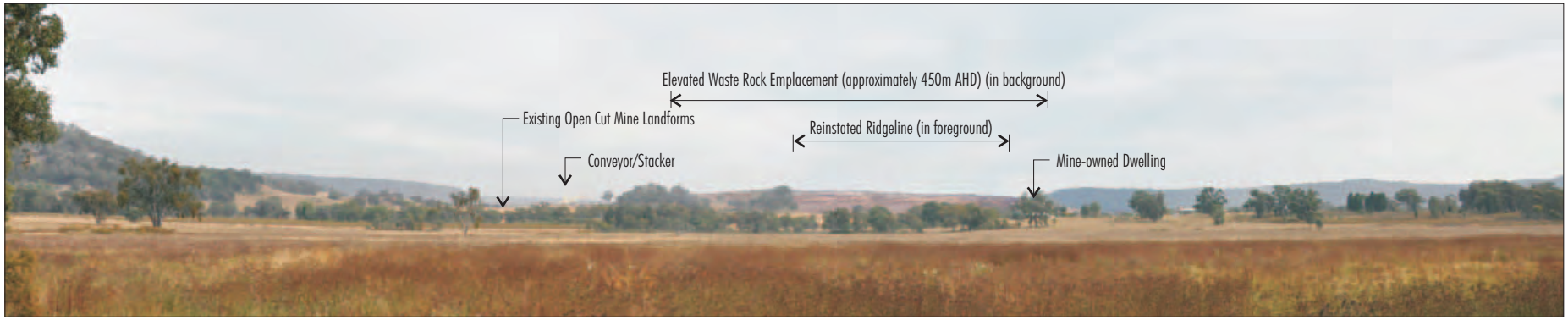
Resource Strategies

WIL-12-12_75WMod12_006A

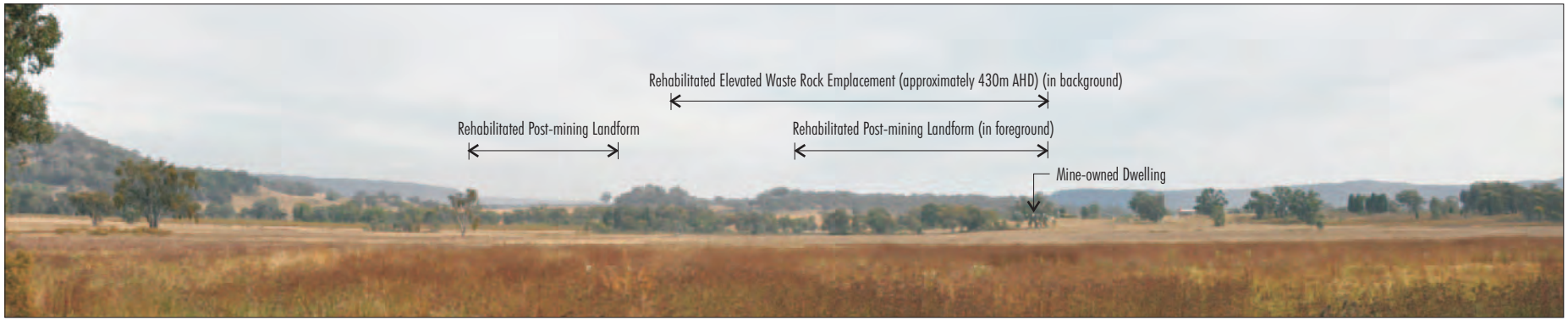
WILPINJONG COAL MINE

FIGURE 23a
Visual Simulations -
Existing View and Simulation 1

Peabody ENERGY



Simulation 2 – Elevated Waste Rock Emplacement at Maximum Height - From Wollar Road



Simulation 3 – Post Mining Simulation* - From Wollar Road

Resource Strategies

** Note does not illustrate Regeneration Area, Enhancement and Conservation Area or visual screen vegetation*

WILPINJONG COAL MINE

FIGURE 23b

Visual Simulations - Simulations 2 and 3

Peabody ENERGY

The on-site disposal of this waste would correspondingly reduce waste disposal rates at the MWRC landfill site and heavy vehicle movements associated with transporting the waste on public roads for disposal.

The *Environmental Guidelines: Solid Waste Landfills* (EPA, 1996) state the following with regards to licensing of landfills:

> *Inert waste landfills that receive more than 20,000 tonnes of waste per annum will need to be licensed irrespective of where they are located.*

WCPL proposes to dispose of less than 20,000 tonnes of inert building and demolition waste per annum and therefore this activity would not require licensing. WCPL has protocols in place for classification of waste materials during building and demolition works and any material not classified as inert would be removed by an appropriately licensed contractor.

4.14.2 Environmental Review

The *Environmental Guidelines: Solid Waste Landfills* (EPA, 1996) state the following with regards to potential environmental risks associated with landfilling non-hazardous, inert waste (as proposed by WCPL):

> *If a landfill is only receiving relatively **inert materials** such as building and demolition wastes which have no potentially hazardous characteristics, the potential environmental impacts are generally restricted to dust, noise and sedimentation, which can be readily controlled.*
>
> ***Inert waste** is defined as waste which does not undergo environmentally significant physical, chemical or biological transformations and has no potentially hazardous content once landfilled. This waste from building and demolition activities includes bricks, concrete, glass, plastics, metal and timber. It must not be contaminated or mixed with any other material. (For levels of unacceptable contamination see relevant EPA guidelines or seek EPA advice).*

The disposal of inert waste in Wilpinjong Coal Mine waste rock emplacements has the potential to increase operational noise due to the presence of semi-trailer delivery vehicles. However, waste disposal would utilise existing mobile fleet items to spread and cover the material, and the deliveries would be during the daytime, and hence no material additional off-site noise impacts would occur.

The disposal of inert waste in Wilpinjong Coal Mine waste rock emplacements has the potential to increase dust emissions. However, general air quality control measures would continue to be employed and the small volume of material being disposed (2,000 cubic metres in total) in consideration of the volume of waste rock material being moved into the same emplacements (Table 2) indicates that no material impacts would occur.

The disposal of inert waste in Wilpinjong Coal Mine waste rock emplacements is not expected to result in any increased risk of soil erosion or sediment generation due to the nature of the waste and the proposed disposal of the waste at depth within the Wilpinjong Coal Mine waste rock emplacements.

4.14.3 Mitigation Measures, Management and Monitoring

Noise, dust and sedimentation management measures at the Wilpinjong Coal Mine are currently undertaken in accordance with the NMP (WCPL, 2011b), Air Quality and Greenhouse Gas Management Plan (WCPL, 2011c) and Erosion and Sediment Control Plan (WCPL, 2006d) (Sections 4.2, 4.4 and 4.7).

In addition to the continued implementation of existing noise, air quality and sedimentation management measures in accordance with the relevant management plans, WCPL would prepare a Waste Management Plan that would include:

- procedures for identifying the quantity, type and source of waste received;
- waste compaction targets;
- site capping and revegetation; and
- landfill closure and post-closure monitoring and maintenance.

In addition to the mitigation measures outlined above, WCPL would report on the waste disposal activities in the Annual Review and Environmental Management Report in accordance with the *Environmental Guidelines: Solid Waste Landfills* (EPA, 1996), which state:

> *In relation to landfills that do not require licensing under the proposed new waste legislation, landfill occupiers will still be required to notify the EPA annually of the location, type and quantity of waste received, and ownership details of the landfill.*

4.15 SOCIO-ECONOMICS

A Socio-Economic Assessment for the Modification was undertaken by Gillespie Economics (2013) and is presented in Appendix J.

The benefit cost analysis identified the estimated net production benefits of the Modification mining components to Australia (over and above the economic benefits of the existing approved Wilpinjong Coal Mine) at $28 Million (M) (present value) (Appendix J).

Any environmental, social or cultural impacts of the Modification mining components to Australia, after mitigation, would need to be valued at more than $28M for the Modification to be undesirable from an economic efficiency perspective (Appendix J).

In addition, the benefit cost analysis presented in Appendix J also considered potential residual impacts, including operational noise, air quality, road transport, road transport noise, blasting overpressure and vibration, water resources, Aboriginal heritage, biodiversity, visual, greenhouse gas emissions and employment. The assessment concluded that the main potential impacts were internalised into the production costs, and consequently the net social benefit of the Modification mining components was also estimated at $28M (Appendix J). For operational noise, air quality and biodiversity the assessment also identifies that it is unlikely that any residual impacts after the implementation of mitigation would be material from an aggregate economic welfare perspective (Appendix J).

The infrastructure upgrade components of the Modification (e.g. belt press filter) would have present value capital costs of $16M (Appendix J). While other costs and benefits of these investments were not quantified in the benefit cost analysis, Gillespie Economics concluded that these components of the Modification are also likely to have net social benefits (Appendix J).

The Modification is expected to result in retention of approximately 80 existing employees for an additional year (i.e. in 2018) by delaying a ramp down of ROM coal production.

The regional economic impact analysis, using input-output analysis, estimated that the annual regional economic impact of the Modification (upper bound estimate) in 2018 on the Mid-Western Regional LGA as up to:

- $234M in annual direct and indirect regional output or business turnover;
- $127M in annual direct and indirect regional value added;
- $19M in annual direct and indirect household income; and
- 157 direct and indirect jobs.

These regional impacts would persist for approximately one year (Appendix J). These potential regional economic effects also need to be balanced against other potential environmental benefits and costs, which are described in this EA.

Short-term construction activities associated with the Modification are likely to have negligible impact on community infrastructure and services because only a small number of workers are required and most of the workers would already reside in the region (Appendix J).

WCPL would also continue financial contributions to the MWRC in accordance with Wilpinjong Coal Mine Planning Agreements and sponsorship, donations and in kind support to various education, community development, health, environmental, arts, culture and youth services causes in the region.

4.16 OTHER ENVIRONMENTAL ASPECTS

4.16.1 Transport Noise

There would be no change to Wilpinjong Coal Mine mine life, or maximum and average daily rail movements (Table 1), and therefore, no change to potential rail noise impacts would arise due to the Modification.

SLR Consulting (2013) (Appendix A) conducted an assessment of potential road traffic noise impacts on a key section of Ulan Road for the modest traffic increases associated with the Modification (Section 4.11.2) in accordance with the Road Noise Policy (DECCW, 2011).

The road noise assessment (Appendix A) conservatively included an increase in Wilpinjong Coal Mine operational workforce traffic movements which has occurred between December 2012 (when the traffic counts were undertaken) and 2013.

Even with this conservatism, SLR Consulting (2013) concluded that Ulan Road traffic noise levels would increase by less than 2 dBA over 2012 levels (approximately 0.2 dBA at maximum), and in accordance with the Road Noise Policy (DECCW, 2011) this represents a minor impact that is considered barely perceptible (Appendix A).

4.16.2 Greenhouse Gas Emissions

In accordance with the *National Greenhouse Accounts Factors* (NGA Factors) (Commonwealth Department of Climate Change and Energy Efficiency, 2012), direct greenhouse emissions are referred to as Scope 1 emissions, and indirect emissions are referred to as Scope 2 and Scope 3 emissions.

The major sources of greenhouse gas emissions at the Wilpinjong Coal Mine include:

- combustion of diesel during mining operations (Scopes 1 and 3);
- use of explosives (Scope 1);
- fugitive emissions of methane (Scope 1);
- use of petroleum based greases and oils (Scopes 1 and 3);
- off-site generation of electricity that is consumed at the Wilpinjong Coal Mine (Scopes 2 and 3); and
- transport of product coal and combustion of product coal by third parties (Scope 3).

A revised greenhouse gas emissions inventory for the Wilpinjong Coal Mine incorporating the Modification has been prepared by Todoroski Air Sciences (2013) and is presented in Appendix B.

Annual average Scope 1 emissions for the Wilpinjong Coal Mine incorporating the Modification are estimated to be approximately 88,890 tonnes of carbon dioxide equivalent (CO_2-e), which is approximately 0.02% of Australia's estimated annual greenhouse gas emissions for October 2011 to September 2012 (Appendix B).

Greenhouse gas abatement measures undertaken at the Wilpinjong Coal Mine include (WCPL, 2013):

- Minimisation of fuel usage (i.e. diesel and unleaded petrol) through:
  - encouragement of staff car pooling;
  - undertaking plant and equipment maintenance; and
  - operational practices (e.g. unattended plant is not left idling and is switched off as soon as practicable after use).
- Use of solar power for monitoring equipment and investigations into its use for other operations.

Greenhouse gas emissions from the Wilpinjong Coal Mine would continue to be monitored and reported annually in accordance with Peabody Energy's obligations under the Commonwealth Government National Greenhouse and Energy Reporting System (Section 5.1.3). Peabody Energy and WCPL will also comply with any obligations under the Commonwealth *Clean Energy Act, 2011*.

4.16.3 Non-Aboriginal Heritage

A non-Aboriginal heritage survey and assessment was conducted over the Wilpinjong Coal Mine Project Application Area by Heritage Management Consultants (2004). The surveys identified nine sites considered of some local heritage significance.

No non-Aboriginal heritage items of local heritage significance have been identified within the Modification open cut extension areas.

Based on the absence of any material evidence bearing historical heritage values, the Modification would likely have no impact upon heritage values either in the Modification open cut extension areas or surrounds.

4.16.4 Aquatic Ecology

An aquatic ecosystem assessment was conducted over the Wilpinjong Coal Mine area (Bio-Analysis, 2005) and identified aquatic habitat within Planters Creek, Spring Creek, Cumbo Creek, Wilpinjong Creek and Wollar Creek. In general, the aquatic habitats in the Wilpinjong Coal Mine disturbance area were found to be in poor condition, which reflected the degraded nature of their immediate catchments that have been adversely affected by loss of riparian vegetation, physical damage to banks, and erosion of watersheds over a long period (Bio-Analysis, 2005; Landline Consulting, 2012b).

WCPL undertakes stream health monitoring on Wilpinjong Creek, Cumbo Creek and Wollar Creek in accordance with the Surface Water Management and Monitoring Plan. The 2012 stream health survey generally showed some improvement in most stream health indicators at most sites in Wilpinjong Creek and relatively little change in indicator values at sites in Wollar Creek and Cumbo Creek (Landline Consulting, 2012b).

The Modification would not result in additional direct disturbance of creeks that provide aquatic habitat within the Wilpinjong Coal Mine area.

The Surface Water Assessment (Appendix D) concluded there is negligible difference in predicted flow loss in Wilpinjong Creek as a result of the Modification. The continuation of licensed discharge under the EPL would generally lead to some decrease in Wilpinjong Creek salinity, with negligible predicted increases in downstream salinity during high flow periods (Section 4.7.2).

In consideration of the above, the Modification is not anticipated to have any material additional impact on aquatic ecology compared to the approved Wilpinjong Coal Mine. The existing stream health monitoring programme would continue for the Wilpinjong Coal Mine incorporating the Modification.

4.16.5 Hazard and Risk

A Preliminary Hazard Analysis (PHA) was conducted in 2005 to assess the potential hazard and risk associated with the Wilpinjong Coal Mine. The PHA comprised a qualitative assessment of risks to the environment, members of the public and their property arising from sudden and unexpected incidents that have the potential to occur at the Wilpinjong Coal Mine (WCPL, 2005).

The PHA was conducted in accordance with the general principles of risk evaluation and assessment outlined in *Multi-Level Risk Assessment Guidelines* (NSW Department of Urban Affairs and Planning, 1999). Preventative measures were developed as part of the PHA to produce a low level of risk in accordance with the risk assessment criteria (WCPL, 2005).

It is considered that the Modification would not change the existing potential risks identified in the PHA conducted for the Wilpinjong Coal Mine as the proposed activities associated with the Modification (e.g. open cut mining activities, workshop activities) are consistent with the activities assessed in the PHA.

Notwithstanding, environmental management plans and monitoring programmes would be reviewed, and where necessary, revised to included the Modification and manage any associated environmental risks. In particular, the Pollution Incident Response Management Plan would be updated to include the new WCPL light vehicle servicing workshop proposed as part of the Modification.

4.17 CONSIDERATION OF CUMULATIVE IMPACTS WITH OTHER NEARBY MINING OPERATIONS

4.17.1 Moolarben Coal Mines

The Moolarben Coal Mines are located immediately to the west of the Wilpinjong Coal Mine (Figure 1).

Stage 1 of the Moolarben Coal Project was approved on the 6 September 2007 and involves mining of three open cut mines and one underground mine. Stage 1 has been modified a number of times and is currently approved to mine until 2028 at a rate of up to 8 Mtpa ROM coal from the three open cuts and 4 Mtpa ROM coal from the underground mine (Yancoal Australia, 2013).

Moolarben Coal Mines currently has a major proposal before the Minister for Planning and Infrastructure (Moolarben Coal Project Stage 2) that includes one open cut mine (Open Cut 4) that would be located to the immediate west of the Wilpinjong Coal Mine (Figure 2) that is proposed to be mined at a maximum rate of 12 Mtpa, as well as two underground mines with a combined maximum mining rate of 4 Mtpa.

Additional coal handling facilities are proposed to be constructed to transfer the ROM coal to the existing Stage 1 CHPP and increase the capacity of approved Stage 1 processing facilities to process Stage 2 ROM coal.

The Moolarben Coal Project Stage 2 is not yet approved by the NSW Minister for Planning and Infrastructure and assessment of the proposal continues to be undertaken by the DP&I. Notwithstanding, as the proposal may be determined in the near future, potential cumulative impacts with this proposal as described in the Moolarben Coal Project Stage 2 Preferred Project Report (Moolarben Coal Mines Pty Limited, 2012) have been considered where relevant in the environmental reviews conducted for this EA.

Moolarben Coal Mines also currently has a separate proposal before the Minister for Planning and Infrastructure for Modification 9 to Stage 1 (the Stage 1 Optimisation Modification) that was publicly exhibited in May/June 2013.

The Stage 1 Optimisation Modification Environmental Assessment indicates that the modification would include extension of mining in open cuts 1 and 2, additional water management infrastructure, minor changes to the rehabilitation sequencing and final landform and would extend the life of Stage 1 to 2033 (Yancoal Australia, 2013).

The Stage 1 Optimisation Modification would not require any material changes to the approved Stage 1 rates of coal production, mining method, employees or general operations and environmental impacts would be similar to the existing operation (Yancoal Australia, 2013). If approved, Stage 1 as modified would operate concurrently with Stage 2 (if approved).

At full production, the Moolarben Coal Mines would have the capacity to produce 17 Mtpa of ROM coal and employ approximately 450 personnel (Yancoal Australia, 2013).

Due to the relative proximity of Open Cut 4 to the Wilpinjong Coal Mine (Figure 2) and the other proposed development activities associated with Stage 2 (including construction activities and increased operational workforce) the potential cumulative impacts of Stage 2, if approved, are likely to be greater than Stage 1 incorporating the Stage 1 Optimisation Modification.

The potential cumulative impacts of the proposed Moolarben Coal Project Stage 2 have been considered in the environmental studies where potentially relevant in this EA (e.g. air quality, operational noise and groundwater).

4.17.2 Ulan Coal Mines

Mining in the Ulan area has been undertaken since the 1920s. The Ulan Coal Mines are located approximately 11 km to the north-west of the Wilpinjong Coal Mine (Figure 1) and potential cumulative impacts are therefore more limited in comparison to the adjacent Moolarben Coal Mines.

A major extension (the Ulan Coal Continued Operations Project) was approved by the NSW Minister for Planning in November 2010. The Ulan Coal Continued Operations Project (as modified) involves concurrently mining open cut and underground resources at a combined rate of 20 Mtpa product coal over a 21 year mine plan.

Potential cumulative impacts of the Ulan Coal Continued Operations Project have been considered in the environmental studies where relevant in this EA (e.g. road transport).

4.17.3 Cobbora Coal Project

Cobbora Holding Company Pty Limited currently has a proposal before the Minister for Planning and Infrastructure that involves the development of a 20 Mtpa ROM open cut coal mine and associated facilities (the Cobbora Coal Project) approximately 58 km north-west of Mudgee. The project would provide coal to Macquarie Generation, Delta Electricity and Origin Energy to generate electricity and would have a construction workforce of up to 550 people and an operational workforce of up to 590 people (Cobbora Holding Company Pty Limited, 2012).

The Cobbora Coal Project is not yet approved by the NSW Minister for Planning and Infrastructure and on 1 July 2013 the NSW Treasurer stated the NSW Government's commitment to sell or lease the proposed Cobbora Coal Mine following the sale of Eraring Energy and proposed termination of other coal supply contracts (NSW Treasurer, 2013).

The Cobbora Coal Project, if approved, would result in additional rail transport movements on the Sandy Hollow-Gulgong Railway. However, as the proposed development is located some 40 km to the west and the Modification does not involve any increase in approved rail movements or extension to the life of the approved Wilpinjong Coal Mine (Section 3.2.9) or significant changes in regional population, no significant cumulative impacts with the proposed Cobbora Coal Project are anticipated.

4.17.4 Mt Penny Coal Project

The proposed Mt Penny Coal Project is located at Bylong, approximately 20 km east of the Wilpinjong Coal Mine (Figure 1).

An Environmental Assessment for the Mt Penny Coal Project is not yet publicly available. However, the Mount Penny Coal Project Preliminary Environmental Assessment (Mt Penny Coal Pty Ltd, 2011) indicates that the project would include development of a 5 Mtpa ROM open cut coal mine and associated facilities within Exploration Licence (EL) 7406 that would employ approximately 250 people during operations and up to 300 people during construction.

Potential cumulative traffic generation from the Mt Penny Coal Project has been conservatively considered in the Road Transport Assessment (Appendix H).

4.17.5 Bowdens Silver Project

The proposed Bowdens Silver Project is located approximately 30 km south of the Wilpinjong Coal Mine (Figure 1).

An Environmental Impact Statement for the Bowdens Silver Project is not yet publicly available. However, the documentation supporting an application for Director-General's Requirements for the Bowdens Silver Project (Kingsgate Bowdens Pty Limited, 2012) indicates that the project would include development of a 4 Mtpa open cut silver mine and associated facilities, a construction workforce of 300 people an operational workforce of approximately 200 people.

As the Modification does not involve any significant population or accommodation demand in Mudgee (Section 4.15) and the key transport routes for the Bowdens Silver Project are unlikely to significantly overlap with the Wilpinjong Coal Mine key transport routes (Appendix H), it is not anticipated that there would be any significant potential cumulative impacts.

5 STATUTORY CONTEXT

The Wilpinjong Coal Mine was approved under Part 3A of the EP&A Act by the NSW Minister for Planning in February 2006 (Project Approval 05-0021 [Attachment 1]).

The Wilpinjong Coal Mine is a 'transitional Part 3A project' under clause 2 of Schedule 6A of the EP&A Act and therefore section 75W of the EP&A Act continues to apply to modifications to Project Approval 05-0021, notwithstanding its repeal[5].

As outlined in Section 1.3, WCPL consulted with the DP&I in November 2012 with regards to seeking the necessary approvals for the Modification and based on this consultation, this EA has been prepared under section 75W of the EP&A Act.

Section 75W of the EP&A Act states:

> **75W Modification of Minister's approval**
>
> *(1) In this section:*
>
> ***Minister's approval** means an approval to carry out a project under this Part, and includes an approval of a concept plan.*
>
> ***Modification of approval** means changing the terms of a Minister's approval, including:*
>
> *(a) revoking or varying a condition of the approval or imposing an additional condition of the approval, and*
>
> *(b) changing the terms of any determination made by the Minister under Division 3 in connection with the approval.*
>
> *(2) The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.*
>
> *(3) The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.*
>
> *(4) The Minister may modify the approval (with or without conditions) or disapprove of the modification.*
>
> *….*

[5] Part 3A of the EP&A Act (as in force immediately before its repeal) continues to apply for the Wilpinjong Coal Mine. The description and quotations of relevant references to clauses of Part 3A in this document are as if Part 3A of the EP&A Act is still in force.

5.1 GENERAL STATUTORY CONSIDERATIONS

5.1.1 State Legislation

Environmental Planning and Assessment Act, 1979

The EP&A Act and EP&A Regulation set the framework for planning and environmental assessment in NSW. As noted above, the Modification is to be assessed under section 75W (Part 3A) of the EP&A Act.

Section 5 of the EP&A Act describes the objects of the EP&A Act as follows:

(a) to encourage:

(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,

(ii) the promotion and co-ordination of the orderly and economic use and development of land,

(iii) the protection, provision and co-ordination of communication and utility services,

(iv) the provision of land for public purposes,

(v) the provision and co-ordination of community services and facilities, and

(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and

(vii) ecologically sustainable development, and

(viii) the provision and maintenance of affordable housing, and

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

The Modification is considered to be generally consistent with the objects of the EP&A Act, because it is a Modification which:

- incorporates:
  - measures for the management and conservation of natural and artificial resources including agricultural land, water and natural areas (Section 4);
  - further development of the State's mineral resources (i.e. coal resources) in a manner that minimises environmental impacts through the implementation of the Wilpinjong Coal Mine Environmental Management Strategy (Section 2.14) and other measures (Section 4);
  - measures to minimise potential amenity impacts associated with noise, blasting, air quality and visual impacts on surrounding land uses (Sections 4.2 to 4.5 and 4.13);
  - continued employment and other socio-economic benefits to the community (Sections 4.15);
- would improve coal recovery at the Wilpinjong Coal Mine (Section 3.2.1);
- involves the orderly economic use and development of land as the Modification open cut extensions are wholly within ML 1573 and the approved Project Application area (Figure 3);
- would be conducted in accordance with relevant lease/licence/reserve conditions over Crown land within ML 1573;
- would support the ongoing provision of community services and facilities through contributions to State royalties, State taxes, Commonwealth tax revenue and voluntary contributions to community initiatives (Sections 2.15 and 4.15 and Appendix J);
- incorporates a range of measures for the protection of the environment, including the protection of native plants and animals, threatened species, and their habitats (Sections 4.8 and 4.9);
- incorporates relevant ecologically sustainable development considerations through:
  - incorporation of risk assessment and analysis at various stages in the Modification design and environmental assessment and within decision-making processes;

- implementation of an adaptive management approach by implementing real-time noise and air quality controls;
- adoption of high standards for environmental and occupational health and safety performance;
- assessment of potential greenhouse gas emissions associated with the Wilpinjong Coal Mine, incorporating the Modification;

- is an application under section 75W of the EP&A Act that would be determined by the Minister for Planning and Infrastructure, however consultation with the MWRC and a range of stakeholders has been undertaken and issues raised have been considered and addressed where relevant (Section 1.3); and
- involves public involvement and participation through Wilpinjong Coal Mine consultation activities (Section 1.3), which would be ongoing following the public exhibition of this EA document and DP&I assessment of the Modification in accordance with the requirements of the EP&A Act.

Other State Legislation

In addition to the EP&A Act, the following NSW Acts may be applicable to the Wilpinjong Coal Mine, incorporating the Modification:

- *Coal Mine Health and Safety Act, 2002*;
- *Contaminated Land Management Act, 1997*;
- *Crown Lands Act, 1989*;
- *Dams Safety Act, 1978*;
- *Dangerous Goods (Road and Rail Transport) Act, 2008*;
- *Fisheries Management Act, 1994*;
- *Heritage Act, 1977*;
- *Mining Act, 1992*;
- *National Parks and Wildlife Act, 1974* (NPW Act);
- *Native Vegetation Act, 2003*;
- *Noxious Weeds Act, 1993*;
- *Protection of the Environment Operations Act, 1997* (PoEO Act);
- *Roads Act, 1993*;
- *Threatened Species Conservation Act, 1995* (TSC Act);
- *Water Act, 1912*;
- *Water Management Act, 2000*; and
- *Work Health and Safety Act, 2011*.

Relevant licences or approvals required under these Acts would continue to be obtained for the Wilpinjong Coal Mine as required. Key plans, licences and agreements that would require revision to incorporate the Modification are outlined in Section 5.3.

Additional detail on the likely requirements under the some of the key Acts is provided in the sub-sections below.

Mining Act, 1992

All of the open cut extensions are wholly within the boundary of ML 1573. Therefore, there is no need for the variation of existing authorities or the issue of new authorities under the *Mining Act, 1992*. WCPL will apply for and renew relevant exploration tenements with the DRE as required.

Under the *Mining Act, 1992*, environmental protection and rehabilitation are regulated by conditions of mining leases, including requirements for the submission of a Mining Operations Plan prior to the commencement of operations, and subsequent Annual Environmental Management Reports (or Annual Reviews).

The current Mining Operations Plan (WCPL, 2012) would require revision to reflect the revised extent of open cut mining and the increased annual waste rock production rates as a result of the Modification (Section 5.3).

Protection of the Environment Operations Act, 1997

The PoEO Act establishes the State's environmental regulatory framework and requires (sections 43(b), 48 and 55) that an EPL be issued prior to carrying out a scheduled activity.

The existing Wilpinjong Coal Mine is currently licensed under EPL 12425 to conduct "mining for coal" and "coal works" as defined in Schedule 1 of the PoEO Act. EPL 12425 would be varied as required following approval of the Modification (Section 5.3).

Disposal of inert building and demolition waste that is produced from off-site building demolition in the approved mine waste rock emplacements would not require licensing under the PoEO Act as less than 20,000 tonnes of material would be disposed.

Water Management Act, 2000 and Water Act, 1912

The *Water Management Act, 2000* and the *Water Act, 1912* contain provisions for the licensing, allocation, capture and use of water resources. Under the *Water Management Act, 2000*, water sharing plans are being introduced for water sources. Water sharing plans establish rules for sharing water between different users and between the various environmental sources (namely rivers or aquifers).

Licensing under the *Water Management Act, 2000* and *Water Act, 1912* has been addressed as part of the consideration of the AIP (Section 5.2).

Dams Safety Act, 1978

The *Dams Safety Act, 1978* regulates dam safety in NSW. A number of tailings dams at the Wilpinjong Coal Mine (TD1 East, TD1 West and TD2) are 'Prescribed Dams' under the *Dams Safety Act, 1978*. There are no changes to Prescribed Dams proposed as part of the Modification.

WCPL would continue to comply with its design, construction, operation and maintenance requirements under the *Dams Safety Act, 1978*.

National Parks and Wildlife Act, 1974

The NPW Act contains provisions for the protection and management of national parks, historic sites, nature reserves and Aboriginal heritage in NSW.

Section 75U(1) of the EP&A Act outlines authorisations that are not required for a transitional Part 3A project, such as the Wilpinjong Coal Mine. An Aboriginal heritage impact permit under section 90 of the NPW Act is not required for the Wilpinjong Coal Mine, including the Modification.

Notwithstanding, an ACHA for the Modification has been undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a) (Section 4.10).

Heritage Act, 1977

The *Heritage Act, 1977* regulates the conservation of items listed on the State Heritage Register or subject to an interim heritage order.

No items on the State Heritage Register or subject to an interim heritage order have been identified within the Modification open cut extension areas (Section 4.16.3), therefore the *Heritage Act, 1977* is not relevant to the Modification.

Threatened Species Conservation Act, 1995

The TSC Act protects threatened species and provides a framework for the assessment of a development's impacts on threatened species and ecological communities.

The impact of the Modification on threatened species, populations and ecological communities was assessed as part of the Terrestrial Flora Assessment (Appendix E) and the Terrestrial Fauna Assessment (Appendix F). Hunter Eco and Biodiversity Monitoring Services concluded that the Modification would not have a significant impact on threatened species, populations and ecological communities with the implementation of the proposed management measures and biodiversity offset (Sections 4.8 and 4.9).

Roads Act, 1993

The approved Wipinjong Coal Mine involves realignment of sections of Ulan-Wollar Road. The Modification would not involve any additional realignment of public roads.

Coal Mine Health and Safety Act, 2002

WCPL holds necessary approvals under the *Coal Mine Health and Safety Act, 2002* for the Wilpinjong Coal Mine. These approvals would be reviewed and revised, where necessary throughout the life of the Wilpinjong Coal Mine.

5.1.2 Environmental Planning Instruments

State environmental planning policies and local environmental plans that may be relevant to the Modification are discussed below.

State Environmental Planning Policies

State Environmental Planning Policy (Major Development) 2005

As outlined above, the Wilpinjong Coal Mine was approved under Part 3A of the EP&A Act by the NSW Minister for Planning in February 2006 (Project Approval 05-0021). The Modification activities are wholly contained within the Project Application area of the approved Wilpinjong Coal Mine (Figures 3 and 5).

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries)* (Mining SEPP) regularises the various environmental planning instruments that previously controlled mining activities and aims to provide for the proper management of and development of mineral resources.

Clause 5(3) of the Mining SEPP gives it primacy where there is an inconsistency between the provisions of the Mining SEPP and the provisions of any other environmental planning instrument (except the *State Environmental Planning Policy (Major Development) 2005*, *State Environmental Planning Policy No. 14 [Coastal Wetlands]* and *State Environmental Planning Policy No. 26 [Littoral Rainforest]*).

Clause 7

Clause 7(1) of the Mining SEPP states that development for any of the following purposes may be carried out only with development consent:

(a) underground mining carried out on any land,

(b) mining carried out:

(i) on land where development for the purposes of agriculture or industry may be carried out (with or without development consent), or

(ii) on land that is, immediately before the commencement of this clause, the subject of a mining lease under the Mining Act 1992 or a mining licence under the Offshore Minerals Act 1999.

The modified Wilpinjong Coal Mine comprises mining within ML 1573 (granted on 8 February 2006 prior to commencement of the Mining SEPP) and on land where development for the purposes of agriculture is permissible. Therefore the Modification activities are permissible with development consent.

Part 3 of the Mining SEPP outlines the matters to be considered when determining development applications. Relevant clauses are discussed further below.

Clause 12

Clause 12 of the Mining SEPP requires that, before determining an application for consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must:

(a) consider:

(i) the existing uses and approved uses of land in the vicinity of the development, and

(ii) whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and

(iii) any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and

(b) evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a) (i) and (ii), and

(c) evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a) (iii).

Land use in the vicinity of the Wilpinjong Coal Mine is characterised by a combination of coal mining operations, conservation areas, agricultural land uses and the Village of Wollar. Land use in the Modification open cut extension areas includes mining-related infrastructure, areas of vegetation and cleared grazing land and is wholly within the Project Application area of the approved Wilpinjong Coal Mine.

The potential impacts of the Modification on vegetation and agricultural resources are described in Appendices E and I and summarised in Sections 4.8 and 4.12. The potential impacts of the Modification on amenity are summarised in Sections 4.2 to 4.5 and 4.13.

The Modification would allow for the extraction of additional coal reserves adjoining the existing Wilpinjong Coal Mine. The benefits of the Modification are described in Section 4.15.

WCPL would implement a range of measures to avoid or minimise incompatibility of the Modification with existing and future land uses in the area. This would be achieved through the implementation of the existing Wilpinjong Coal Mine Environmental Management Strategy (Section 2.14) with relevant updates as described in Sections 4 and 5.3.

Clause 14

Clause 14(1) of the Mining SEPP requires that, before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the approval should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following:

> *(a) that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,*
>
> *(b) that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,*
>
> *(c) that greenhouse gas emissions are minimised to the greatest extent practicable.*

In addition, clause 14(2) requires that, without limiting clause 14(1), in determining a development application for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programmes or guidelines concerning greenhouse gas emissions.

The potential impacts of the Modification on groundwater and surface water resources are discussed in Sections 4.6 and 4.7, including measures to minimise potential impacts which are described in Sections 4.6.3 and 4.7.3. The potential impacts of the Modification on threatened species and biodiversity are described in Sections 4.8 and 4.9, including measures to minimise potential impacts which are described in Sections 4.8.3 and 4.9.3.

Existing greenhouse gas abatement measures and greenhouse gas emissions estimate are described in Section 4.16.2 and Appendix B. This section and appendix of the EA provide a quantitative assessment of potential scope 1, 2 and 3 greenhouse gas emissions of the Wilpinjong Coal Mine incorporating the Modification.

Clause 15

Clause 15 of the Mining SEPP requires that:

> *(1) Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider the efficiency or otherwise of the development in terms of resource recovery.*
>
> *(2) Before granting consent for the development, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at optimising the efficiency of resource recovery and the reuse or recycling of material.*
>
> *(3) The consent authority may refuse to grant consent to development if it is not satisfied that the development will be carried out in such a way as to optimise the efficiency of recovery of minerals, petroleum or extractive materials and to minimise the creation of waste in association with the extraction, recovery or processing of minerals, petroleum or extractive materials.*

The Modification would allow for the extraction of additional coal reserves adjoining the existing Wilpinjong Coal Mine. By mining land adjacent to an existing mine, WCPL is able to maximise the efficient recovery of coal through existing infrastructure and processes.

Subject to feasibility and engineering design, the Modification may also involve minor CHPP upgrades to improve fine coal reject management (Section 3.2.8). The use of a belt press filter would allow the co-disposal of fine coal reject material with coarse rejects.

WCPL has progressively presented information on the Modification to the DRE during the development of this EA (Section 1.3). It is in the financial interest of WCPL to maximise the efficiency of coal recovery.

Clause 16

Clause 16(1) of the Mining SEPP requires that, before granting consent for development for the purposes of mining or extractive industry that involves the transport of materials, the consent authority must consider whether or not the consent should be issued subject to conditions that do any one or more of the following:

(a) *require that some or all of the transport of materials in connection with the development is not to be by public road,*

(b) *limit or preclude truck movements, in connection with the development, that occur on roads in residential areas or on roads near to schools,*

(c) *require the preparation and implementation, in relation to the development, of a code of conduct relating to the transport of materials on public roads.*

The primary public road network transport routes to and from Wilpinjong Coal Mine include routes that are adjacent to rural areas, industrial/commercial areas, residential areas and schools.

Wilpinjong Coal Mine generates road traffic relating to the movement of employees and consumables/deliveries. Wilpinjong Coal Mine product coal would continue to be transported from site by rail.

In the short-term, the Modification would result in an increased construction workforce travelling to and from Wilpinjong Coal Mine, incremental increases in deliveries of consumables, and delivery of construction materials to the site.

A Road Transport Assessment has been conducted for the Modification (Appendix H) and is summarised in Section 4.11.

The Road Transport Assessment concluded no significant impacts on the performance, capacity, efficiency and safety of the road network are expected to arise as a result of the Modification.

No specific management or mitigation measures are considered to be warranted by the Modification, noting that Ulan Road is planned to be widened and its intersections upgraded irrespective of the Modification.

Clause 17

Clause 17 of the Mining SEPP requires that before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the approval should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development. In particular, the consent authority must consider whether conditions of the consent should:

(a) *require the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated, or*

(b) *require waste generated by the development or the rehabilitation to be dealt with appropriately, or*

(c) *require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines (including guidelines under section 145C of the Act and the Contaminated Land Management Act 1997), or*

(d) *require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardize public safety.*

WCPL implements a Rehabilitation Management Plan (WCPL, 2011a) that describes management strategies including landform design, topsoil management, rehabilitation management measures, management of flora and fauna, rehabilitation monitoring programme and completion criteria. The Rehabilitation Management Plan would be revised to incorporate the Modification (Section 4.12.3).

Discussion of the material balance and final landform of the Wilpinjong Coal Mine incorporating Modification is presented in Section 3.4.

One of the key Wilpinjong Coal Mine rehabilitation objectives is the creation of safe, stable, adequately drained post-mining landforms that are consistent with the local surrounding landscape.

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

Clause 13 of the *State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)* (SEPP 33) requires the consent authority, in considering a Development Application for a potentially hazardous or a potentially offensive industry, to take into account:

> *(c) in the case of development for the purpose of a potentially hazardous industry—a preliminary hazard analysis prepared by or on behalf of the applicant, and*
>
> *(d) any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application (including any feasible alternatives for the location of the development and the reasons for choosing the location the subject of the application)…*

A PHA was conducted for the Wilpinjong Coal Mine in accordance with SEPP 33 (WCPL, 2005) (Section 4.16.5).

The Modification would not significantly alter the consequences or likelihood of a hazardous event occurring at the Wilpinjong Coal Mine, as the operational activities on-site would be generally unchanged.

The Modification open cut extension areas have been selected based on ongoing infill exploration drilling results and updates to Wilpinjong Coal Mine geological models. The Modification would improve coal recovery at the Wilpinjong Coal Mine.

Alternative locations for the on-site light vehicle servicing workshop were considered by WCPL. The light vehicle servicing workshop would be established in an existing farm building within the Wilpinjong Coal Mine Project Application area and would result in no additional land disturbance (Section 3.2.12).

State Environmental Planning Policy No. 44 – Koala Habitat Protection

State Environmental Planning Policy No. 44 (Koala Habitat Protection) (SEPP 44) requires the consent authority for any Development Application in certain LGAs (including the former Mudgee LGA) to consider whether land subject to a Development Application is “potential Koala habitat” or “core Koala habitat”.

An assessment of potential and core Koala habitat was conducted in the EIS (Mount King Ecological Surveys, 2005) and the Fauna Assessment for the Modification (Appendix F). Both assessments concluded that land at the Wilpinjong Coal Mine, including Modification open cut extension areas, is not core Koala habitat. Therefore the provisions of SEPP 44 are not considered applicable to the Modification.

State Environmental Planning Policy No. 55 (Remediation of Land)

SEPP 55 aims to provide a State-wide planning approach to the remediation of contaminated land. Under SEPP 55, planning authorities are required to consider the potential for contamination to adversely affect the suitability of the site for its proposed use.

A consent authority must consider the following under Clause 7(1):

> *(a) whether the land is contaminated, and*
>
> *(b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*
>
> *(c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.*

Further, under Clause 7(2), before determining an application for consent to carry out development that would involve a change of use of land, the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned, carried out in accordance with the contaminated land planning guidelines.

A Land Contamination Assessment has been conducted across the Project Application area of the approved Wilpinjong Coal Mine (AGE, 2005b). The Land Contamination Assessment concluded that the land was suitable for the land use change from agriculture to the development of the Wilpinjong Coal Mine.

The Modification activities are wholly contained within the Project Application area of the approved Wilpinjong Coal Mine.

Mid-Western Regional Local Environmental Plan 2012

The Wilpinjong Coal Mine is located wholly within the Mid-Western Regional LGA and is covered by the *Mid-Western Regional Local Environmental Plan 2012* (MWR LEP).

Clause 2.3(2) of the MWR LEP relevantly provides:

> *The consent authority must have regard to the objectives for development in a zone when determining a development application in respect of land within the zone.*

As outlined above, the consent authority for transitional Part 3A projects is the Minister for Planning and Infrastructure.

Under the MWR LEP, the Project Application area of the approved Wilpinjong Coal Mine includes land zoned as RU1 – Primary Production (across the majority of the Project Application Area) and SP2 – Special Infrastructure (along the Sandy Hollow-Gulgong Railway).

SP2 – Special Infrastructure

As indicated above, the Sandy Hollow-Gulgong Railway is zoned SP2 – Special Infrastructure. Product coal transport along the Sandy Hollow-Gulgong Railway would be unchanged by the Modification.

RU1 – Primary Production

Under the MWR LEP "open cut mining" is permissible with consent on lands zoned RU1 – Primary Production.

"Mining" is defined under the MWR LEP as:

> ***mining*** *means mining carried out under the Mining Act 1992 or the recovery of minerals under the Offshore Minerals Act 1999, and includes:*
>
> *(a) the construction, operation and decommissioning of associated works, and*
>
> *(b) the rehabilitation of land affected by mining.*

The Modification would also involve disposal of inert building and demolition waste that is produced from off-site building demolition in the approved mine waste rock emplacements (Section 3.2.3).

"Waste disposal facilities" are permissible on lands in the RU1 – Primary Production zone with development consent as waste disposal facilities are not listed as being a prohibited use in the zoning table in Part 2 of the MWR LEP.

Under the MWR LEP the objectives of the RU1 – Primary Production zone are:

- *To encourage sustainable primary industry based production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To maintain the visual amenity and landscape quality of Mid-Western Regional by preserving the area's open rural landscapes and environmental and cultural heritage values.*
- *To promote the unique rural character of Mid-Western Regional and facilitate a variety of tourist land uses.*

The Modification is consistent with the general objectives of RU1 – Primary Production zone as mining is a primary industry and the Modification would continue and enhance the productivity of the Wilpinjong Coal Mine. The Modification open cut extension areas are wholly contained within ML 1573 and would not significantly alter the compatibility of the Wilpinjong Coal Mine with adjoining land uses.

The Modification involves incremental extensions to existing open cut pits and is generally consistent with the visual impacts of the existing Wilpinjong Coal Mine (Section 4.13).

5.1.3 Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act, 1999

The objective of the EPBC Act is to provide for the protection of those aspects of the environment that are of *national environmental significance.* Proposals that are likely to have a significant impact on a matter of national environmental significance are defined as a controlled action under the EPBC Act.

The nine matters of national environmental significance are:

- world heritage properties;
- national heritage places;
- wetlands of international importance (also called 'Ramsar' wetlands);
- nationally threatened species and ecological communities;
- migratory species;
- Commonwealth marine areas;
- the Great Barrier Reef Marine Park;
- nuclear actions; and
- a water resource, in relation to coal seam gas development and large coal mining development.

Proposals that are, or may be, a controlled action are required to be referred to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities to determine whether the proposal requires assessment and approval under the EPBC Act.

The Wilpinjong Coal Project (disturbance of approximately 290 ha of native woodland/forest/ shrubland) was determined to be not a controlled action under the EPBC Act (EPBC 2005/2309) on 16 December 2005.

The Modification involves only minor alterations to the approved extent of mining at the Wilpinjong Coal Mine. The Modification is unlikely to have a significant impact on nationally threatened species and ecological communities, migratory species and water resources as described in the sub-sections below.

There are no world heritage properties, national heritage places, wetlands of international importance or Commonwealth marine areas of relevance to the Modification. The Modification is not located in or near the Great Barrier Reef Marine Park and does not constitute a nuclear action.

Potential Impacts on Nationally Threatened Species and Ecological Communities

The following discussion has been prepared based on advice from Hunter Eco and Biodiversity Monitoring Services.

Threatened Flora Species

No threatened flora species were recorded in the Modification open cut extension areas by the Modification surveys or by historical surveys. The results of the flora survey indicate that substantial numbers of threatened flora species listed under the EPBC Act were unlikely to be present, if any at all. On this basis it is considered that the Modification would not result in a significant impact to any threatened flora species.

Threatened Fauna Species

The following nationally threatened fauna species are considered possible occurrences within the Modification open cut extension areas:

- Regent Honeyeater (endangered);
- Swift Parrot (endangered);
- Superb Parrot (vulnerable);
- Large-eared Pied Bat/Large Pied Bat (vulnerable);
- South-eastern Long-eared Bat (vulnerable); and
- Koala (vulnerable).

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will (Australian Government, 2009):

- lead to a long-term decrease in the size of a population;
- reduce the area of occupancy of the species;
- fragment an existing population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of a population;
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;
- introduce disease that may cause the species to decline; or
- interfere with the recovery of the species.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will (Australian Government, 2009):

- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;
- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

The woodland vegetation to be cleared by the Modification open cut extensions is located on the edge of historical farmland and constitutes several small areas rather than one large area. The vegetation to be cleared is located immediately adjacent to the existing/approved Wilpinjong Coal Mine open cut pits and the Modification would not materially affect edge effects, connectivity or movement corridors.

The Modification is unlikely to lead to a long-term decrease in the size of a population (or an important population in case of vulnerable species), as only a small amount of preferred habitat for some threatened fauna species would be affected.

In consideration of the above, the Modification is unlikely to significantly impact nationally threatened fauna.

Threatened Ecological Communities

Box-gum Woodland is listed as a CEEC under the EPBC Act.

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will (Australian Government, 2009):

- reduce the extent of an ecological community;
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines;
- adversely affect habitat critical to the survival of an ecological community;
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;
- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting;
- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
  - assisting invasive species, that are harmful to the listed ecological community, to become established; or
  - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community; or
- interfere with the recovery of an ecological community.

The Modification would result in the loss of 2.2 ha of the woodland form of the Box-gum Woodland CEEC and conservatively 8.4 ha of the grassland form of the Box-gum Woodland CEEC. These areas have been subject to past disturbances including substantial clearing and grazing. A range of other studies have identified significant areas of Box-gum Woodland in the region, including within existing reserves and protected lands.

Based on this, it is concluded that:

- The Modification would not significantly reduce the extent of Box-gum Woodland CEEC.
- Loss of this part of the local occurrence of Box-gum Woodland CEEC would not result in fragmentation of the local occurrence of this CEEC.

- The Modification would not adversely affect habitat critical to the survival of the local occurrence of this CEEC.
- The Modification would not result in any change to the availability of abiotic factors necessary for survival of the local occurrence of this CEEC (noting that areas of Box-gum Woodland located immediately beside the existing open pit showed no evidence during the surveys that current mining has had any impact on this vegetation).
- The Modification would not cause a substantial change in the species composition of the local occurrence of this CEEC.
- The Modification would not result in an increased detrimental impact on the integrity of the local occurrence of this CEEC.
- The Modification would not enhance the spread of weed species that are established in the area as a consequence of pre-mining agricultural practices over many years.
- The Modification would not prevent recovery of the ecological community with the impact restricted to the loss of 2.2 ha of the woodland form and conservatively 8.4 ha of the grassland form.

Therefore, the Modification is unlikely to significantly impact nationally threatened ecological communities.

Potential Impacts on Migratory Species

The following discussion has been prepared based on advice from Biodiversity Monitoring Services.

The following migratory species are considered possible occurrences within the Modification open cut extension areas:

- White-throated Needletail;
- Rainbow Bee-eater;
- Satin Flycatcher; and
- Regent Honeyeater.

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will (Australian Government, 2009):

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

The woodland vegetation to be cleared by the Modification open cut extensions is located on the edge of historical farmland and constitutes several small areas. The vegetation to be cleared is located immediately adjacent to the existing/approved Wilpinjong Coal Mine open cut pits and the Modification would not materially affect edge effects, connectivity or movement corridors (Appendix F).

The Modification is unlikely to substantially modify, destroy or isolate an area of important habitat for a migratory species, as only a small amount of preferred habitat for some migratory species would be affected.

In consideration of the above, the Modification is unlikely to significantly impact migratory species.

Potential Impacts on Water Resources

The Department of Sustainability, Environment, Water, Populations and Communities released the *Draft significant impact guidelines: Coal seam gas and large coal mining developments – impacts on water resources* (Australian Government, 2013) in June 2013.

An action is likely to have a significant impact on a water resource if there is a real chance or possibility that it will directly or indirectly result in (Australian Government, 2013):

- a substantial change to the hydrology of a water resource; or
- a substantial change in water quality of a water resource.

The Modification would involve minor alterations/ extensions to the open cut disturbance areas.

These extensions (approximately 70 ha) represent an increase of less than 5% on the existing approved open cut and contained infrastructure area which covers approximately 1,920 ha.

The key findings of the Groundwater Assessment (Section 4.6) relating to hydrogeology are:

- The Modification would have no discernible impact on stream baseflows, beyond the effects of approved mining.
- The Modification would have no discernible impact on groundwater upflow from the Permian sediments to overlying alluvium, beyond the effects of approved mining.
- The Modification would cause imperceptible additional drawdown at any of the alluvium or coal bores in the monitoring network.
- The Modification would not contribute to any measurable incremental cumulative effect (including the effects of the Moolarben Coal Project Stage 2).
- The Modification could not be considered to have a significant impact on the recovery of groundwater levels, beyond the effects of approved mining.

In addition, WCPL and Peabody Energy hold adequate licence entitlement under a state water resource plan to account for the potential take of water associated with the approved operations and the minor incremental change associated with the Modification (Section 5.3).

Therefore, it is unlikely that the Modification would directly or indirectly result in a substantial change in the hydrology of groundwater resources.

Gilbert & Associates (Appendix D) concluded there is negligible difference in predicted flow loss in Wilpinjong Creek as a result of the Modification (Section 4.7). Therefore, it is unlikely that the Modification would directly or indirectly result in a substantial change in the hydrology of surface water resources.

In addition, it is noted that there would be negligible effect on other groundwater users (Section 4.6.2) and there would continue to be no impacts on private surface water users from the Wilpinjong Coal Mine, including the Modification (Section 4.7.2).

HydroSimulations (Appendix C) concluded the Modification could not be considered to have a significant impact on groundwater quality, beyond the effects of approved mining.

On the basis of available recorded data, Gilbert & Associates (Appendix D) concluded there has been no discernible change in Wilpinjong Creek, Cumbo Creek or Wollar Creek pH, EC and sulphate concentrations since the commencement of mining at the Wilpinjong Coal Mine.

In addition, the Modification would be unlikely to result in substantial change in surface water quality beyond the effects of the approved Wilpinjong Coal Mine.

Therefore, it is unlikely that the Modification would directly or indirectly result in a substantial change in water quality of a water resource.

Conclusion

Based on the above, there would be no significant impact on matters of national environmental significance as a result of the Modification.

It is therefore considered that there is no need to refer the Modification to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities.

National Greenhouse and Energy Reporting Act, 2007

The *National Greenhouse and Energy Reporting Act, 2007* (NGER Act) introduced a single national reporting framework for the reporting and dissemination of corporations' greenhouse gas emissions and energy use. The NGER Act makes registration and reporting mandatory for corporations whose energy production, energy use or greenhouse gas emissions meet specified thresholds.

Peabody Energy triggers the threshold for reporting under the NGER Act, and reports energy use and greenhouse gas emissions from its enterprises, including the Wilpinjong Coal Mine.

5.2 NSW GOVERNMENT POLICY

Strategic Regional Land Use Plan

As part of the Strategic Regional Land Use Policy, the NSW Government is introducing a 'Gateway Process' for the upfront assessment of the impacts of State Significant mining and coal seam gas proposals on Strategic Agricultural Land (NSW Government, 2012b).

The Strategic Regional Land Use Policy and the 'Gateway Process' will only apply to new State Significant Development applications or modifications for mining projects located outside of existing mining lease areas (NSW Government, 2012b).

The Modification open cut extension areas are wholly contained within ML 1573, therefore the 'Gateway Process' will not apply to the assessment of the Modification.

The Upper Hunter Strategic Regional Land Use Plan did not map any Strategic Agricultural Land in ML 1573. An assessment of potential impacts on agricultural land and resources is presented in Appendix I and summarised in Section 4.12. A summary of the assessment against the provisions of the AIP is provided below.

Aquifer Interference Policy

The AIP (NSW Government, 2012c) has been developed by the NSW Government as a component of the NSW Government's Strategic Regional Land Use Policy. The AIP applies State-wide and details water licence and impact assessment requirements.

The AIP has been developed to ensure equitable water sharing between various water users and proper licensing of water taken by aquifer interference activities such that the take is accounted for in the water budget and water sharing arrangements. The AIP will also enhance existing regulation, contributing to a comprehensive framework to protect the rights of all water users and the environment in NSW.

The *Water Management Act, 2000* defines an aquifer interference activity as that which involves any of the following:

- *the penetration of an aquifer;*
- *the interference with water in an aquifer;*
- *the obstruction of the flow of water in an aquifer;*
- *the taking of water from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations; and*
- *the disposal of water taken from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations.*

A Groundwater Assessment (Appendix C) has been prepared in consideration of the AIP and the key conclusions are summarised below.

Water Source

The AIP requires all water taken by aquifer interference activities to be accounted for within the extraction limits set by the relevant Water Sharing Plan. The Water Sharing Plan relevant to the Modification is the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009* (the HUAWSP). Therefore, licensing under the HUAWSP is required to account for any additional loss of flow to the alluvium resulting from the Modification.

Licensing to account for water taken from the coal seams and adjacent hardrock under the NSW *Water Act, 1912* is also required for any additional pit inflows from the porous rock aquifer.

Baseline Groundwater Conditions

Baseline groundwater conditions and the existing observed impacts of the approved Wilpinjong Coal Mine on alluvial and porous rock aquifers are presented in Section 2 of Appendix C.

Modelling of Potential Impacts

Potential impacts on alluvial and unregulated water sources have been modelled using the EIS groundwater model that was developed in consultation with key regulators. In order to quantify incidental water loss from the alluvium to the hardrock, and to re-assess the impact on creek baseflows for the Modification, the EIS groundwater model, incorporating the alluvium and the creeks, has been converted to a more suitable software platform for water balance interrogation[6].

The potential impacts of the Modification have been assessed by making comparisons between the currently approved and the proposed modified mine plan for the Wilpinjong Coal Mine.

Licensing Requirements

Details of the current groundwater licences held by WCPL and Peabody Energy that are relevant to extraction at the Wilpinjong Coal Mine are summarised in Table 9. The predicted annual groundwater volumes required to be licensed for the approved operations and for the Modification are summarised in Table 10.

Water take from the alluvial aquifer comprises reduction in upflow from the Permian system to the alluvial aquifer, loss of water from excavated alluvium and loss of rainfall recharge to excavated alluvium.

Table 9 indicates that WCPL and Peabody Energy currently hold licence entitlements of 474 units for the HUAWSP and 3,341 ML/annum for water extracted from porous rock. Comparison of licence entitlements against the predicted annual licensing requirements (Table 10) shows that adequate licences are available to account for the potential take of water associated with the approved operations and the minor incremental changes associated with the Modification.

[6] Converted from PMWIN to Groundwater Vistas software.

Table 9
Groundwater Licence Summary

Licence Number	Description	Valid to	Extraction Limits
Licences under the *Water Management Act, 2000* (Alluvial Aquifer)			
WAL 21499[1]	Alluvial Aquifer Licence	Current	474 units[2]
Licences under the *Water Act, 1912* (Porous Rock Aquifer)			
20BL173517	Pit 1 Licence	10 June 2014	1 ML/annum
20BL173516	Pit 2 Licence	10 June 2014	190 ML/annum
20BL173514	Pit 3 Licence	10 June 2014	680 ML/annum
20BL173515	Pit 4 Licence	10 June 2014	350 ML/annum
20BL173513	Pit 5 Licence	10 June 2014	800 ML/annum
20BL170147	Dewatering	30 March 2016	110 ML/annum
20BL170148	Dewatering	30 March 2016	110 ML/annum
20BL170149	Dewatering	30 March 2016	110 ML/annum
20BL170150	Dewatering	30 March 2016	110 ML/annum
20BL170151	Dewatering	30 March 2016	110 ML/annum
20BL170152	Dewatering	30 March 2016	110 ML/annum
20BL170153	Dewatering	30 March 2016	110 ML/annum
20BL170063	Water Supply Bore (GWs10)	18 December 2016	110 ML/annum
20BL170062	Water Supply Bore (GWs11)	18 December 2011[3]	110 ML/annum
20BL170061	Water Supply Bore (GWs12)	18 December 2011[3]	110 ML/annum
20BL170059	Water Supply Bore (GWs14)	18 December 2016	110 ML/annum
20BL170058	Water Supply Bore (GWs15)	18 December 2011[3]	110 ML/annum

Source: Heritage Computing (2013).

1 Assigned to the Wollar Creek Water Source.

2 One unit is currently equivalent to 1.0 ML as per the *Available Water Determination Order for Various NSW Unregulated and Alluvial Water Sources (No. 1) 2013*.

3 WCPL is in consultation with NOW regarding the renewal of these licences.

Table 10
Groundwater Licensing Requirement Summary

Water Sharing Plan	Management Zone/ Groundwater Source	Predicted Annual Inflow Volumes Requiring Licensing (ML/annum)	
		Currently Approved	Incremental Change Due to Modification
Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009	Wollar Creek Water Source	Maximum 184	Maximum 0.5
Water Act, 1912	Porous Rock	Average 971 Maximum 2,034	Average 3 Maximum 4

Source: After Heritage Computing (2013).

Post-closure annual licensing requirements are expected to be less than the licensing requirements during operation. Given WCPL and Peabody Energy currently hold adequate licenses to account for the potential take of water associated with the approved operations and the Modification it is expected WCPL would have adequate licences to account for the potential post-closure take of water.

Notwithstanding, the numerical groundwater model would be refined over progression of the mine life in order to more accurately calculate the post-closure licensing requirements associated with the Wilpinjong Coal Mine.

Minimal Impact Considerations

The AIP establishes minimal impact considerations for highly productive and less productive groundwater.

Figure 18 shows the NOW mapping of highly productive groundwater in the vicinity of the Wilpinjong Coal Mine, which indicates that an area of highly productive alluvial aquifer exists to the north-east of the Wilpinjong Coal Mine on Wilpinjong Creek. It follows that the remaining alluvial aquifers in the vicinity of the Wilpinjong Coal Mine along Wilpinjong Creek are less productive.

An assessment of the Modification against the minimal impact considerations in the AIP was conducted as part of the Groundwater Assessment and is presented in Section 5.3 of Appendix C.

The Groundwater Assessment concluded that the Modification is within the 'Level 1' minimal impact considerations outlined in the AIP and further mitigation, prevention or avoidance measures above those summarised in Sections 4.6 and 4.7 would be necessary.

Relevant Mitigation and Contingency Measures

Other Groundwater Users

Predicted end of mining drawdown is not expected to exceed 1 m at any privately owned land (Appendix C) and therefore meets the 'Level 1' minimal impact considerations outlined in the AIP.

Notwithstanding that no impacts on privately owned bores are predicted, WCPL implements an approved Surface and Ground Water Response Plan (WCPL, 2006b). The Surface and Ground Water Response Plan includes:

- process to deal with a groundwater-related complaint;
- groundwater impact investigation protocol; and
- response plan, in the event that an investigation conclusively attributes an adverse impact to an existing groundwater supply user to Wilpinjong Coal Mine operations.

Appropriate contingency measures for an impact on a groundwater supply user may include:

- deepening the affected groundwater supply;
- construction of a new groundwater supply; or
- provision of a new alternative water supply.

Floodplain Water Management

As part of the EIS, WCPL committed to assess the requirement for flood bunds to mitigate against inflows from major flooding in Wilpinjong Creek and backflow up tributary drainages (e.g. Cumbo Creek).

A flood modelling study was undertaken for the reach of Wilpinjong Creek adjacent to and downstream of Pit 1, including Cumbo Creek adjacent to Pit 4 and Pit 3. The study predicted peak 100 year average recurrence interval (ARI) flood levels in these creek reaches and determined that additional flood mitigation works were not required.

WCPL will extend the flood study upstream along Wilpinjong Creek adjacent to Pit 5 and Pit 6 to assess the required level of any flood bunds adjacent to these pits.

Interception of Alluvial Groundwater

WCPL implements an approved Surface and Ground Water Response Plan (WCPL, 2006b) that includes a response plan for any direct groundwater inflows from Wilpinjong or Cumbo Creek alluvium exposed in the final highwall of the open cut during mining operations.

Any alluvial groundwater will be intercepted prior to it reaching the floor of the open cut and pumped back to the nearest creek by the installation of sumps and a pump/pipe system located on a bench of the open cut.

Areas of exposed alluvium in the final highwall will be sealed during the backfilling of the completed open cuts. This will be achieved by measures such as the selective placement of more weathered materials against the alluvium intersect as the open cut excavation is backfilled with waste rock. These materials will be sourced from pre-stripping operations. If necessary, placement methodologies for these materials (i.e. placement in thinner layers and trafficking with mine fleet) will be developed to achieve the desired degree of compaction.

Monitoring and Reporting of Water Make

WCPL monitors groundwater extraction as required under the conditions of its water licences.

In accordance with WCPL's groundwater extraction licences, WCPL will provide the NOW with an annual compliance report, which:

- assesses compliance with the licences;
- provides a summary of new bores or pits constructed during that year;
- provides statistics for the monitoring data collated for each bore for the last water year;
- summarises contingency events that impacted on groundwater during the last water year, including actions taken to remedy the situation and extra monitoring results; and
- any recommendations for improvements for the new water year.

5.3 PLANS, LICENCES AND AGREEMENTS THAT REQUIRE REVISION

Project Approval Conditions

Condition 6, Schedule 2 of Project Approval 05-0021 (Attachment 1) stipulates limits of approval as follows:

> *The Proponent shall not beneficiate more than 8.5 million tonnes of ROM coal at the Coal Handling and Preparation Plant on the site in a calendar year.*

WCPL is seeking to remove Condition 6, Schedule 2 of the Project Approval as a component of the Modification (Section 3.2.7).

As described in Section 3.2.4, WCPL seeks the following amendments to Condition 10, Schedule 3 of Project Approval 05-0021 regarding blasting frequency:

> ***Blasting Frequency***
>
> *10. The Proponent shall comply with the following blasting restrictions on site:*
>
> *(a) a maximum of 2 blast events per day, unless an additional operational blast is required following a blast misfire;*
>
> *(b) a maximum of 5 blast events per week, averaged over any 12 month period (excluding blast misfires);*
>
> *(c) a maximum of ~~2~~ 3 blasts per week where the maximum instantaneous charge (MIC) is greater than 400kg; and*
>
> *(d) a maximum of ~~1~~ 2 blasts per week where the MIC is greater than 400kg, when averaged over any 12 month period.*
>
> *However the Director-General may approve minor variations to these restrictions for short periods of time.*
>
> *Note: A blast event may involve up to three blasts within a short period, typically measured in seconds.*

Tables 1 and 2, Schedule 3 of Project Approval 05-0021 (Attachment 1) provide land acquisition and noise impact assessment criteria. These tables would require revision to reflect recent changes in land ownership.

Appendix 2 (Project Layout Plans), Appendix 3 (Offset Strategy), Appendix 5 (Aboriginal Sites) and Appendix 7 (Receiver Location Plans) of the Project Approval would also require revision to incorporate the Modification and reflect changes to land ownership.

Environment Protection Licence Conditions

Conditions L5 and L6 of EPL 12425 provide noise and blasting limits for the Wilpinjong Coal Mine. These conditions would require variation as a result of the Modification to match the revised conditions of the Project Approval.

Wilpinjong Coal Project Planning Agreement

The life of the Wilpinjong Coal Mine would be unchanged by the Modification. In addition, the existing Wilpinjong Coal Mine operational workforce would not require any augmentation for the Modification (Section 3.2.10).

As a result, no changes to the Wilpinjong Coal Mine Planning Agreement are considered warranted.

Management/Monitoring Plans

Some management plans (e.g. the Noise Monitoring Programme, Air Quality Monitoring Programme and ACHMP) may require revision to reflect updated environmental management measures or changes to Project Approval conditions resulting from the modification.

Mining Operations Plan

The current Mining Operations Plan (WCPL, 2012) would require revision to reflect the revised extent of open cut mining and the increased annual waste rock production rates as a result of the Modification.

6 REFERENCES

Australasian Groundwater and Environmental Consultants Pty Ltd (2005a) *Wilpinjong Coal Project Groundwater Impact Assessment.* Appendix B in Resource Strategies (2005) *Wilpinjong Coal Project Environmental Impact Statement.*

Australasian Groundwater and Environmental Consultants Pty Ltd (2005b) *Wilpinjong Coal Project Land Contamination Assessment.* Appendix L in Resource Strategies (2005) *Wilpinjong Coal Project Environmental Impact Statement.*

Australian Government (2009) *Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999.*

Australian Government (2013) *Draft significant impact guidelines: Coal seam gas and large coal mining developments—impacts on water resources.*

Bio-Analysis (2005) *Wilpinjong Coal Project Aquatic Ecosystem Assessment*. Appendix HD in Resource Strategies (2005) *Wilpinjong Coal Project Environmental Impact Statement*.

Biodiversity Monitoring Services (2013) *Wilpinjong Coal Mine Modification – Terrestrial Fauna Assessment.*

Cobbora Holding Company Pty Limited (2012) *Cobbora Coal Project Environmental Assessment*.

Department of Climate Change and Energy Efficiency (2012) *National Greenhouse Accounts Factors*.

Department of Environment, Climate Change and Water (2010a) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*.

Department of Environment, Climate Change and Water (2010b) *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*.

Department of Environment, Climate Change and Water (2011) *NSW Road Noise Policy*.

Department of Planning and Infrastructure (2013) *Ulan Road Strategy – Dispute Resolution*. Letter from Sam Haddad to Ian Livingstone-Blevins, dated 25 May 2013.

Department of Urban Affairs and Planning (1999) *Multi-Level Risk Assessment Guidelines*. Revised edition.

Dowding, C.H. (1985) *Blast Vibration Monitoring and Control*. Prentice-Hall International Series in Civil Engineering and Engineering Mechanics.

EcoLogical (2011) *Wilpinjong Coal Mine Bushfire Management Plan 2011*.

EDAW Gillespies Australia (2005) *Wilpinjong Coal Project Visual Impact Assessment*. Appendix N in Wilpinjong Coal Pty Limited (2005) *Wilpinjong Coal Project Environmental Impact Statement.*

Environment Protection Authority (1996) *Environmental Guidelines: Solid Waste Landfills*.

FloraSearch (2005) *Wilpinjong Coal Project Flora Assessment*. Appendix HA in Resource Strategies (2005) *Wilpinjong Coal Project Environmental Impact Statement.*

Gilbert & Associates (2013) *Wilpinjong Coal Mine Modification Surface Water Assessment*.

Gillespie Economics (2013) *Wilpinjong Coal Mine Modification Socio-Economic Assessment.*

Greg Richards and Associates (2005) *Wilpinjong Coal Project Bat Fauna Assessment*. Appendix HC in Resource Strategies (2005) *Wilpinjong Coal Project Environmental Impact Statement.*

GTA Consultants (2013) *Wilpinjong Coal Mine Modification Road Transport Assessment.*

Heggies (2010) *Wilpinjong Coal Mine - 75W Modification Noise Impact Assessment.*

Heritage Computing (2013) *Wilpinjong Coal Mine Modification Groundwater Assessment*.

Heritage Management Consultants (2004) *Wilpinjong Coal Project Non-Aboriginal Heritage Impact Assessment*. Appendix G in Resource Strategies (2005) *Wilpinjong Coal Project Environmental Impact Statement.*

Hunter Eco (2013) *Wilpinjong Coal Mine Modification Terrestrial Flora Assessment.*

HydoSimulations (2013) *Wilpinjong Coal Mine Modification Groundwater Assessment.*

Keith, D. (2004) *Ocean shores to desert dunes: the native vegetation of New South Wales and the ACT*. New South Wales Government.

Kingsgate Bowdens Pty Limited (2012) *Documentation Supporting an Application for Director-General's Requirements for the Bowdens Silver Project via Lue, NSW*.

Landline Consulting (2012a) *Wilpinjong ECA Flora and Rehabilitation Monitoring Report 2012*.

Landline Consulting (2012b) *Wilpinjong Coal Mine Stream Health Monitoring Aquatic Macroinvertebrate Survey September 2012*.

McKenzie Soil Management (2013) *Agricultural Resource Assessment: "Wilpinjong Coal Mine Modification", Wollar, NSW.*

Moolarben Coal Mines Pty Limited (2012) *Moolarben Coal Project Stage 2 Preferred Project Report*.

Mount King Ecological Surveys (2005) *Wilpinjong Coal Project Terrestrial Fauna Assessment*. Appendix HB in Resource Strategies (2005) *Wilpinjong Coal Project Environmental Impact Statement.*

Mt Penny Coal Pty Ltd (2011) *Mt Penny Coal Project Preliminary Environmental Assessment*.

Murphy, BW and Lawrie, JW (1998) *Soil Landscapes of Dubbo 1:250,000 Sheet.*

Navin Officer Heritage Consultants (2005) *Wilpinjong Coal Project Aboriginal Cultural Heritage Assessment*. Appendix F in Resource Strategies (2005) *Wilpinjong Coal Project Environmental Impact Statement.*

New South Wales Government (2012a) *Upper Hunter Strategic Regional Land Use Plan*. Released September 2012.

New South Wales Government (2012b) *Strategic Regional Land Use Policy*. Released September 2012.

New South Wales Government (2012c) *Aquifer Interference Policy*. Released September 2012.

New South Wales Government (2013) *Interim protocol for site verification and mapping of biophysical strategic agricultural land.*

New South Wales Treasurer (2013) *Cobbora Coal Mine*. Media release dated 1 July 2013. Website: http://www.treasury.nsw.gov.au/__data/assets/pdf_file/0003/25527/1-7-13_Cobbora_coal_mine.pdf Date accessed: July 2013.

Office of Environment and Heritage (2012) *The Land and Soil Capability Assessment Scheme Second Approximation – A general rural land evaluation system for New South Wales*.

Pacific Environment Limited (2013) *Ambient Air Monitoring Report – Wilpinjong Coal.*

PAEHolmes (2010) *Air Quality Impact Assessment Wilpinjong Coal Mine Modification.*

Resource Strategies (2005) *Wilpinjong Coal Project Environmental Impact Statement.*

SLR Consulting (2013) *Wilpinjong Coal Mine Modification Noise and Blasting Impact Assessment.*

South East Archaeology (2013) *Wilpinjong Coal Mine, Central Tablelands of New South Wales – Modification: Aboriginal Cultural Heritage Assessment*.

SP Solutions (2013) *Wilpinjong Coal Mine Modification - Environmental Risk Assessment*.

Todoroski Air Sciences (2013) *Air Quality Impact Assessment Wilpinjong Coal Mine Modification.*

Wilpinjong Coal Pty Limited (2005) *Wilpinjong Coal Project Preliminary Hazard Analysis.* Appendix L in Resource Strategies (2005) *Wilpinjong Coal Project Environmental Impact Statement.*

Wilpinjong Coal Pty Limited (2006a) *Wilpinjong Coal Project Spontaneous Combustion Management Plan.*

Wilpinjong Coal Pty Limited (2006b) *Wilpinjong Coal Project Groundwater Monitoring Programme.*

Wilpinjong Coal Pty Limited (2006c) *Wilpinjong Coal Project Surface and Ground Water Response Plan.*

Wilpinjong Coal Pty Limited (2006d) *Wilpinjong Coal Project Erosion and Sediment Control Plan.*

Wilpinjong Coal Pty Limited (2006e) *Wilpinjong Coal Project Surface Water Management and Monitoring Plan.*

Wilpinjong Coal Pty Limited (2011a) *Wilpinjong Coal Mine Rehabilitation Management Plan.*

Wilpinjong Coal Pty Limited (2011b) *Wilpinjong Coal Mine Noise Management Plan.*

Wilpinjong Coal Pty Limited (2011c) *Wilpinjong Coal Mine Air Quality and Greenhouse Gas Management Plan.*

Wilpinjong Coal Pty Limited (2012) *Wilpinjong Coal Mine Mining Operations Plan (ML 1573) January 2013 to December 2017.*

Wilpinjong Coal Pty Limited (2013) *Wilpinjong Coal Mine 2012 Annual Review and Environmental Management Report.*

Yancoal Australia (2013) *Welcome to Moolarben Coal.*
Website: http://www.moolarbencoal.com.au/
Date accessed: July 2013.