Preliminary Environmental Assessment

Rix's Creek Continuation of Mining Project

Preliminary Environmental Assessment

Rix's Creek Continuation of Mining Project

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21-Nov-2013

Job No.: 60289290

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Quality Information

Document Preliminary Environmental Assessment

Ref 60289290

Date 21-Nov-2013

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Reviewed by Scott Jeffries, Associate Director - Environment

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	8 June 2013	Draft PEA – Internal Review	Simon Murphy Senior Environmental Planner	
B	11-Jul-2013	Draft PEA - Client Review	Simon Murphy Senior Environmental Planner	
C	28-Aug-2013	Draft PEA - Client 2nd Review	Simon Murphy Senior Environmental Planner	
D	18-Nov-2013	Final Draft & Mine Lease Update	Simon Murphy Senior Environmental Planner	
E	21-Nov-2013	Final - DP&I issue	Simon Murphy Senior Environmental Planner	

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Executive Summary

This Preliminary Environmental Assessment (PEA) has been prepared on behalf of Rix's Creek Pty Ltd in support of a request for Director-General's environmental assessment requirements with respect to the construction and operation of the Rix's Creek Mine Continuation of Mining Project (the project). The project would involve the continuation of the existing multi-seam benching open cut mining, predominately within coal leases held by Rix's Creek Pty Ltd, Coal Lease (CL) 352 and Mining Lease (ML) 1432. The project would utilise the existing mine infrastructure in use at the Rix's Creek Mine. The project also includes a small extension of the existing Mining Lease boundary in a westerly direction to accommodate a proposed new overburden emplacement area which will allow reductions in the impact of noise and visual amenity.

Rix's Creek Mine (the Mine) of Rix's Creek Pty Limited, is owned and operated by Bloomfield Collieries Pty Limited (Bloomfield). The Mine is an open cut coal mine approximately 5 km north-west of Singleton in the Hunter Valley Coalfields of NSW (refer to **Figure 1** and **Figure 2**). The Mine currently produces approximately 1.5 million tonnes per annum (Mtpa) of product coal from its existing operations.

Rix's Creek Pty Ltd has owned and operated the Mine since 1989. Current mining operations are forecast to continue until 2038, subject to approval. There is potential for further resource recovery to continue beyond this period subject to separate environmental assessment and approvals.

The Mine has been operating on the project site for over 20 years and currently employs 130 personnel across its operations, including in the mining, administration and maintenance sectors. Existing operations are economically beneficial at a local, regional and State level through the generation of coal royalties, employment, contributing to the operation of local businesses and involvement with the local community. The Bloomfield Group is a wholly Hunter based private company which uses revenue from the Rix's Creek Mine to sustain the employment of its 500 Hunter based employees.

The project is described in this PEA in the context of environmental planning issues likely to be key to the preparation of an Environmental Impact Statement (EIS) under Division 4.1, Part 4 of the *Environmental Planning and Assessment Act 1979*. The information contained in the PEA is intended to guide the Department of Planning and Infrastructure in issuing Director-General's requirements for the proposed project.

Background and History

Coal mining operations in the vicinity of what is the current day Mine began in the late 1800s with the New Park Colliery. Development Consent for mining operations in their current form at the Mine was first issued on 19 October 1989. The 1989 Development Consent allowed production of up to 0.3 Mtpa of raw coal for the first five years, increasing to 1.5 Mtpa in year six following the commissioning of a coal preparation plant.

The 1989 Development Consent for Rix's Creek mine was issued under CL352 which allowed mining operations for a period of 21 years from the date of approval. CL 352 included surface mining exclusions required by the then landowners, which prevented the operation of open cut mining activities. Following agreement being reached with the landholder's, preparation of an Environmental Impact Statement began in order to allow surface mining to take place. This development application was approved on 16 October 1995 and ML 1432 issued on 24th June 1998 allowing open cut mining to occur over the entire area. The Mine continues to operate under this approval.

The 1995 EIS undertook a full assessment of environmental impacts across ML 1432 with current day operations largely reflecting the operations assessed and approved in 1995. The proposed project, as described below, would see a new EIS prepared across predominantly the same study area (ML 1432) as the 1995 EIS taking into consideration new environmental legislation, guidelines, regulations and constraints.

The Proposed Project

The project seeks approval for the ongoing operation of the existing open cut mining operation at the Mine, within the existing Coal Lease (CL) 352 and with a small extension to the western boundary of the existing Mine Lease (ML) 1432.

The project is permissible with consent under clause 7 of *State Environment Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) as it would take place on land where development for the purpose of agriculture may be carried out, and is land that is subject to a mining lease issued under the *Mining Act 1992.* The project would be located within the Singleton Local Government Area (LGA) on land subject to the *Singleton Local Environmental Plan 2013*.

The project is declared to be State Significant Development, for the purpose of the *Environmental Planning and Assessment Act 1979*, under clause 8 and Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011* as it constitutes development for the purpose of coal mining.

The future operation of the Mine would provide ongoing economic and resultant social benefits to Singleton and the Hunter Valley. Importantly the project would assist in securing employment not only for existing Rix's Creek mine staff, but also for employees at Bloomfield's East Maitland operation who may be employed at the Rix's Creek Mine in the future.

It is expected that there will be recoverable resource remaining within ML1432 beyond the life of the continuation of mining operations, should it be approved. In the event that further mining activities are proposed, they would be subject to separate impact assessment and approvals processes in the future.

Key Environmental Issues

Construction and operation of the project would be carried out with the principal aim of avoiding environmental and social impacts where reasonable and feasible to do so. Key environmental assessment issues identified for the project are:

- Air quality;
- Noise and vibration; and
- Ecology.

Other environmental issues that would be considered in the Environmental Impact Statement but are not considered as key environmental assessment issues include:

- Soils and geology;
- Surface water;
- Groundwater;
- Heritage (Aboriginal and European);
- Traffic and transport;
- Social and economic effects;
- Visual amenity and landscape;
- Hazard and risk;
- Greenhouse gas;
- Land use;
- Waste; and
- Rehabilitation.

Assessments would be undertaken as part of the preparation of the Environmental Impact Statement to investigate and present the potential environmental, social and cumulative impacts of the proposed project. These assessments would identify mitigation and safeguard measures to minimise potential impacts, as well as include consideration of the positive social and economic benefits which will result from the continuation of mining project.

Conclusion

The project represents a continuation of the existing mining operations at the Mine within the extent of the mining area as originally identified for mining in the 1989 and 1995 environmental assessments and approvals. The project also includes a small extension of the western boundary of the mining lease to accommodate a proposed extended overburden emplacement area which will assist with mitigation of noise and visual amenity impacts. Whilst the known available resource may extend beyond the 21-year life of any continuation of mining approval, the proposed mine plan for the continuation of mining operations reflects an optimised approach to resource extraction, balanced with achieving acceptable environmental and land use outcomes on the site.

The project would see the existing economic and social benefits of the mine continue over the life of a new approval. Similarly the proposed project would provide security of employment for the company's employees at both its Bloomfield Colliery (East Maitland) and Rix's Creek operations. With the progression of resource extraction on the site moving further away from the township of Singleton over time, it is anticipated that potential impacts on Singleton and residential receivers would further decrease over time.

Bloomfield intends on undertaking a thorough environmental assessment and identifying practical measures to minimise impacts from the proposed continuation of mining on the community and environment, whilst continuing to support the local economy and providing the benefits which follow.

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1.0 Introduction and Background

1.1 Introduction

Rix's Creek Mine (the Mine) of Rix's Creek Pty Limited, is owned and operated by Bloomfield Collieries Pty Limited (Bloomfield). The Mine is an open cut coal mine approximately 5 km north-west of Singleton in the Hunter Valley Coalfields of NSW (refer to **Figure 1** and **Figure 2**). The Mine currently produces approximately 1.5 million tonnes per annum (Mtpa) of product coal from its existing operations.

Bloomfield is seeking approval for the Rix's Creek Continuation of Mining Project (the project), which relates the ongoing processes of the existing open cut coal mine operations in Pit 3, as well as other mining and related activities across the Mine. The proposed project would allow the Mine to continue to operate as an open cut mine, accessed via its existing infrastructure facilities.

This report provides the Preliminary Environmental Assessment (PEA) of the project for the purpose of developing Director-General's requirements (DGRs) for an Environmental Impact Statement (EIS) under Division 4.1, Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2 Background and History

Coal mining operations in the vicinity of what is the current day Mine began in the late 1800s with the New Park Colliery.

Development Consent for mining operations in their current form at the Mine was first issued on 19 October 1989 following an approvals process which began in the mid 1970's and culminated in a Commission of Inquiry that was conducted in April 1989. The 1989 Development Consent allowed production of up to 0.3 Mtpa of raw coal for the first five years, increasing to 1.5 Mtpa in year six following the commissioning of a coal preparation plant.

In order to provide rail transport for the coal product, a joint rail loop was subsequently constructed between the Rix's Creek and Camberwell mines. A Statement of Environmental Effects (SEE) was prepared for the rail loading facility and coal stockpile, which was approved on 18 October 1990. The rail loop and loading facility became operational in April 1993, following which all coal produced by the mine was transported by rail.

The 1989 Development Consent for the Mine was issued under CL352 which allowed mining operations for a period of 21 years from the date of approval. CL 352 included surface mining exclusions over certain sections of the lease area, required by the then landowners, which prevented the operation of open cut mining activities. Due to the depth of the coal resource across much of the lease area, open cut mining presented the most efficient means of extraction, therefore negotiations began with the relevant landowners regarding the removal of the surface mining restriction.

Following agreement being reached with the landholder's, preparation of an Environmental Impact Statement began in order to allow surface mining to take place. The 1994 EIS modified the mine plan to incorporate surface (open cut) mining, as well as providing for additional infrastructure and equipment upgrades required for open cut operations, to meet new technological standards available at the time. This development application was approved on 16 October 1995 and ML 1432 issued on 24 June 1998 allowing open cut mining to occur over the entire area. The Mine continues to operate under this approval.

The 1995 EIS undertook a full assessment of environmental impacts across ML 1432 with current day operations largely reflecting the operations assessed and approved in 1995.

Operation commenced on the extension of Pit 1 in 1997, increasing production rates to 1.7 Mtpa of ROM coal. Mining operations continued in Pits 1 and 2 after 1997. In 2002, operations also commenced in the West Pit (i.e. Pit 3) which is adjacent to Pit 2 in the west of the mining lease area.

The first tailings emplacement area (Tailings Emplacement No.1) was a small one hectare area adjacent to the haul road bridge over the New England Highway. This area was capped and rehabilitation completed in 1999.

The North Pit tailings emplacement area (Tailings Emplacement No. 2) covered an area of 15 ha. This tailings emplacement area was contained in a section of the Old North Pit void prior to the floor being elevated to the Liddell seams. The tailings emplacement area was dewatered into the Old North Pit mine water storage area for recycling and reuse in the CHPP. This tailings emplacement area reached capacity during 2005 and has since

been dewatered, progressively capped and disturbed areas rehabilitated. This process is expected to be completed during 2014.

Following closure of Tailings Emplacement No. 2, tailings began being received into the old Pit 2 void (Tailings Emplacement No. 3). **Figure 4** shows locations of Pits, tailings emplacement areas and existing mine infrastructure.

1.3 Existing Operations

The Mine is located approximately 5km north-west of Singleton in the Hunter Coalfields (refer to **Figure 1** and **Figure 2**). The Mine currently extracts from within the Barrett, Liddell, Arties and Pikes Gully and Lemington seams of the Whittingham Coal Measures, mostly producing thermal and semi-soft coking coal. Coal products from the Mine are mainly sold on the export market with occasionally small quantities of product coal being sold to domestic customers.

A truck and shovel method is used to remove and stockpile topsoil ahead of mining operations. Overburden is then drilled and blasted, with blasting requirements dependent on the characteristics of the overburden. Blasting is typically undertaken using Ammonium Nitrate and Fuel Oil (ANFO).

Coal is currently extracted from two operational pits: Pit 1 to the east of the New England Highway; and Pit 3 to the west of the Highway and on the western side of Rix's Creek. Ongoing mining continues concurrently in Pits 1 and 3 with production rates of around 2.5 Mtpa of ROM coal. Annual production is currently around 1.5 Mtpa of product coal. It is anticipated that current open cut coal extraction from the northern end of Pit 1 will be complete by the beginning of 2014, with coal extraction concentrated in Pit 3 after that time. With the completion of coal extraction from the northern end Pit 1, overburden will be progressively backfilled into the void prior to capping to final levels and rehabilitation.

Extraction of coal from Pit 2 ceased in 2003, with this pit utilised for tailings emplacement from 2005 onwards (as Tailings Emplacement No 3). This tailings emplacement area is expected to reach capacity by mid-2014, after which dewatering and rehabilitation will commence. Tailings will then be disposed into Tailings Emplacement No. 4 which is contained within the Pit 1 (North Pit) void. Bloomfield is also conducting trials of drying tailings to allow co-disposal with coarse reject within overburden emplacements.

The existing Coal Handling and Processing Plant (CHPP) allows coal to be washed onsite and then transported by rail to the Port of Newcastle for blending and export. Coal stockpiles and the rail loading facility at the Mine are located outside of the current mining lease area, along the Integra rail loop.

The current approval for the Mine allows for operation 24 hours a day, seven days. The Mine currently operates 24 hours a day, and operates with three eight-hour shifts per day (06:30 to 14:30, 14:30 to 22:30 and 22:30 to 06:30).

The existing surface infrastructure facilities are located within CL 352 and ML 1432 (refer to **Figure 3**).

The project as described in **Section 2.0** represents a continuation of the existing mining activities which are currently undertaken at the Mine including the ongoing use of the same equipment, CHPP, mining methods and procedures. The EIS for the continuation of mining project will build on the site environmental studies undertaken for the 1995 approvals and subsequent studies as required to be updated in accordance with current environmental and regulatory requirements.

1.4 Summary of Mine Approvals

A summary of the approvals under which the Mine operates are listed in **Table 1**.

Table 1 Development Consents for the Existing Rix's Creek Mine Operations

Year	Approval and Consent Authority	Activity
1989	Minister for Local Government and Minister for Planning	Construction and operation of a surface coal mine, associated transport and coal loading facilities, including coal preparation plant. Consent was granted to mine up to 1.5 Mtpa of ROM coal. Coal Lease (CL) 352 was subsequently granted.
1995	DA 49/94 - Minister for Urban Affairs and Planning	Coal mining within CL 352 and on land subject to Coal Lease Application No. 17 in Singleton, construction and operation of surface coal mine extensions.
1999	DA 49/94 Modification 1 – Minister for Infrastructure and Planning	Modification to amend applicable noise criteria at nearby receivers.
2003	DA 49/94 Modification 2 – Minister for Infrastructure and Planning	Modification to receive ROM coal from Glennies Creek underground mine, process the coal and ship it by rail.
2004	DA 49/94 Modification 3 – Minister assisting the Minister for Infrastructure and Planning	Modification to receive, process and transport bulk coal samples from the Bickham exploration project.
2009	DA 49/94 Modification 4 - Minister for Planning	Modification to allow a cut and cover tunnel under the New England Highway.
2013	DA 49/94 Modification 5 – (Draft conditions issued - determination pending)	Modification to enable the construction and operation of a rail loop and associated clean coal stockpile and rail loading facility on the Rix's Creek mine site.

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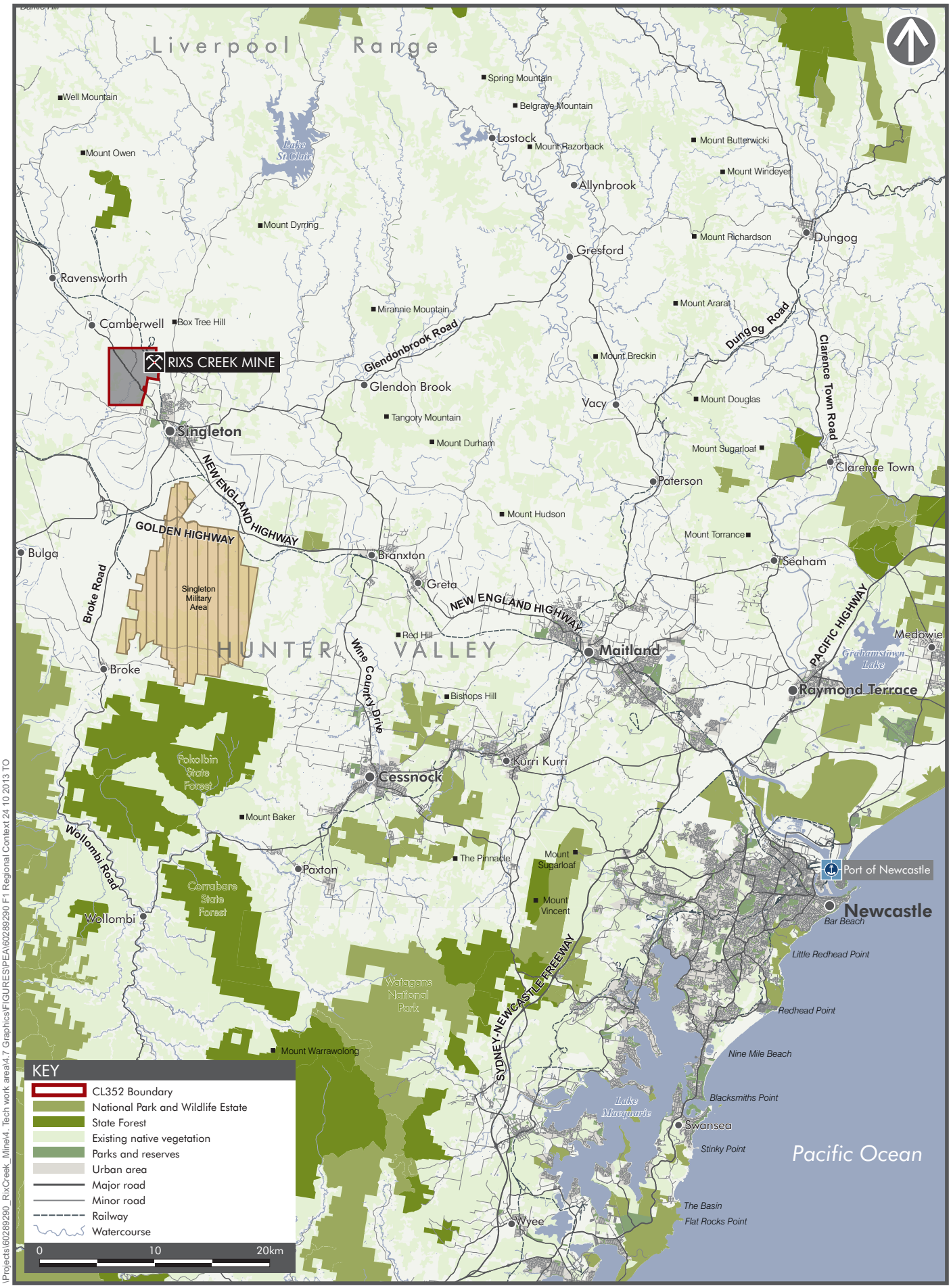

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REGIONAL CONTEXT

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FIGURE 1

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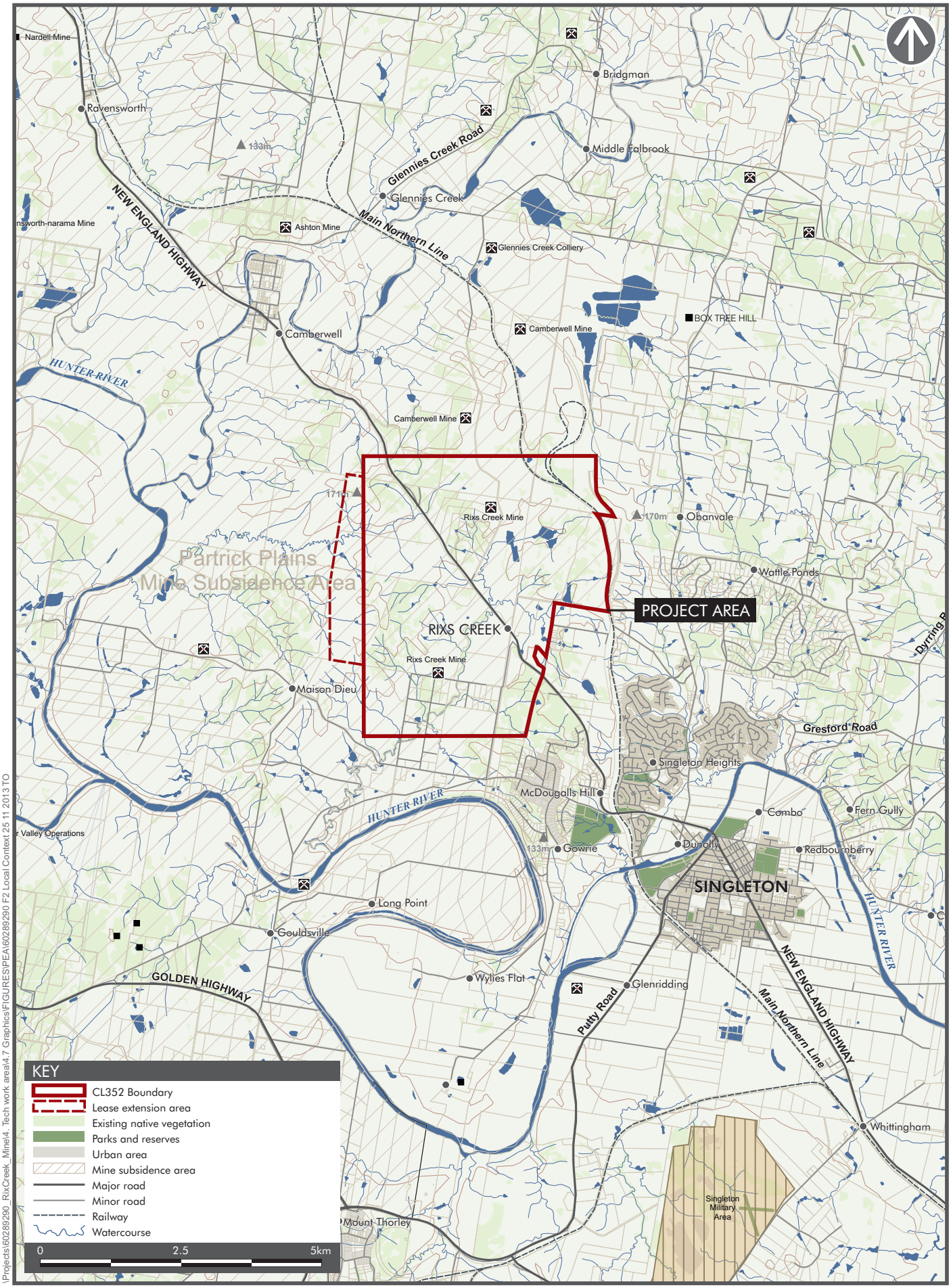

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LOCAL CONTEXT

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FIGURE 2

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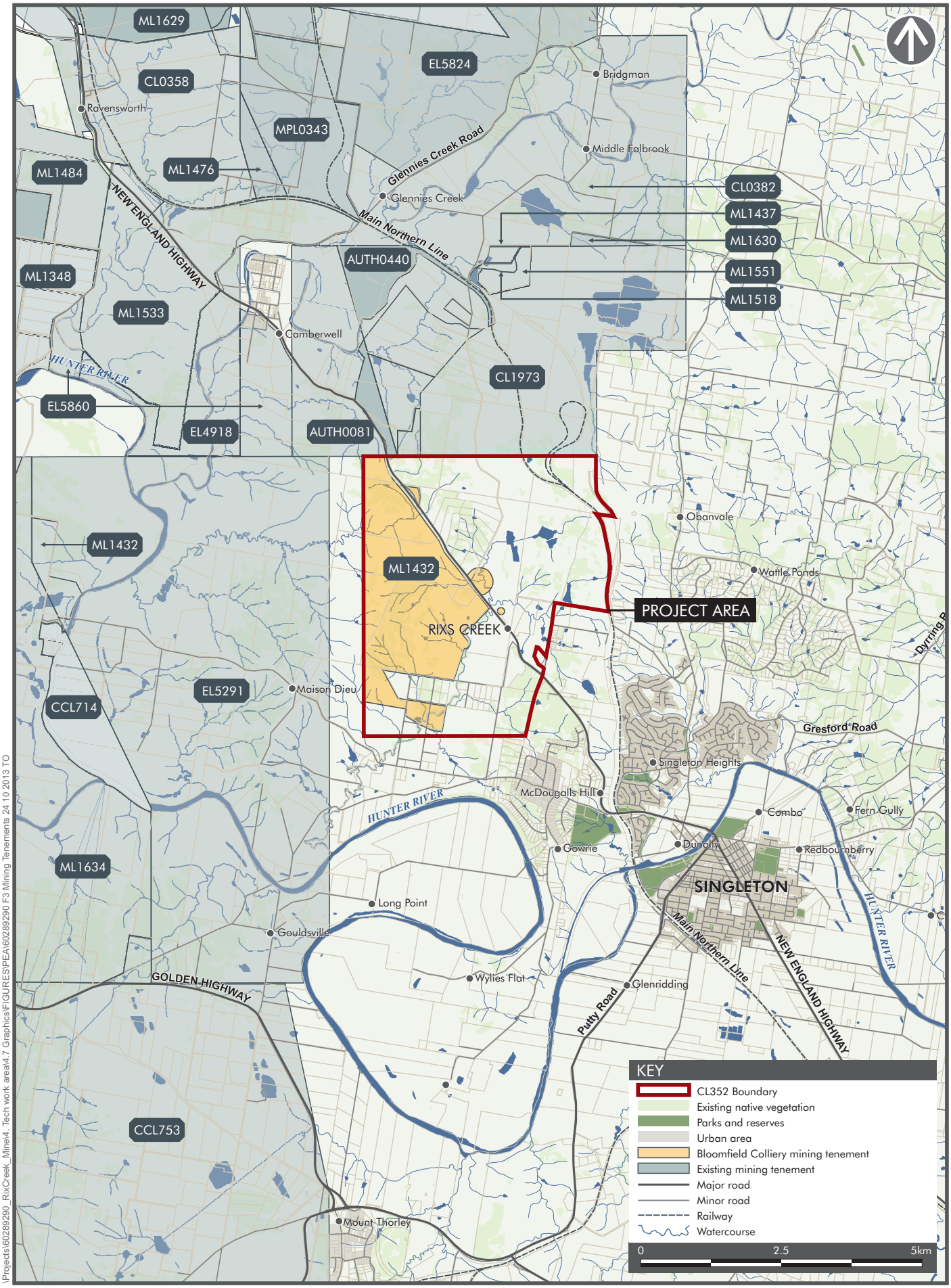

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MINING TENEMENTS

Rix's Creek Continuation of Mining
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FIGURE 3

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2.0 The Proposed Project

2.1 Development Location

The proposed continuation of mining operations at the Rix's Creek Mine (the project) will involve the continuation of operations at the Mine beyond the mine plan in the current approval. The continuation of mining operations will extend in a north-westerly direction and require a modification to ML 1432 for an out of pit dump (refer to **Figure 3**). The continuation of operations will utilise the existing mine access, CHPP, coal stockpiling and rail facilities.

2.2 Development Description

The project will involve the continuation of current mining activities through the use of mining methods similar to those presently employed at the Mine (refer to **Section 2.2.1**) to extract coal from the remaining coal seams. As part of this project, Bloomfield is seeking approval to allow for the extraction of up to 4.5 Mtpa of ROM coal. This additional production level will capitalise on the remaining coal resource at the Mine, estimated to contain around 32 million tonnes of saleable coal.

Bloomfield has long standing thermal and semi-soft coking contracts in Japan. Currently the combined production of both the Rix's Creek Mine and the Bloomfield Colliery Open Cut Mine service these contracts by supplying around 4.2 to 4.5 Mtpa of ROM coal. Bloomfield Colliery Open Cut mine will deplete its ROM coal resource within the remaining life of the Rix's Creek Mine. The project will therefore ensure Bloomfield's future supply of coal to meet its current contractual obligations by continuing the life of the Rix's Creek Mine and offsetting the eventual depletion of the Bloomfield Colliery Open Cut Mine as a source of coal to fulfil these obligations. Based on the need to accommodate ROM production of up to 4.5Mtpa to meet existing contractual obligations, the continued operation of the Mine is expected to be required to meet the estimated annual ROM production rates detailed in **Table 2** resulting in an indicative final landform as shown on **Figure 5**.

Table 2 Indicative Production Rate over Life of Project

Years	ROM Coal (Mtpa)	Saleable Coal (Mtpa)
2017 - 2020	2.5	1.5
2021 - 2023	4.5	2.7
2024 - 2028	1.6	1.0
2029 - 2032	1.5	0.9
2033 - 2036	1	0.6
2037	0.8	0.5
2038	0.7	0.4
Total	**53.0**	**31.8**

Once the coal has been extracted it will continue to be processed via the existing CHPP, and then transported to Port of Newcastle via the existing Integra rail facility as is currently the case. Once the Rix's Creek Mine rail loop is approved, constructed and operational, that facility would replace existing arrangements for the haulage of coal from the Mine.

The design of the project will continue to be refined during detailed mine planning however, each component of the project is described in broad terms in **Section 2.2.1** to **Section 2.2.6**.

It is expected that recoverable resource will remain within ML 1432 following the completion of mining activities as described in this PEA. Any remaining resource will be evaluated at the appropriate time in the future and, where necessary, additional approvals sought for the extraction of coal beyond the limits described in this PEA.

2.2.1 Mining Method

Mining methods will be the same as those currently employed at the Mine, being multi-seam bench open cut techniques. Around one half of the remaining coal reserves at the Mine are contained in steeply dipping areas. As a consequence, multi-seam bench system technique mining up to nine seams will continue to be used to manage this geology. This mining technique involves the sequential removal of overburden, the coal, then interburden between the recoverable seams. ROM coal will continue to be processed onsite at the CHPP. Product coal will then transported by trucks to the rail loader for distribution to the Port of Newcastle. It is estimated that the Mine could yield a total of 32 million saleable tonnes of coal at an overburden ratio of approximately 10.5:1 before coal seams are exhausted.

2.2.2 Mine Infrastructure

Current infrastructure at the Mine has available capacity to process and transport in excess of 4.5 Mtpa of ROM coal. In order to accommodate the maximum production rate of 4.5 Mtpa of ROM coal envisaged as part of the project, the following changes to mining infrastructure and equipment will be applied:

- The CHPP currently operates 4.5 days per week. This will be increased to seven days per week to allow the 4.5 Mtpa ROM coal to be processed under continued mining operations; and
- Some additional mobile equipment will be added to the existing mine fleet. Additional rear dump trucks will remain in the current 240T class. The existing policy of fleet renewal will mean the replacement of some of the current mine fleet as required.

As mining continues northward in Pit 3, an additional New England Highway crossing will be required. This crossing will be located to the north of the existing tunnel crossing. The existing southern tunnel crossing will eventually be closed as progression of mining in Pit 3 proceeds past the crossing, making it inaccessible in future.

2.2.3 Coarse Rejects

Coarse rejects from the CHPP will continue to be placed in the reject bin, before being hauled by truck to the open cut area to be disposed of within the spoil material. Coarse rejects disposal within the spoil material will continue to be controlled by the production supervisor, with tip areas being located on the basis of environmental constraints, the potential for spontaneous combustion and the stability of tip faces within the spoil area. All carbonaceous and reject material will also continue to be covered by a minimum of two metres of inert overburden material before the spoil area is shaped for final rehabilitated.

2.2.4 Fine Rejects

The fine rejects at the Mine consist of a slurry of clay, silt and composite mineral and coal particles less than 1.5 mm in size, with water to a pulp density of around 28 percent. This slurry will continue to be pumped from the underflow of the tailings thickener through a pipeline to the Tailings Emplacement Dam No. 4. Bloomfield is also conducting trials of drying tailings to allow co-disposal with coarse reject within overburden emplacements. The first of three drying modules was commissioned in October 2013.

2.2.5 Tailings Emplacement

The tailings emplacement area within Pit 2 (Tailings Emplacement No. 3) covers 19 ha and is scheduled to reach capacity during 2014. This tailings emplacement area will continue to be dewatered, capped and eventually rehabilitated by 2019. Tailings Emplacement No. 4, located in a section of the Pit 1 void received approval in 2012. Placement of tailings in Tailings Emplacement No. 4 will commence when Pit 2 (Tailings Emplacement No. 3) reaches tailings capacity and will accept tailings during the continuation of operations at the Mine.

2.2.6 Transportation of Product Coal to Port of Newcastle

The project will continue to transport product coal from the rail loading facility that is located outside of the current mining lease area, on the Integra rail loop (refer **Figure 4**). From here, product coal will continue to be sent to the Port of Newcastle for blending and export. The proposed project will see the quantity of product coal transported from the Mine to the Port of Newcastle increase from around 1.5 Mtpa to around 2.5 Mtpa.

It should be noted that DP&I is currently considering an application from the Mine to construct its own rail loop and coal loading facility within the mine lease as shown on **Figure 4**. Subject to approval and construction of this rail loop, all future coal will be transported via the Mine's own rail loop.

2.3 Mining Tenements

The project will be located predominately within the boundaries of the CL352 and ML 1432 (**Figure 3**) which are held by Bloomfield, and will utilise the existing mine access, CHPP, coal stockpiling and rail facilities. The two tenements pertaining to the project are detailed further in **Table 3**.

Table 3 Mining Tenements Relevant to the Rix's Creek Project

Mining Tenement	Details	Purpose
CL 352	Bloomfield Collieries Pty Ltd Expiry: October 2031	- Historical workings within CL 352 including workings down to 900m below AHD.
ML 1432	Bloomfield Collieries Pty Ltd Expiry: July 2019	- Extraction of coal from the ML area.

In order to allow space for alternative out of pit dump, it is proposed to extend ML 1432 on its western boundary. Providing an out of pit dump in this location will have the benefits of:

- Reducing the visual impacts of the existing out of pit dump adjacent to the New England Highway;
- Moving overburden handling further away from Singleton and surrounding residential receivers, thereby reducing potential noise and air quality impacts;
- Reducing the distance overburden from Pit 3 needs to be transported, resulting in reduced tyre dust generation, vehicle emissions and operational costs; and
- Improving the efficiency of mining operations in Pit 3 that will result as mining progresses north and the Pit narrows.

2.4 Project Benefits

It is proposed to obtain consent to extend the life of mine to allow the extraction of the identified resources within the ML and CL areas. It is estimated that the Mine could yield a total of 32 million saleable tonnes of coal before its coal seams are exhausted. The proposed project would therefore involve the continuation of mining operations at the Mine past the current life of mine expiration date to capitalise on the existing land ownership, lease arrangements, infrastructure and management systems that are in place to efficiently extract, process and export this remaining resource.

The project will benefit the local, regional and State economies through:

- Direct and indirect employment for personnel during the operation;
- Royalties and taxes; and
- Local and regional benefits from capital investment and purchasing carried out by a wholly owned Hunter valley private company, where all profits are subjected to the Australian taxation system. Bloomfield has no overseas based companies.

In addition, coal is a major export commodity for Australia. The project will continue to supply thermal coal and semi-soft coking coal for both export to the global market and domestic consumption.

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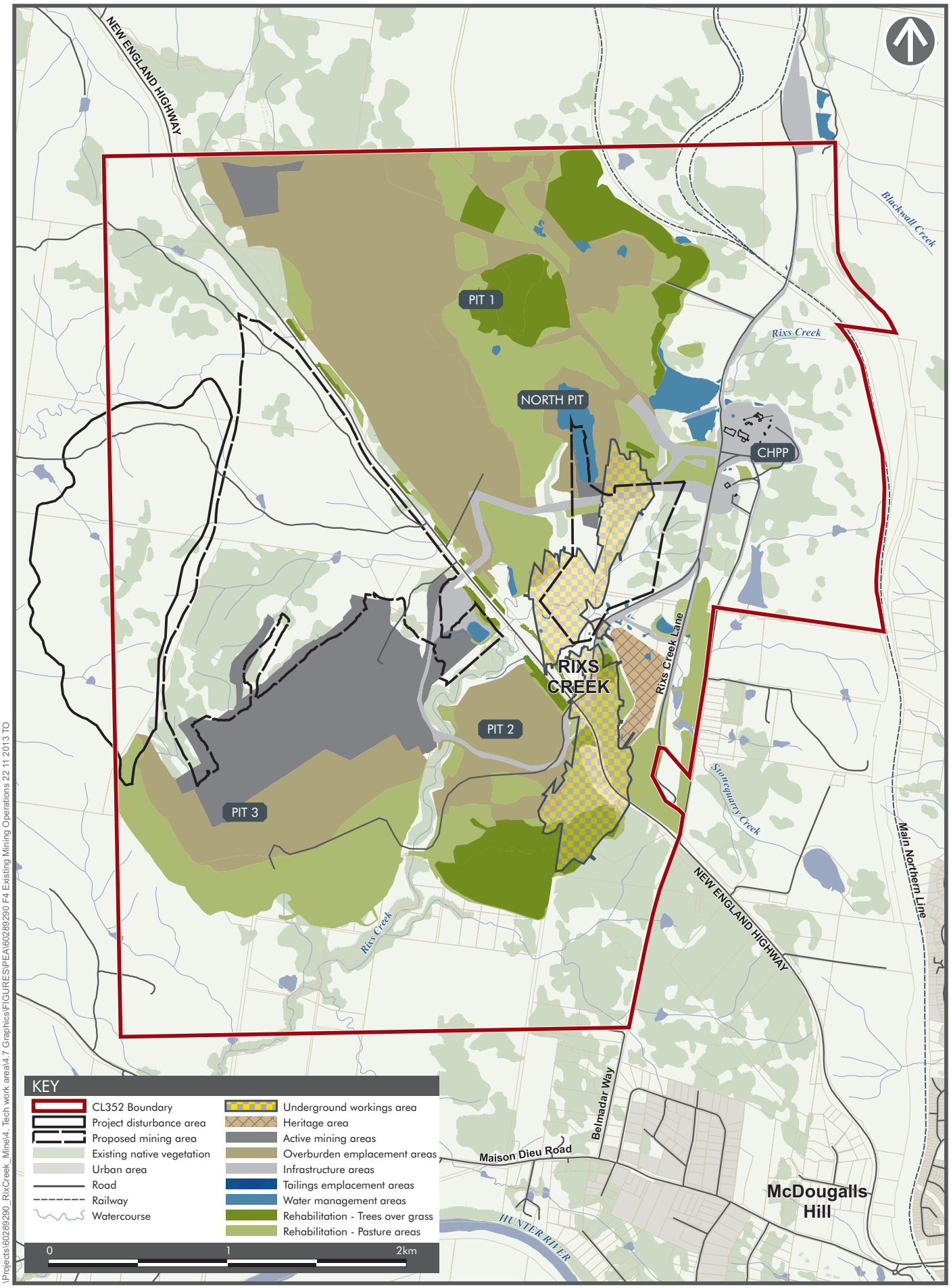

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EXISTING MINING OPERATIONS

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FIGURE 4

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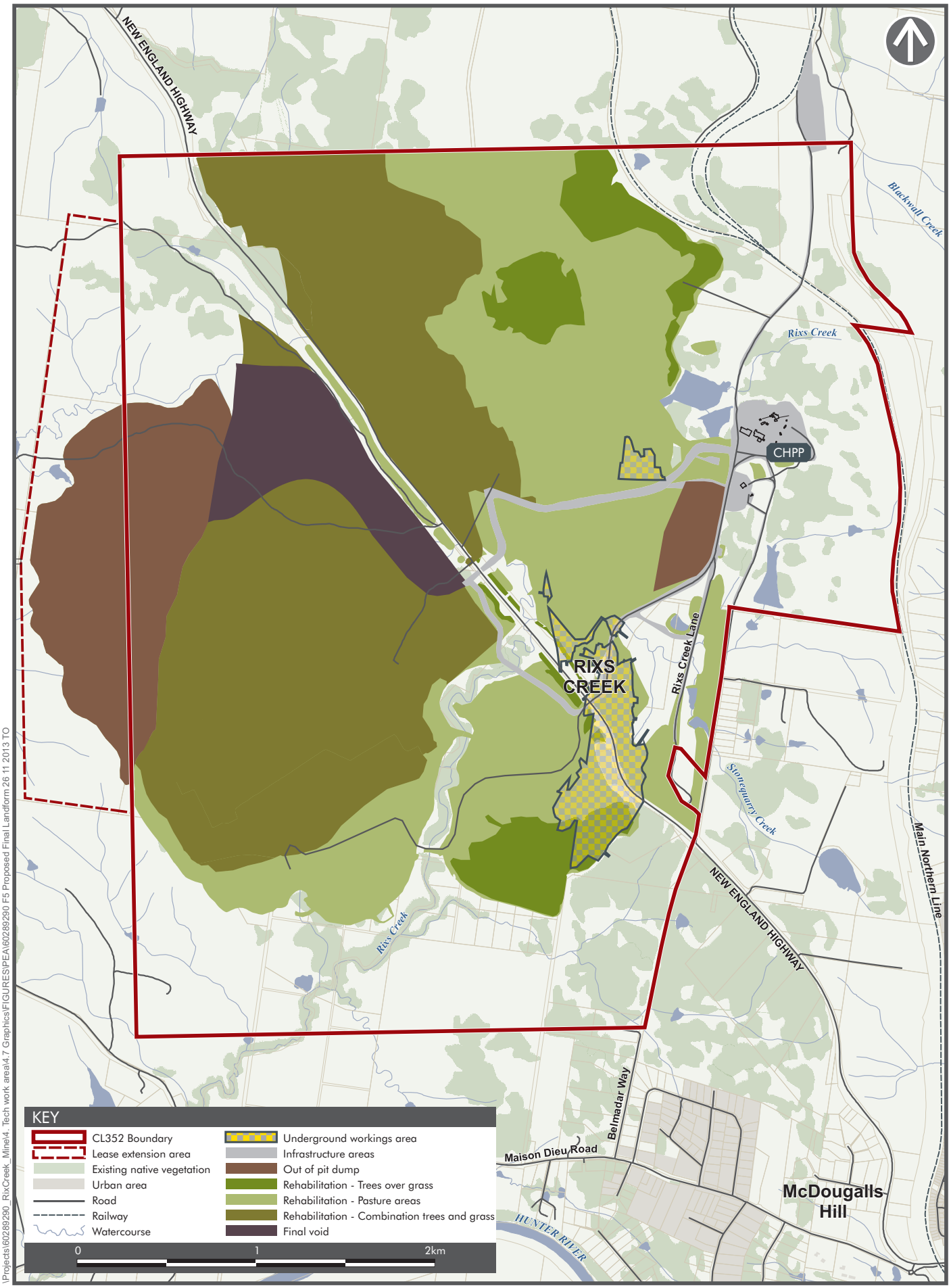

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PROPOSED FINAL LANDFORM

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FIGURE 5

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3.0 Context of the Development within the Hunter Coalfields

The Hunter Coalfields is one of five major coalfields located within the Sydney-Gunnedah Basin. It is located west of the Newcastle Coalfield and east of the Western Coalfield. It occupies around 2,100 km^2 from the north-east margin of the Sydney Basin, being largely centred over the Hunter River (Hutton, 2009). The geological context of the area is shown in **Figure 6**.

The Hunter Coalfields is the largest coal-producing region in NSW, producing the bulk of thermal coal for NSW's electricity generation needs as well as for export markets. There are 18 operational coal mines in the immediate vicinity (approx. 10km radius) of the Mine in the Hunter Coalfields as shown on **Figure 7** and detailed in **Table 4**.

Table 4 Current Mining Operations in the Hunter Coalfields

Coal Mine	Current Owner/Operator	Source of Coal (Seam)
Wambo Mine (labelled 10 on **Figure 7**)	Peabody Energy	Wambo
Bulga Mining Complex (labelled 3 on **Figure 7**)	Glencore Bulga/ Bulga Coal Management Pty Ltd	Redbank Creek, Wambo, Whynot, Blakefield, Glen Munro and Woodlands Hill
Mount Owen Mining Complex (including Mt Owen, Ravensworth East, and Glendell, labelled 2, 3 and 4 on **Figure 7**)	Glencore Mt Owen/ Thiess Pty Ltd	Ravensworth, Bayswater, Lemington, Pikes Gully, Arties, Liddell, Barrett, Hebden.
Ravensworth Surface Operations (labelled 7 on **Figure 7**)	Glencore Coal Pty Limited	Broonie, Bayswater Lemington, Pikes Gully, Arties, Liddell, Barrett and Hebden
Ravensworth Underground Mine	Glencore Coal Pty Limited	Pikes Gully, Lemington, Upper Liddell, Middle Liddell and Barrett
Mt Thorley-Warkworth Mining Complex (labelled 12 on **Figure 7**)	Mt Thorley: Coal and Allied Industries Limited and POSCO Australia Pty Ltd Warkworth: CNA Warkworth Australasia Pty Limited, CAN Resources Limited, Mitsubishi Development Pty Limited, Nippon Steel Australia Pty Limited and Mitsubishi Materials (Australia) Pty Limited	Mt Arthur, Warkworth and Bowfield
United Mine	Glencore Coal Pty Limited/United Collieries Pty Limited	Woodlands Hill and Blakefield
Ashton Mine (labelled 6 on **Figure 7**)	Yancoal Australia Ltd and Itouchu Corporation of Japan	Lemington, Pikes Gully, Liddell, Barrett and Hebden
Liddell Mine (labelled 1 on **Figure 7**)	Glencore, Mitsui Matsushima Australia Pty Limited/Liddell Coal Operations Pty Ltd	Liddell and Barrett
Hunter Valley Operations (labelled 8 and 9 on **Figure 7**)	Rio Tinto Coal Australia/Coal and Allied	Broonie, Bayswater, Warkworth, Mt Arthur, Piercefield, Vaux, Glen Munroe, Woodlands Hill, Arrowfield and Bowfield

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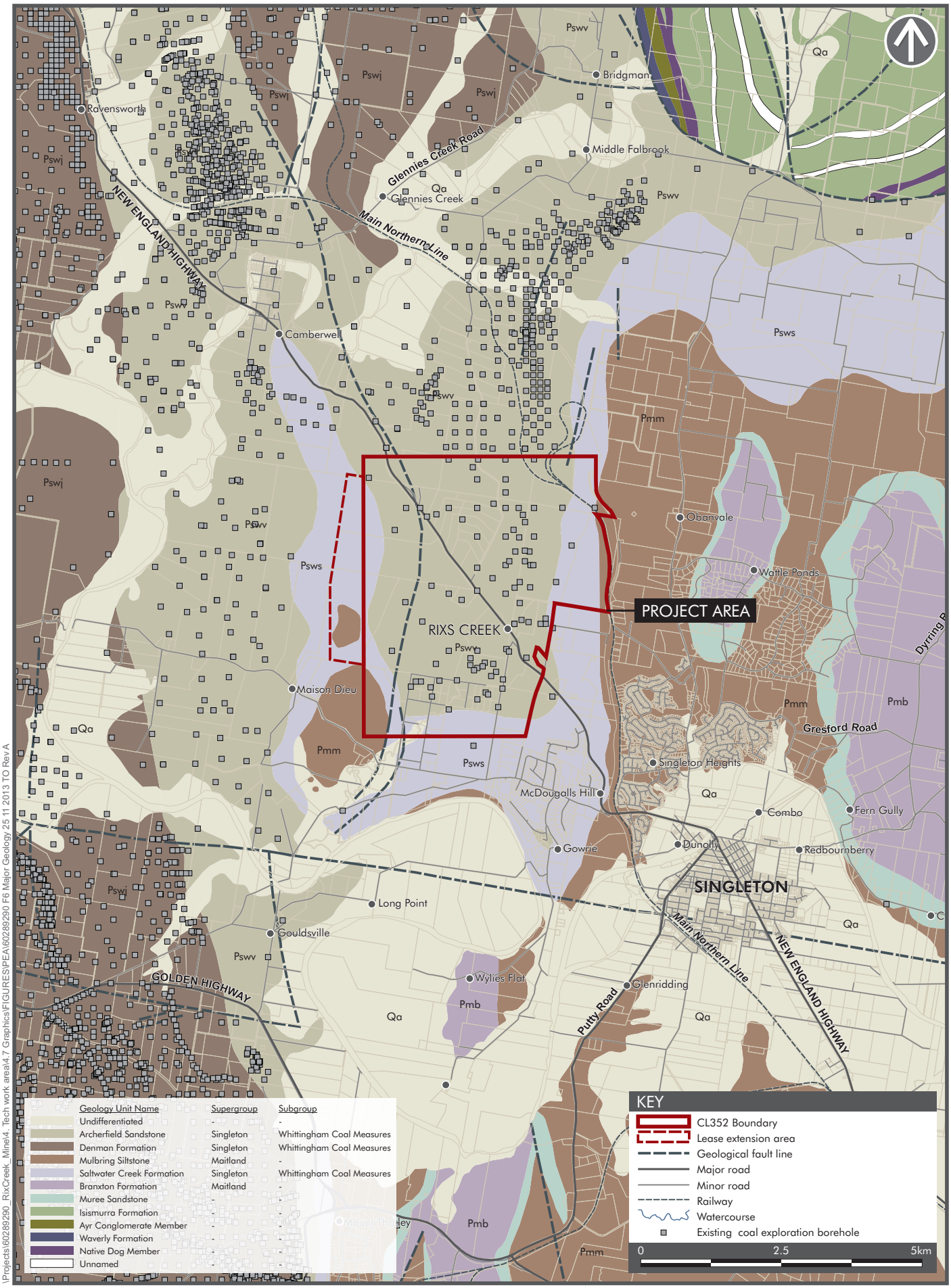

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MAJOR GEOLOGY

Rix's Creek Continuation of Mining
Preliminary Environmental Assessment

FIGURE 6

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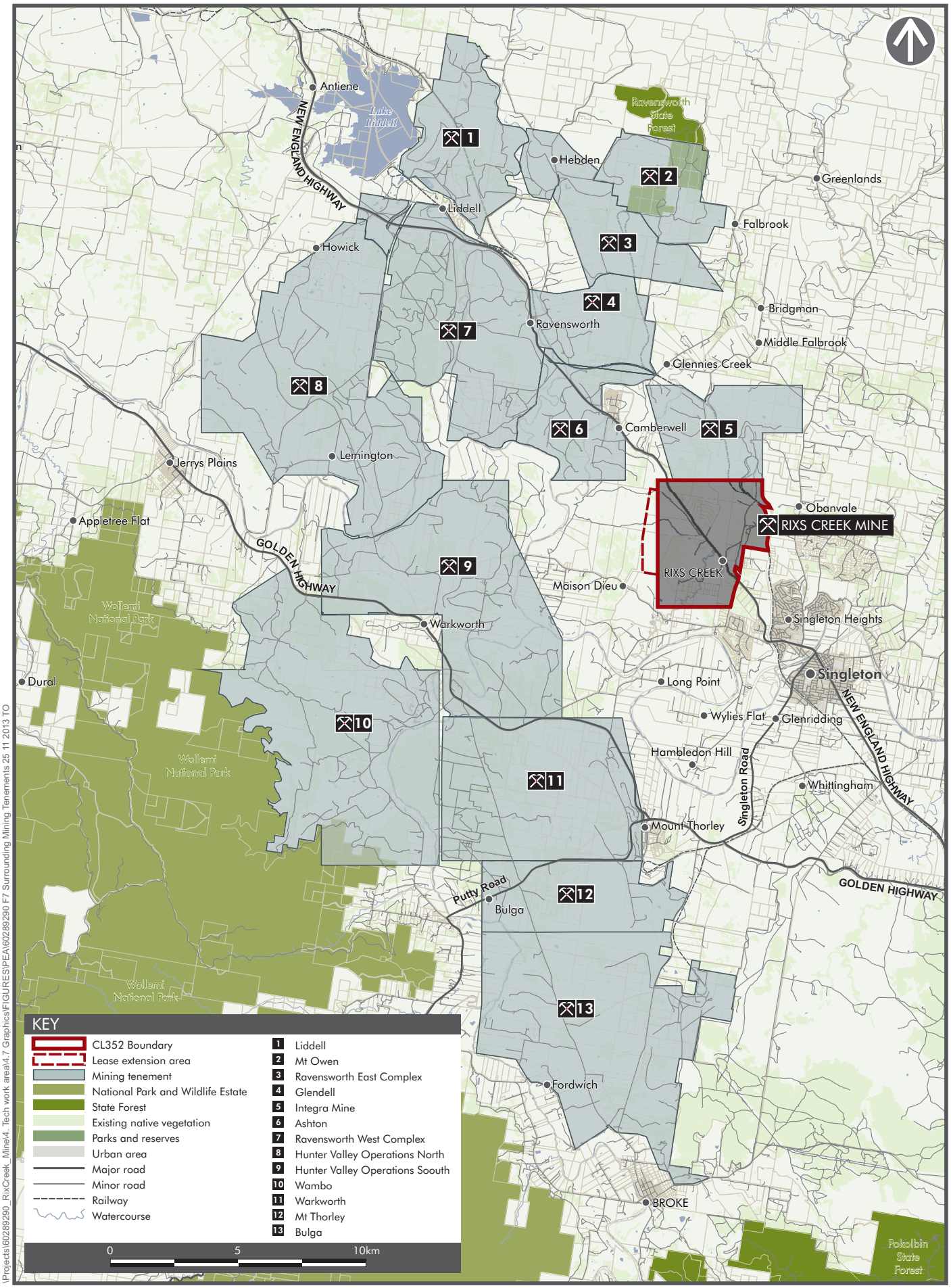

\Projects\60289290_RixCreek_Mine\4. Tech work area\4.7 Graphics\FIGURES\PEA\60289290 F7 Surrounding Mining Tenements 25 11 2013 TO

AECOM

SURROUNDING MINING TENEMENTS

Rix's Creek Continuation of Mining
Preliminary Environmental Assessment

FIGURE 7

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4.0 Environmental Planning Considerations

4.1 Permissibility

The project is permissible with consent under clause 7 of the *State Environment Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) as it is classified as:

> *(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)…*

The project will be located within Singleton Local Government Area (LGA) and subject to the *Singleton Local Environmental Plan 2013* (Singleton LEP 2013). The project will affect land zoned as RU1 Primary Production under the Singleton LEP 2013. Development for the purpose of agriculture is permissible in the RU1 zone, and therefore the project is also permissible by virtue of the Mining SEPP.

4.2 Environmental Assessment Process

The project is declared to be State Significant Development, for the purposes of the EP&A Act, under clause 8 and Schedule 1 of the *State Environment Planning Policy (State and Regional Development) 2011*.

Schedule 1 of the *State Environment Planning Policy (State and Regional Development) 2011* lists:

> "*(1) Development for the purpose of mining that:*
>
> *(a) is coal or mineral sands mining, or*
>
> *(b) is in an environmentally sensitive area of State significance, or*
>
> *(c) has a capital investment value of more than $30 million.*
>
> *(2) Extracting a bulk sample as part of resource appraisal of more than 20,000 tonnes of coal or of any mineral ore.*
>
> *(3) Development for the purpose of mining related works (including primary processing plants or facilities for storage, loading or transporting any mineral, ore or waste material) that:*
>
> *(a) is ancillary to or an extension of another State significant development project, or*
>
> *(b) has a capital investment value of more than $30 million.*
>
> *(4) Development for the purpose of underground coal gasification.* "

The project will be subject to an assessment by the Minister for Planning and Infrastructure (or his delegate) under Division 4.1, Part 4 of the EP&A Act. An EIS is required to support the application for development consent.

4.3 Environmental Planning Instruments

The following environmental planning instruments include provisions relating to issues that would or may be relevant to the environmental impact assessment of the project and relevant provisions will be considered in the EIS:

- *Singleton Local Environmental Plan 2013*;
- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*;
- *State Environmental Planning Policy No 33—Hazardous and Offensive Development*;
- *State Environmental Planning Policy No. 44 – Koala Habitat Protection*; and
- *State Environmental Planning Policy No. 55 – Remediation of Land*.

4.3.1 Singleton Local Environmental Plan 2013

Pursuant to the Singleton LEP 2013 the site is zoned of RU1 Primary Production. The New England Highway bisects the site and is zoned SP2 Infrastructure. No mining is proposed in this zone (The New England Highway). The project is permissible with consent in the RU1 Primary Production zone (refer to **Section 4.1**).

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

The Mining SEPP is the principal environmental planning instrument that governs the carrying out of the project. The Mining SEPP recognises the importance of mining, petroleum production, and extractive industries within the State. Clause 7 of the Mining SEPP identifies development which can be carried out only with development consent (refer to **Section 4.1**).

The aims of the Mining SEPP are:

(a) To provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and

(b) To facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and

(c) To establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources.

The project will involve the extraction of up to 4.5 Mtpa of ROM coal from the Hebden, Barrett, Liddell, Arties, Pikes Gully and Lemington Seams in the Hunter Coalfields of NSW. With careful design and management, the project will facilitate the orderly and economic use and development of land containing extractive material resources. Additionally, the project will promote the social and economic welfare of the State by benefiting local, State and regional economies through direct and indirect employment opportunities, as well as through the payment of coal royalties, consistent with the aims of the Mining SEPP.

4.3.3 State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State and Regional Development) 2011 (State and Regional Development SEPP) defines development that is considered State Significant Development (SSD) for the purposes of assessment under Division 4.1, Part 4 of the EP&A Act. Pursuant to clause 5, Schedule 1 of the State and Regional Development SEPP, development for the purposes of coal mining is SSD.

4.3.4 State Environmental Planning Policy No 33—Hazardous and Offensive Development

State Environmental Planning Policy No 33 – Hazardous and Offensive Development (SEPP 33) requires a consent authority to consider whether a development may constitute a hazardous or offensive industry as defined by SEPP 33. The instrument dictates that proposed mitigation measures are to be taken into account when determining whether a development is a hazardous or offensive industry, and that the consent authority must have sufficient information to make its determination and impose conditions to minimise impacts.

While the proposed project is not strictly considered an 'industry' within the meaning of SEPP 33, it will nonetheless be subject to the application of a risk screening for potentially hazardous industry as defined by SEPP 33. The risk screening will be undertaken in accordance with *Hazardous and Offensive Development Guidelines: Applying SEPP 33* (Department of Planning, 2011) and would be documented in general accordance with *Hazardous Industry Planning Advisory Paper No.6: Hazard Analysis* (Department of Planning, 2011).

4.3.5 State Environmental Planning Policy No. 44

State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44) requires a consent authority to consider whether land subject to a development application is classified as potential koala habitat and/ or core koala habitat. Before development consent can be granted on land defined as core koala habitat, a plan of management must be prepared for that land.

SEPP 44 applies to the Singleton LGA. Areas previously surveyed at the mine have not identified Koalas or potential Koala habitat (refer **Section 7.3.1**). However portions of the proposed mining area have not been subjected to targeted survey. The potential for these areas to provide Koala habitat would therefore be considered as part of the EIS. If potential habitat is identified, an assessment of the potential impacts on Koalas and Koala habitat would be included as part of an EIS, in accordance with the provisions of SEPP 44.

4.3.6 State Environmental Planning Policy No. 55

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) requires a consent authority, when assessing and determining a development application, to consider whether the land subject to the development is contaminated and if so, whether the land requires remediation before the intended land use can proceed.

There are no known major contaminated sites in the vicinity of the proposed project and contaminated land is not expected to be a significant constraint. However, in order to meet the requirements of *State Environmental Planning Policy No. 55 – Remediation of Land*, the EIS would consider the potential for contaminated land to be encountered based on historical land use, and appropriate mitigation measures would be identified where required.

4.4 Strategic Land Use Planning

4.4.1 Upper Hunter Strategic Regional Land Use Plan

The *Upper Hunter Strategic Regional Land Use Plan* (The Upper Hunter Strategy: DP&I, 2012) outlines the framework for supporting growth, protecting the environment and responding to competing land uses in the Upper Hunter region, whilst also preserving the key regional values of the Upper Hunter over the next 20 years. The Upper Hunter region is defined to include the LGAs of Singleton, Muswellbrook, Dungog, the Upper Hunter and Gloucester. The Upper Hunter Strategy identifies that population growth within this region varies between these various LGAs, and how this is most likely linked to the presence of mining-related employment.

The Upper Hunter Strategy also recognises that development in the Upper Hunter region such as mining development is necessarily constrained by the requirements to preserve strategic biophysical agricultural lands and critical clusters of equine or viticulture industries.

The Upper Hunter Strategy has mapped certain areas that are already known to contain these strategic biophysical agricultural lands, and critical industry clusters of agriculture, equine and viticulture lands. The Upper Hunter Strategy also provides criteria for determining whether other unmapped lands within the Upper Hunter region also fall within this definition. The project area is not mapped as strategic agricultural land nor is it identified as either viticulture or equine industry strategic land. Initial investigations indicate that it would not be identified as strategic land in accordance with the definition if subject to further investigation.

A review of the Biophysical Strategic Agricultural Land Mapping prepared as part of The Upper Hunter Strategy, the Rix's Creek Mine (including the existing mine footprint and the proposed extension of ML1432) is not located within:

- Biophysical Strategic Agricultural Land (BSAL);
- Equine Critical Industry Cluster; or
- Viticulture Critical Industry Cluster.

In accordance with the Upper Hunter Strategy work will be undertaken to verify that the site is not BSAL and a Site Verification Certificate will be sought to confirm this outcome.

Despite the requirements of the Upper Hunter Strategy, an assessment of the agricultural capacity of land directly affected by the project will be undertaken as part of the environmental assessment. This assessment will determine potential impacts to the agricultural capacity of affected areas and will recommend measures to maintain or improve this capacity following the completion of mining activities.

4.4.2 Singleton Land Use Strategy

The *Singleton Land Use Strategy* (Planning Workshop Australia, 2008) identifies how growth and change are anticipated to occur within the Singleton LGA. The *Singleton Land Use Strategy* also provides land use planning objectives and strategies to guide this growth and change and recognises the infrastructure required to meet those demands. It anticipates that the Singleton LGA will experience population increases of around 1-1.5 percent per annum before 2032, and that around 200 new dwellings will be required per annum to meet this demand. The *Singleton Land Use Strategy* suggests this growth is most likely to result from migration into the LGA for employment and lifestyle reasons. The mining industry is particularly relevant, as a large proportion of the current Singleton LGA workforce is already employed in mining, and these rates of mining industry employment are expected to either remain stable or increase before 2023. After this time coal production and employment is forecast to gradually decline as accessible coal reserves are exhausted within the Singleton LGA. Coal mining is

therefore recognised as the most significant land use and economic activity in terms of shaping the future of the Singleton LGA.

The *Singleton Land Use Strategy* seeks to maximise the benefits of coal mining, amongst other land uses, in the LGA through appropriate land use zonings and planning controls that limit the potential for land use conflicts in the buffer areas around these resources, and also by ensuring that appropriate environmental buffers are applied to these areas to protect other land uses.

4.5 Other NSW Environmental Approvals

Under sections 89J and 89K of the EP&A Act, other NSW environmental approvals will not be required for the project (section 89J), or will be required to be issued consistent with the development consent for the proposed project (section 89K). Each of these separate approvals is considered in **Table 5**. Other environmental approvals may be required in addition to those referred to under section 89J and 89K of the EP&A Act. These will be considered and outlined where relevant to the assessment of the project during preparation of the EIS.

Notwithstanding, where separate environmental approval processes have been integrated into the assessment regime under the EP&A Act, the EIS for the project will be required to consider and address the same issues that would have otherwise been required to be assessed for the separate environmental approval.

Table 5 Relevant Environmental Approvals

Approval	Relevant to the Development?	Comment
Approvals not required under section 89J		
Concurrence under Part 3 of the *Coastal Protection Act 1979*.	Not relevant.	The project will not be located within the coastal zone.
A permit under section 201of the *Fisheries Management Act 1994*.	Not relevant.	The project will not involve dredging or reclamation works.
A permit under section 205 of the *Fisheries Management Act 1994*	Not relevant.	The project will not harm marine vegetation.
A permit under section 219 of the *Fisheries Management Act 1994*	Potentially relevant.	The project is unlikely to result in the blockage of fish passage.
An approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*.	Potentially relevant.	The project (including land clearing and excavation works) may impact on a heritage listed place, building, work, relic, moveable object, precinct, or land, that is subject to an. The extent to which the project is likely to impact a heritage item will be determined during preparation of an EIS.
An Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*.	Potentially relevant.	The dominant features of Aboriginal heritage in the vicinity of the project comprise early production chert, mudstone and silcrete flakes associated with erosion channels, Rix's Creek and other major creek lines. These areas are identified as environmentally sensitive with regards to items of Aboriginal heritage significance. The project will be undertaken to avoid impacts on Aboriginal heritage objects, places, land or persons wherever reasonable and feasible to do so. However, until more detailed survey work is undertaken within the extent of the project, and the detailed mine plan is progressed further, total avoidance of impacts to Aboriginal cultural heritage is not certain. The extent to which the project is likely to impact on Aboriginal cultural heritage will be determined during preparation of an EIS.

Approval	Relevant to the Development?	Comment
An authorisation referred to in section 12 of the *Native Vegetation Act 2003* (or under any Act repealed by that Act) to clear native vegetation or State protected land.	Relevant.	The project will require clearance of native vegetation for the purposes of expanding the rejects emplacement area and constructing ventilation shafts. The EIS will report on the extent of native vegetation clearance required to undertake the proposed project, assess the impacts of any clearing, and recommend safeguard measures.
A bushfire safety authority under section 100B of the *Rural Fires Act 1997*.	Not relevant.	Components of the project may be located in bushfire prone areas. It is not anticipated that bushfire prone land would require subdivision to accommodate the continuation of existing mining operations.
A water use approval (section 89), a water management work approval (section 90) or an activity approval (other than an aquifer interference approval) (section 91) of the *Water Management Act 2000*.	Relevant.	The project is likely to involve water supply works and drainage works, as well as the taking of groundwater. The project is also likely to involve works in, on or under waterfront land, as defined by the *Water Management Act 2000*.
Approvals required to be issued consistently under section 89K		
An aquaculture permit under section 144 of the *Fisheries Management Act 1994*.	Not relevant.	The project will not involve aquaculture.
An approval under section 15 of the *Mine Subsidence Compensation Act 1961*.	Relevant.	The project is located within the Patrick Plains mine subsidence district.
A mining lease under the *Mining Act 1992*.	Relevant.	The project involves mining.
A production lease under the *Petroleum (Onshore) Act 1991*.	Not relevant.	The project will not involve petroleum production.
An EPL under Chapter 3 of the *Protection of the Environment Operations Act 1997* (for any of the purposes referred to in section 43 of that Act).	Relevant.	Mining for coal is listed as a scheduled activity under clause 28(2)(a), Schedule 1 of the *Protection of the Environment Operations Act 1997*, being mining for coal with a capacity to produce more than 500 tonnes of coal per day. Rix's Creek Pty Ltd currently holds EPL 3391 for the Mine. Variations to this EPL will be sought from the EPA if required, in order to take account of the amended operations.
Consent under section 138 of the *Roads Act 1993*.	Not relevant.	The project will not require works in on or over a public road, nor will it require connection of private road to a classified road. The project will, however, require exaction of a new tunnel crossing beneath the New England Highway.
A licence under the *Pipelines Act 1967*.	Not relevant.	The project will not involve the operation of a pipeline that would require a licence under the *Pipelines Act 1967*.

4.6 Commonwealth Environmental Approvals

4.6.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires approval from the Commonwealth Minister for the Environment where an action has, or will have, a significant impact on a matter of National Environmental Significance.

A search of the *EPBC Protected Matters Search Tool* has been conducted generally across the mine with a 10km buffer. The search identified potential triggers that may require Commonwealth environmental approval for the project. Results of this search are presented in **Table 6** (only positive search results have been listed).

The proposed project has the potential to trigger the need for an EPBC Act referral (and potential subsequent need for approval under that Act) through:

1) Direct impacts, principally through vegetation clearing; and

2) Potential groundwater and aquifer impacts.

The project has the potential to impact on threatened species and endangered ecological communities through direct vegetation clearance associated with the proposed mining methods (refer **Section 7.3.1** for more detail). Previous survey of areas within the mining lease has not identified threatened plant species as occurring onsite and it is considered unlikely that threatened species occur within the proposed mining area due to previous clearing activities and abundance of invasive species. However, it is possible that some older trees present at the site may provide habitat for endangered bird species. As outlined in **Section 4.3.5**, the northern proposed mining area has not been previously surveyed and vegetation clearing would be undertaken in this location. The potential for this area to provide Koala habitat will therefore require consideration.

The potential for the proposed project to impact on these matters of national environmental significance listed in **Table 6** would be considered in detail as part of the EIS. If it is determined that any threatened species or communities are within the footprint of the mining areas, referral of the project may be required under the EPBC Act. However at this stage there is nothing that indicates an EPBC referral is likely to be required. Again, this will be confirmed once ecological survey work is completed as part of the EIS.

Table 6 Matters of National Environmental Significance within a 10km Buffer Area

Matter of National Environmental Significance	Outcomes of Database Search
Wetlands of International Importance	Hunter estuary wetlands: The proposed project is located in Rixs Creek catchment, a sub catchment of the Hunter River catchment. Therefore, the proposed project drains to the Hunter River, upstream of the RAMSAR listed Hunter estuary wetlands. Potential impacts of the proposed project on the wetlands would be related to cumulative (across the Hunter Valley) changes in water quality.
Listed Threatened Species and Ecological Communities	Two critically endangered ecological communities (CEEC) have potential to occur in the vicinity of the project. These are: - Lowland Rainforest of Subtropical Australia CEEC; and - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC. Twenty-four listed threatened species have potential to occur in the vicinity of the proposed project: - Regent Honeyeater (*Anthochaera phrygia*); - Australasian Bittern (*Botaurus poiciloptilus*); - Red Goshawk (*Erythrotriorchis radiatus*); - Swift Parrot (*Lathamus discolor*); - Malleefowl (*Leipoa ocellata*); - Australian Painted Snipe (*Rostratula australis*); - Green and Golden Bell Frog (*Litoria aurea*); - Booroolong Frog (*Litoria booroolongensis*); - Stuttering Frog (*Mixophyes balbus*); - Large-eared Pied Bat (*Chalinolobus dwyeri*); - Spotted-tailed Quoll (*Dasyurus maculatus maculatus*);

Matter of National Environmental Significance	Outcomes of Database Search
	- South-eastern Long-eared Bat (*Nyctophilus corbeni*); - New Holland Mouse (*Pseudomys novaehollandiae*); - Hastings River Mouse (*Pseudomys oralis*); - Brush-tailed Rock Wallaby (*Petrogale penicillata*); - Koala (*Phascolarctos cinereus*); - Grey-headed Flying Fox (*Pteropus poliocephalus*); - Lobed Blue-grass (*Bothriochloa biloba*); - Slaty Red Gum (*Eucalyptus glaucina*); - *Euphrasia arguta*; - Leek-orchid (*Prasophyllum* sp. Wybong (C.Phelps ORG 5269)); - Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood (*Pterostylis gibbosa*); - Siah's Backbone, Sia's Backbone, Isaac Wood (*Streblus pendulinus*); and - Austral Toadflax (*Thesium australe*).
Listed Migratory Species	Fourteen listed migratory species have potential to occur in the vicinity of the proposed project: - Fork-tailed Swift (*Apus pacificus*); - Cattle Egret (*Ardea ibis*); - Great Egret (*Ardea alba*); - White-bellied Sea Eagle (*Haliaeetus leucogaster*); - White-throated Needletail (*Hirundapus caudacutus*); - Spectacled Monarch (*Monarcha trivirgatus*); - Malleefowl (*Leipoa ocellata*); - Rainbow Bee-eater (*Merops ornatus*); - Regent Honeyeater (*Xanthomyza phrygia*); - Black-face Monarch (*Monarcha melanopsis*); - Satin Flycatcher (*Myiagra cyanloleuca*); - Rufous Fantail (*Rhipidura rufifrons*); - Latham's Snipe (*Gallinago hardwickii*); and - Painted Snipe (*Rostratula benghalensis* s. lat).
Coal Seam Gas or Large Mining Development with the Potential to Affect a Water Resource	The project involves a large mining development within the meaning of the EPBC Act and is likely to affect a groundwater resource.
Commonwealth Land	There are four sites containing Commonwealth Land within 10 km of the project, including the Australian Telecommunications Commission, the Defence Housing Authority, and Telstra Corporation Limited.

Investigations are currently underway to inform further consideration of the project and its potential impacts on matters of National Environmental Significance. Depending on the outcomes of these further considerations, a referral may be made to the Commonwealth Department of the Environment under the EPBC Act.

4.7 Native Title Act

The *Native Title Act 1993* recognises that Aboriginal people have rights and interests to land which derives from their traditional laws and customs. Native title can be negotiated in three ways; through a Native Title Claim (applications and determinations), through an Indigenous Land Use Agreement, or future act agreements.

There are no such indigenous Land Use Agreements or future act agreements that apply in the vicinity of the project.

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5.0 Consultation

Bloomfield recognises the importance of undertaking the project in a manner that avoids and minimises potential impacts on the environment and local communities. An important input into the consideration of environmental and community impacts will come from direct and transparent consultation with potentially affected members of the community and other relevant stakeholders.

5.1 Stakeholder Management Strategy

Community and stakeholder engagement for the project will be guided by the *Rix's Creek Continuation of Mining Stakeholder Engagement Strategy* (Stakeholder Engagement Strategy) (AECOM, 2013).

The Stakeholder Engagement Strategy was prepared specifically to guide community and stakeholder consultation during the environmental assessment preparation for the project. The Stakeholder Engagement Strategy provides a consistent management framework to identify and consult with stakeholders that have an interest in the project. It also provides guidance for appropriate monitoring and reporting of community initiated enquiries.

The Stakeholder Engagement Strategy will be implemented following the submission of this PEA to DP&I, throughout the EIS preparation phase of the project, and continuing during the operation of the project. The plan will be a dynamic document and periodically reviewed to ensure that consultation requirements adapt to specific project phases. The key objectives of the Stakeholder Engagement Strategy are provided in **Table 7** below.

Table 7 Community Consultation Objectives for the Proposed Project.

Objectives of the Stakeholder Management Plan	Objectives of the Community Consultation Plan
- To identify key stakeholder groups relevant to the proposed project. - To manage and facilitate the engagement of identified stakeholders. - To outline procedures for communication with the identified stakeholders. - To define the means by which the Mine will record and respond to feedback received from identified stakeholders. - To guide monitoring and reporting of community initiated enquiries and contact appropriately.	- To identify the communities and key stakeholders likely to be affected by the proposed project. - To identify the nature and extent of stakeholder issues and concerns, as well as relevant strategies to proactively manage these issues and concerns. - To define the key messages, and communication tools and techniques to be used by the Mine during the EIS phase of the proposed project and related exhibition phases to disseminate information and provide opportunity for feedback. - To identify the methods to be used by the Mine to record and respond to enquiries, complaints, issues and incidents. - To identify and allocate communication roles and the responsibilities of these roles.

5.2 Key Consultation Activities

Government agency stakeholders have been, and will continue to be, consulted as part of the environmental approvals process for the project. The Mine has made initial presentations of the project to the DP&I (13 May 2013). DP&I advised that a full Planning Focus Meeting (PFM) was not required however key agency and Government stakeholders should be briefed on the project. Key agency consultation activities that took place prior to the submission of this PEA are summarised as:

- DP&I project briefing – DP&I Offices, 13 May 2013;
- Singleton Shire Council project briefing, SSC offices, 2 June 2013;
- NSW Environment Protection Authority, emailed project briefing document, 8 August 2013, acknowledgement received 9 August 2013;
- Department of Trade and Investment – Division of Resources and Energy, site project briefing, Rix's Creek Mine, 12 August 2013;

- DP&I, site project briefing, Rix's Creek Mine, 12 August 2013; and
- Department of Resources and Energy, October 2013 regarding the proposed change to the mining lease boundary.

Issues raised during this initial agency consultation have been taken into consideration during the identification of key project issues (**Section 6.0**) as part of this PEA.

The key consultation activities and communications summarised in **Table 8** are to be undertaken during the development and assessment of the project.

Table 8 Key Consultation Activities and Communications

Activity/ Community Method	Summary
Project webpage	The Bloomfield webpage will be updated as required, including information about key milestones, provision of relevant documents available for public download, answers to frequently asked questions, and contact details for project inquiries. http://www.bloomcoll.com.au/bloomfield/bfield/Operations/RixsCreek/tabid/226/Default.aspx
Key Stakeholder Briefings	Ongoing meetings are to be held with key stakeholders and relevant Government agencies throughout the environmental planning approvals process. This will establish relationships throughout the life of the project, and provide opportunities for issues or concerns to be raised and addressed.
Key Stakeholder Letters	Local and State Government agencies as well as sensitive receivers will be sent letters providing progress updates during the preparation of the EIS. Letters will be sent to provide updates regarding key milestones, as well as to encourage feedback and/or participation in the assessment process.
Newspaper Advertising	Local newspaper advertisements will be used to inform the wider community of the Project and to invite feedback on the PEA and EIS. This mechanism will also be used to raise awareness when the EIS is on public exhibition.
Fact Sheets	Fact sheets will be made available for the community and interested stakeholders during consultation events and to notify stakeholder and the community of the progress of key milestones.
EIS Community Information Session	A community information session will be held to disseminate information on the project and the EIS and will offer key stakeholders and the community the opportunity to provide feedback on the project and the EIS.
Site Inspections	Key agency stakeholders will be invited to attend site inspections and project briefings. The outcomes of these inspections will inform the preparation of DGRs for the project.
Consultation with Aboriginal stakeholders	Aboriginal stakeholders will be consulted through the heritage impact assessment to be undertaken (**Section 7.7**), in accordance with the relevant guidelines issued by the Office of Environment and Heritage.

6.0 Identification of Key Assessment Issues

The project will utilise the existing mine infrastructure and provide ongoing and additional (direct and indirect) local employment and financial benefits, particularly through the generation of coal royalties.

Bloomfield recognises the need to carefully consider the potential impacts of the proposed project on the environment and local communities, and the need to minimise these impacts wherever reasonable and feasible to do so. In taking this approach, the benefits of the proposed project can be realised with the least net cost to the environment and the community.

6.1 Approach to Identification of Key Environmental Issues

An initial screening of potential issues for consideration in the EIS has been undertaken. The risk screening process has determined the likely level of assessment required to adequately and appropriately address each issue identified. The risk screening considered the significance of each potential environmental impact (through a preliminary environmental risk screening), and also the likely level of stakeholder interest in each issue. Including stakeholder perception of potential environmental impacts is an important part of determining the level of assessment that should be applied, given that key stakeholder concerns may not necessarily align with a purely technical analysis of environmental risks.

By combining the likely significance of each identified environmental issue with the expected level of stakeholder interest, an assessment has been made as to whether each issue is integral to the assessment of the project, and whether a detailed specialist investigation or desktop analysis would be appropriate. Where a high level of stakeholder interest is expected, a potential environmental impact has been determined to be a key issue requiring a detailed assessment irrespective of the outcomes of the environmental risk screening.

6.1.1 Environmental Risk Screening

The preliminary environmental risk screening for the project has taken into account the likelihood of an environmental impact occurring and the consequence of that impact should it not be mitigated. The screening levels applied to the likelihood and consequence of each relevant environmental impact are presented in **Table 9** below. The likelihood and consequence of each impact have been combined through the significance screening matrix presented in **Table 10** to establish the likely significance of the issue for the environmental assessment of the proposed project.

6.1.2 Review of Expected Stakeholder Interest

The expected level of stakeholder interest in each potential environmental issue identified has been considered, based on a broad review of key issues raised in submissions in relation to major coal mining projects over the past five years. Potential environmental impacts have been assigned an expected level of stakeholder interest based on the definitions presented in **Table 11**.

6.2 Screening of Environmental Assessment Significance

Outcomes of the preliminary risk screening process which determined the likely key issues of environmental assessment significance is presented in **Table 12**. This screening allows for general prioritisation of environmental assessment issues based on their potential significance, and does not take into account the application of mitigation measures to minimise and manage potential impacts. Reasonable and feasible mitigation measures will be applied to the project to minimise potential impacts. Mitigation measures will be developed during the assessment process and presented in detail in the EIS.

Table 9 Screening Levels – Environmental Impact Likelihood and Consequence

Likelihood of Impact		Consequence of Impact	
Almost certain	- Almost certain to occur; or - Could occur within months.	Severe	An issue that may cause disastrous environmental impacts with long term effects requiring major remediation.
Likely	- There is between 50% and 99% probability that an environmental effect would occur; or - There is the balance of probability that an environmental effect would occur; or - An environmental effect could occur monthly.	Major	An issue that may cause serious environmental impacts with medium term effects requiring significant remediation.
Possible	- There is between 20% and 50% probability that an environmental effect would occur; or - An environmental effect may occur shortly but there is a distinct probability that it will not; or - An environmental effect could occur within two to five years.	Moderate	An issue that may cause moderate and reversible environmental impacts with a short term effect requiring moderate remediation.
Unlikely	- There is between 1% and 20% probability that an environmental effect would occur; or - An environmental effect may occur but is not anticipated; or - An environmental effect could occur within five to 20 years.	Minor	An issue that may cause minor and reversible environmental impacts requiring minor remediation.
Very unlikely	- There is less than 1% probability that an environmental effect would occur; or - An environmental effect may occur under exceptional circumstances; or - An environmental effect is exceptionally unlikely, even in the long term future; or - An environmental effect could occur once every 20 years.	Insignific ant	An issue that may cause negligible and reversible environmental impacts requiring very minor or no remediation.

Table 10 Significance Screening Matrix

Likelihood of Effect	Consequence of Effect				
	Severe	Major	Moderate	Minor	Insignificant
Almost Certain	Very High Significance	Very High Significance	High Significance	Medium Significance	Medium Significance
Likely	Very High Significance	High Significance	High Significance	Medium Significance	Medium Significance
Possible	High Significance	High Significance	Medium Significance	Medium Significance	Low Significance
Unlikely	Medium Significance	Medium Significance	Medium Significance	Low Significance	Very Low Significance
Very Unlikely	Medium Significance	Medium Significance	Low Significance	Very Low Significance	Very Low Significance

Table 11 Screening Levels – Expected Stakeholder Interest

Level of Interest	Definition
High level of interest	Issues raised in feedback from most stakeholders or in most submissions made on major coal mining projects.
Medium level of interest	Issues raised in feedback from some stakeholders or in some submissions made on major coal mining projects.
Low level of interest	Issues not raised, or rarely raised, in feedback from stakeholders or is submissions made on major coal mining projects.

Table 12 Outcomes of Screening of Environmental Assessment Significance

Issue	Unmitigated Environmental Risk Screening			Stakeholder Level of Interest	Environmental Assessment Significance
	Likelihood	Consequence	Significance		
Air Quality					
Operational dust.	Likely	Minor	Medium	High	High
Noise and Vibration					
Operational noise impact.	Likely	Moderate	High	High	High
Blasting and vibration impacts.	Likely	Moderate	High	High	High
Ecology					
Vegetation clearance and habitat loss.	Almost certain	Moderate	High	High	High
Landscape and drainage change.	Almost certain	Moderate	High	High	High
Changes to aquatic ecology as a consequence of discharge and runoff quality and quantity changes.	Possible	Moderate	Medium	Medium	Medium
Soils and Geology					
Increased sedimentation and erosion.	Possible	Moderate	Medium	Medium	Medium
Surface Water					
Water quality impacts during operation.	Possible	Moderate	Medium	Medium	Medium
Operational water balance deficit - Inadequate supply to meet operational demand.	Possible	Moderate	Medium	Low	Medium
Groundwater					
Changes to volume and quality of inflows onsite and offsite.	Possible	Moderate	Medium	Medium	Medium
Impacts to local bore users.	Possible	Moderate	Medium	Medium	Medium
Heritage					
Impacts to items of Aboriginal heritage.	Likely	Moderate	High	Medium	Medium
Impacts to items of European heritage.	Possible	Moderate	Medium	Medium	Medium
Traffic and Transport					
Increase in vehicle movements as a consequence of operation.	Possible	Minor	Medium	Low	Medium
Increased rail movements associated with the proposed project.	Unlikely	Minor	Low	Low	Low

Issue	Unmitigated Environmental Risk Screening			Stakeholder Level of Interest	Environmental Assessment Significance
	Likelihood	Consequence	Significance		
Social and Economic					
Increase in demand for local services.	Likely	Minor	Medium	Low	Medium
Creation of employment opportunities.	Likely	Minor	Medium	Low	Medium
Visual Amenity and Landscape					
Impacts from an increase in the size of the disturbance area.	Likely	Minor	Medium	Medium	Medium
Visible alterations to surface topography.	Likely	Minor	Medium	Low	Low
Impacts to rural character and local view corridors.	Likely	Minor	Medium	Medium	Medium
Hazard and Risk					
Impacts associated with a bushfire event.	Possible	Moderate	Medium	Medium	Medium
Spontaneous combustion of reject material.	Unlikely	Moderate	Medium	Low	Medium
Hazardous event associated with the on-site storage of dangerous goods.	Unlikely	Major	Medium	Low	Medium
Greenhouse Gases					
Greenhouse gas emissions during operation.	Likely	Insignificant	Low	Low	Low
Downstream end use of coal products from the proposed project.	Likely	Moderate	High	Medium	Medium
Land Use					
Reduction in grazing land.	Likely	Minor	Medium	Low	Low
Waste					
Operational waste.	Likely	Minor	Medium	Low	Medium
Waste associated with a coal washery and reject material.	Likely	Moderate	High	Low	Medium
Rehabilitation					
Disturbance to existing areas of rehabilitation.	Possible	Minor	Medium	Low	Low
Lack of rehabilitation taking place post mining.	Unlikely	Minor	Low	Low	Low

6.3 Identification of Key Environmental Assessment Issues

Based on the risk screening presented in **Table 12**, key issues for consideration as part of the environmental impact assessment of the project have been identified and are summarised in **Table 13**. These issues are discussed in further detail in **Section 7.0** of this PEA.

For each of the issues considered in **Table 13**, an assessment of significance has been made based on the dominant environmental assessment significance ranking. For example, in the case of air quality, noise and vibration and ecology, the majority of environmental significance rankings for potential impacts were rated as high. As a consequence, these issues have been determined key issues for the environmental planning assessment of the development. A similar approach was taken to rehabilitation, soils and geology, surface and groundwater, heritage transport, social and economic, visual amenity and landscape, hazard and risk and greenhouse gas to be of medium significance to the environmental planning assessment process, based on the information available and the desktop investigations undertaken to date. The rankings of environmental assessment significance will be reviewed and updated accordingly as more detailed environmental investigations are undertaken to inform the preparation of the EIS for the project.

Table 13 Identification of Key and Other Environmental Assessment Issues

Issue	Environmental Assessment Significance	Key Issues/Other Issue
Air Quality	High	Key issue (**Section 7.1**)
Noise and Vibration	High	Key issue (**Section 7.2**)
Ecology	High	Key issue (**Section 7.3**)
Soils and Geology	Medium	Other issue (**Section 7.4**)
Surface Water	Medium	Other issue (**Section 7.5**)
Groundwater	Medium	Other issue (**Section 7.6**)
Heritage	Medium	Other issue (**Section 7.7**)
Traffic and Transport	Medium	Other issue (**Section 7.8**)
Social and Economic	Medium	Other issue (**Section 0**)
Visual Amenity and Landscape	Medium	Other issue (**Section 0**)
Hazard and Risk	Medium	Other issue (**Section 0**)
Greenhouse Gas	Medium	Other issue (**Section 0**)
Land Use	Low	Other issue (**Section 0**)
Waste	Low	Other issue (**Section 0**)
Rehabilitation	Low	Other issue (**Section 7.15**)

7.0 Preliminary Environmental Assessment

This section considers the environmental assessment issues for the proposed project. During the pre-feasibility assessment for the project and this PEA, the key focus has been for the avoidance of impacts wherever feasible. This focus will continue through the detailed mine planning phase and preparation of the EIS, with residual implications for the environment and local communities managed to minimise impacts where reasonable and practical.

7.1 Air Quality

7.1.1 Existing Environment

Weather monitoring at the Mine indicates that the dominant wind patterns are either from the north-west or east-south-east wind directions, and are consistent with regional weather patterns in the Hunter Valley. The mixing height (the height above ground level through which relatively vigorous vertical mixing occurs) for the area ranges from 1,500m during summer to 1,000m in winter during normal daytime conditions, lowering to less than 1,000m during the night and early hours of the morning, and under specific, typically winter, night-time conditions. Rainfall is highest between November and March, whilst the lowest mean rainfall occurs during July and August.

As part of its annual environmental management program, the Mine monitors air quality via dust monitors that have, in the past, recorded occasional exceedances of the Environment Protection Authority's annual average assessment criterion for PM_{10} (particulate matter >10 micrometres). Sources of PM_{10} however are not identified by ambient monitoring, and the causes of the elevated levels are not specifically attributable to the Mine operations. Elevated dust events typically coincide with anomalous weather conditions. It is noted in the Annual Environmental Management Report (AEMR) for the Mine that complaints have been made with regard to dust created by vehicles driving over dirt roads and odour emissions from the spreading of biosolids. Dust and odour issues continue to be addressed through additional dust management measures such as adapting operations in response to meteorological events which may increase the potential for dust generation and for odour not spreading biosolids when winds are predicted from the north-west (i.e. blowing towards potentially-affected receiver locations) and/or spreading of low-odour classified material.

7.1.2 Issues for Consideration

The project has the potential to emit air pollutants during operation which may impact the local air shed as well as local sensitive receivers. The potential sources of air pollution from the project are:

- Dust emissions as a result of earthworks including earthmoving and materials handling operations as well as other sources of 'fugitive' dust. Coal dust emissions may also occur during handling and storage of product coal;
- Vehicle exhaust emissions during operation of the project. In particular, emissions of diesel particulate matter; and
- Potential nitrogen dioxide emissions from blasting activities.

There is also potential for cumulative air quality impacts to arise due to the operation of the project in tandem with the existing operations on neighbouring mines and prevailing background levels of air pollutants.

7.1.3 Method of Assessment

Impacts of the project on local air quality conditions will be assessed in an air quality impact assessment to be included in the EIS. The air quality impact assessment will be prepared in accordance with *Approved Methods for the Modelling and Assessment for Air Pollutants in NSW* (DEC, 2005). Air quality impacts will be identified by air dispersion modelling which will include consideration of particulate matter and blast fume (nitrogen oxides). The dispersion modelling will incorporate likely sources of emissions, which are expected to include:

- Operation of active mining areas;
- Operation of course rejects emplacement areas;
- Cumulative impacts associated with the operation of surface facilities, including:
    - Haul roads;

- ROM Stockpiles;
- Conveyors and transfer points;
- Product coal stockpiles;
- Materials handling emissions e.g. bulldozers, truck loading, on-site coal haulage and site maintenance; and

- Blasting activities.

In addition to quantitative modelling, a qualitative assessment of potential odour impacts will also be undertaken.

The air quality impact assessment will determine the nature and extent of the impacts that the project may have on air quality in isolation as well as the cumulative impacts the project may have on the surrounding environment and sensitive receivers. Additionally, the assessment will identify design or management options that may need to be applied to the project to meet relevant air quality criteria and requirements.

7.2 Noise and Vibration

7.2.1 Existing Environment

The Mine is currently approved for a 24 hour, 7 day per week operation, although generally operates a six-day week, with its CHPP operating 4.5 days per week. The noise emissions from mining activities and associated infrastructure at the Mine are regulated by conditions of the 1989 and 1995 development consents as modified (refer to **Table 1**), and by the requirements of EPL 3391. Noise and vibration at the Mine is managed in accordance with the existing *Noise Management Plan* (Bloomfield, 1996).

Existing sources of noise and vibration include coal excavation, overburden movement and handling, blasting, train movements within the mine rail loop, the ROM stockpile dozers, low frequency operations such as washery screens, the CHPP, transfer screens, motor, gearbox/conveyors, product impact (chutes/transfers), gas vacuum pumps, product coal and rejects haul trucks, and the operation of the rejects and tailings emplacement areas.

Rix's Creek Pty Limited is a member of an Upper Hunter joint venture group that provides access to an atmospheric prediction model with accurate weather parameter predictions for operations. This information is used to inform decisions about blast scheduling. Blasting activities as part of the Mine's existing operations are carried out in accordance with the current EPL (i.e. between the hours of 9:00 am and 5:00 pm, Mondays to Saturdays). When blasting takes place within the 500m safety zone of the New England Highway, highway traffic is stopped as per an agreement with RMS. Sensitive rural residential receivers are located predominately to the south of existing operations (refer to **Figure 8**).

During the 2012-2013 annual reporting period, the EPL for the Mine was modified to include three additional Pollution Reduction Programs (PRPs). One of these was directed towards monitoring noise from the site in accordance with the *NSW Industrial Noise Policy* (EPA, 2000).

Continuing mining beyond the existing impact areas has the potential to create noise and vibration impacts for additional receivers. Bloomfield has undertaken steps to acquire properties that may be noise and vibration affected, and hence to avoid or reduce the likelihood of these impacts. The increased operation of the CHPP, haul trucks and the rail loop to process and transport coal also have the potential to increase noise impacts compared to current operations.

Other sources of noise in the vicinity of the project include road and rail traffic noise as well as domestic/rural activities and other mining activities.

7.2.2 Issues for Consideration

Key issues to be considered regarding noise and vibration impacts of the project relate to the use of equipment to clear vegetation as well as the initial excavation and ongoing overburden blasting and haulage associated with mining activities.

Traffic and transport noise and vibration impacts in the local area and along transport routes will be considered, including on-site train movements, rail loading activities, rail noise and vibration, and the transport of coal rejects material to the rejects and tailings emplacement areas.

In addition, there is potential for cumulative noise impacts resulting from the operation of the project in tandem with the existing operations at the Mine and other coal mining operations in the area.

7.2.3 Method of Assessment

Impacts of the project on the surrounding environment will be assessed in a noise and vibration assessment that will be included in the EIS. The assessment will be undertaken in line with regulatory requirements for operational noise modelling and assessment, including:

- *NSW Industrial Noise Policy* (EPA, 2000);
- *NSW Road Noise Policy* (EPA, 2011);
- *Interim Construction Noise Guidelines* (DECCW, 2009);
- *Vibration – A Technical Guideline* (DEC, 2006); and
- *Rail Infrastructure Noise Guideline* (EPA, 2013).

Impacts of the project will be identified and modelled against background noise data which will be used to establish noise assessment criteria according to the above policies and guidelines. The assessment will include consideration of impacts associated with the operation of the mining infrastructure, as well as identified impacts that result from increased road and rail movements and proposed blasting activities. Depending on the outcomes of the noise impact assessment, Bloomfield may review scale and intensity of the project, particularly in the context of the ability reasonably and feasibly achieve application noise criteria at a production rate of 4.5 Mtpa of ROM coal.

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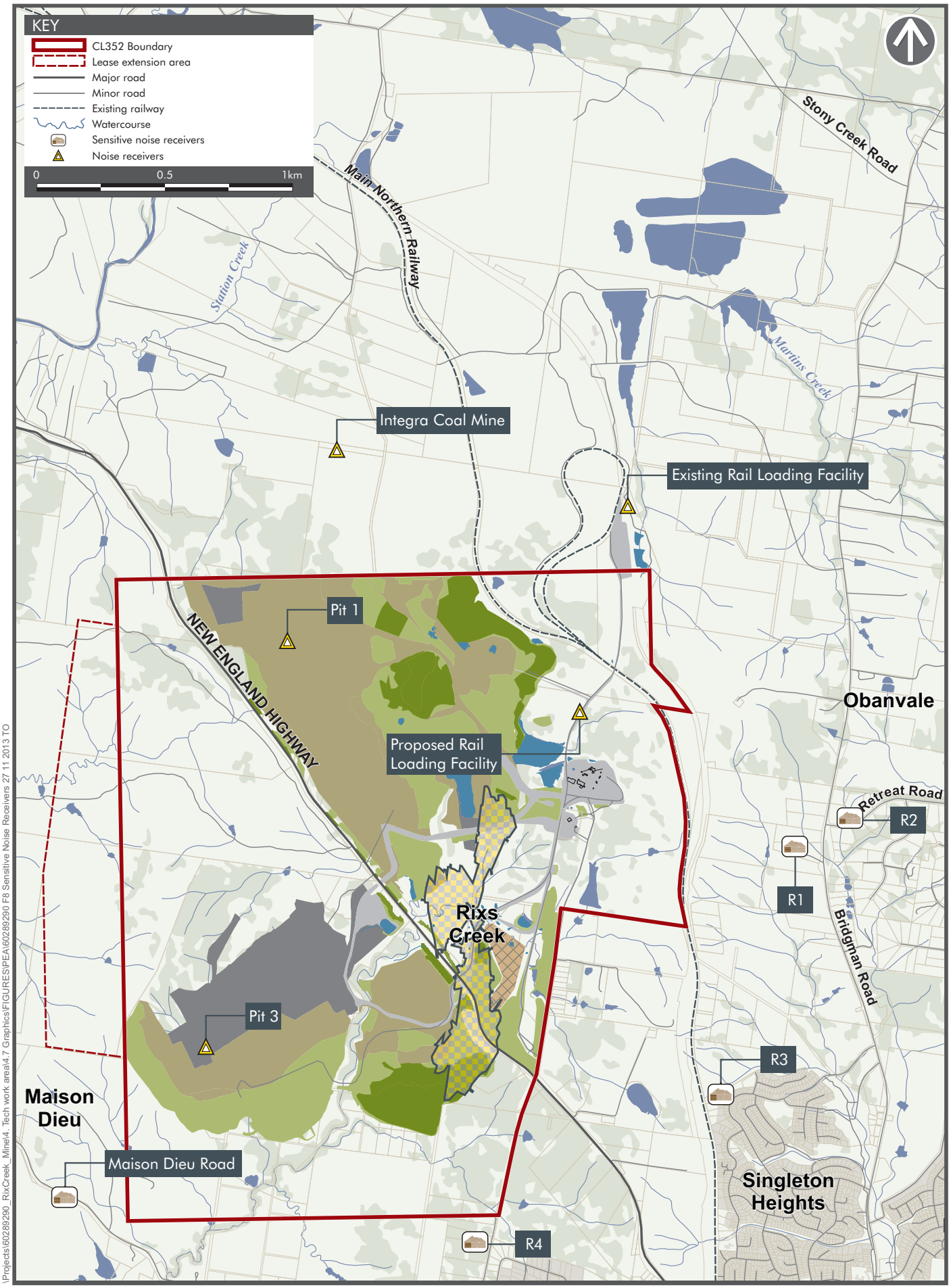

\Projects\60289290_RixCreek_Mine\4. Tech work area\4.7 Graphics\FIGURES\PEA\60289290 F8 Sensitive Noise Receivers 27 11 2013 TO

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SENSITIVE NOISE RECEIVERS

Rix's Creek Continuation of Mining
Preliminary Environmental Assessment

FIGURE 8

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7.3 Ecology

7.3.1 Existing Environment

Previous ecological assessments (Peake 2006 and Bell 2011 – 2013), at the Mine have classified vegetation communities in specified investigation areas. One of these investigation areas partially covers the area proposed for future mining activities and has informed this PEA. The existing ecological environment is described below with regards to vegetation communities, flora, fauna and threatened species.

Vegetation Communities

Four vegetation communities have been mapped within the ML 1432 area, and classified as part of the Hunter Remnant Vegetation Project (HRVP) (Peake 2006) (**Figure 9**). Of these four communities, only two are mapped as occurring within the site:

- Central Hunter Ironbark – Spotted Gum – Grey Box Forest; and
- Central Hunter Swamp Oak Forest.

A survey and assessment of vegetation within several 'investigation areas' within the mining lease was undertaken by Eastcoast Flora Survey in 2011 along with supplementary surveys undertaken during 2012 and 2013. This assessment mapped five vegetation communities as occurring within the stands of vegetation located in the south-west portion of the site (refer to **Figure 10**). All of the mapped communities are common throughout the central and Upper Hunter Valley region. **Table 14** compares these communities to the HRVP classification, and also identifies communities that may correspond with listed Endangered Ecological Communities (EECs) under the *Threatened Species Conservation Act 1997* (TSC Act). Vegetation communities on the site are not considered to correspond to EECs listed under the EPBC Act.

Table 14 Vegetation Communities Likely to Occur within the Proposed Mining Area

Rix's Creek Community (Eastcoast Flora Survey, 2011)	Equivalent HRVP (Peak, 2006) Community	Potential Endangered Ecological Community (TSC Act)
Bulloak Low Forest	Central Hunter Bulloak Forest Regeneration* (unit 32)	-
Grey Box Forest	Central Hunter Box – Ironbark Woodland* (unit 10)	Central Hunter Grey Box-Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions
Rough-barked Apple Grassy Woodland		
Spotted Gum – Red Ironbark Forest	Central Hunter Ironbark – Spotted Gum – Grey Box Forest (unit 27)	Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions*
Spotted Gum – Ironbark – Redgum Forest		

**Equivalent to Central Hunter Ironbark – Spotted Gun – Grey Box Forest (Peake 2006)*

These stands of vegetation range from intact communities to more disturbed stands (impacts from clearing, grazing and weeds) across the site. The communities can be found in dispersed clusters of vegetation across their extent on the site.

Threatened Flora

Searches of the *EPBC Protected Matters Search Tool* and the *NSW Atlas of Wildlife* identified 43 endangered or vulnerable flora species listed as previously being recorded, or having potential habitat, within a 10 km radius of the site (refer to **Appendix A**). Previous survey of areas within the greater mining lease did not identify any threatened plant species as occurring, however noted that there was potential habitat for the threatened Pine Donkey Orchid (*Diuris tricolor*) on the site (Eastcoast Flora Survey, 2011).

Threatened Fauna

Searches of the *EPBC Protected Matters Search Tool* and the *NSW Atlas of Wildlife* identified 82 species (including frogs, reptiles, birds and mammals) listed under the EPBC Act and/or TSC Act as previously being recorded, or having potential habitat, within a 10km radius of the site (to **Appendix A**).

Vegetation clearance will be the principal potential impact of the project for the majority of listed fauna species, with some indirect impacts possible through downstream water quality impacts if not adequately controlled onsite. One TSC listed species, the Speckled Warbler (*Chthononicola sagittatus*), has been previously recorded in the

south-west area of ML 1432. However, previous survey effort as part of the original EIS (Envirosciences Pty Limited,1994), and a recent vegetation assessment (Eastcoast Flora Survey, 2011) have not observed this species or other threatened fauna species within the Mine Lease area.

Vegetation across most of the site is primarily regrowth due to past clearing activities and is unlikely to provide good quality habitat. While good quality grasslands are present, several weed species are scattered throughout the site and have become established where woody vegetation has previously been removed (such as along drainage lines). The quality of riparian areas is anticipated to be severely degraded.

Some larger stands of trees (including Grey Box (*Eucalyptus moluccana*)) have been noted as occurring in the south-western portion of the site. While some are relatively young, some older trees have been retained. These trees may provide suitable habitat for several endangered bird and bat species. While no survey has yet been undertaken for the northern area of the site (where larger trees are also present), it is likely that vegetation and habitat values will be similar to that identified in the southern areas of the site.

SEPP 44 Koala Habitat Protection

SEPP 44 applies within the Singleton LGA. SEPP 44 aims to encourage the conservation and management of areas of natural vegetation that provide potential Koala habitat.

No areas previously surveyed have been identified as containing sufficient feed tree species that would constitute potential or core koala habitat, and historically Koalas have not been recorded on site. The site has not, however, been fully surveyed and may potentially contain some feed tree species such as the Forest Red Gum (*Eucalyptus tereticornis*) which is common in Spotted Gum – Ironbark – Redgum Forest and has been recorded in other areas across the Mining Lease area.

Protected Areas

There are no National Parks, conservation areas or state forests located in close proximity to the site. The nearest protected areas are:

- Wollemi National Park is located approximately 15km to the south-west of the site;
- Belford National Park is located approximately 17km to the south-east of the site; and
- Pokolbin State Forest is located approximately 24km to the south of the site.

7.3.2 Issues for Consideration

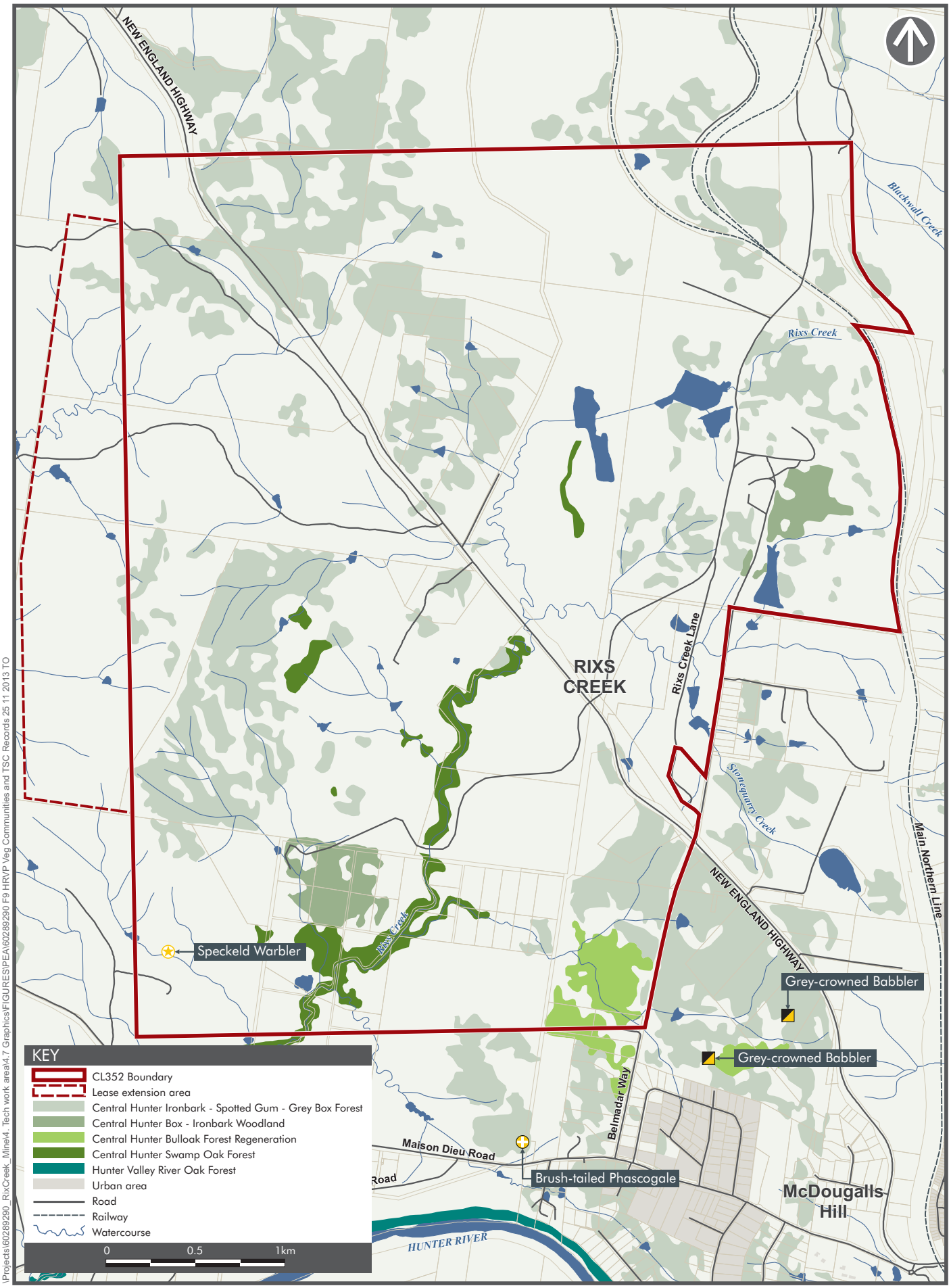
The project is likely to directly impact on native vegetation through clearance required in areas of the site proposed for mining activities. Depending on the outcomes of surveys, there is potential that some of the vegetation on the site may be confirmed as an EEC under the TSC Act.

Based on current mine planning, it is expected that the project may result in a combined clearance of up to approximately 230 ha of vegetation. This vegetation clearance has the potential to impact on local habitat availability for common flora and fauna species, and those species listed as vulnerable, threatened or endangered under the TSC Act and EPBC Act.

7.3.3 Method of Assessment

An ecological survey and assessment of the site will address the impacts of the project on local and regional ecological values. The ecological assessment will identify potential impacts on ecological communities (including potential EECs), listed flora and fauna, and potential habitat for listed species and communities identified as vulnerable, threatened or endangered under the TSC Act and EPBC Act. The impacts of the project on EECs, if identified, will also require detailed consideration of offset arrangements (potentially including biobanking agreements) in consultation with OEH and DP&I. The Rix's Creek Mine is a participating member of the Strategic Assessment of a Biodiversity Plan for Coal Mining in the Upper Hunter Valley. All assessments of fauna and flora to be affected by the project will be conducted in accordance with the requirements of the Biodiversity Plan process.

The interrelationship of potential impacts on surface water systems and potential impacts on aquatic and riparian ecology will be assessed as part of consideration of surface water impacts (refer to **Section 7.5**).



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HRVP VEGETATION COMMUNITIES (PEAKE)

Rix's Creek Continuation of Mining
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FIGURE 9

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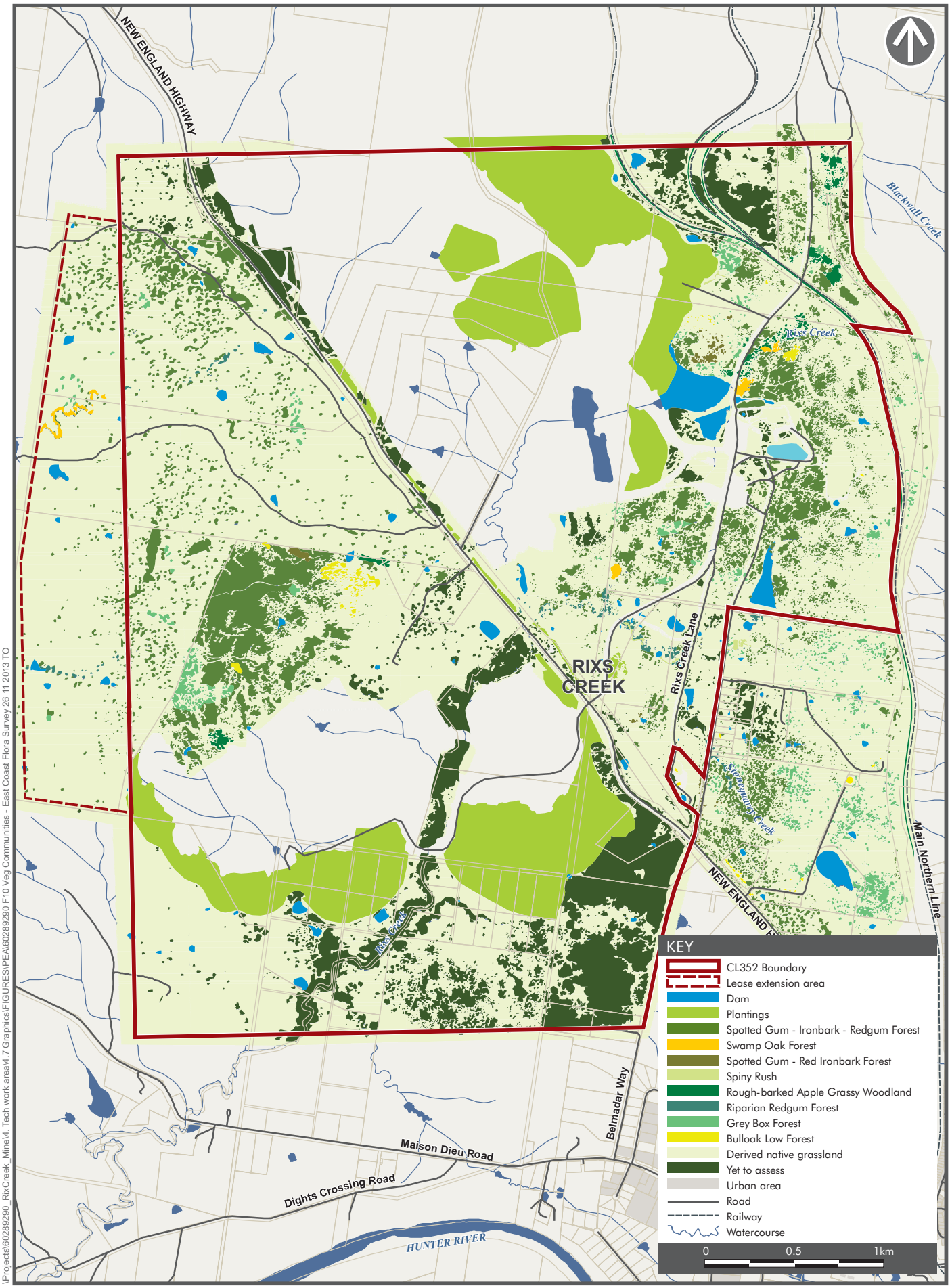

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VEGETATION COMMUNITIES (EAST COAST FLORA SURVEY)

Rix's Creek Continuation of Mining
Preliminary Environmental Assessment

FIGURE 10

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7.4 Soils and Geology

7.4.1 Existing Environment

The geological series map of Singleton (1:250 000 Geological Sheet SI/56-01, Rasmus et.al. 1969), shows that the majority of the site is underlain by the Singleton Super Group (formerly the Singleton Coal Measures). The Singleton Super Group consists of coal seams interbedded with various sequences of mudstones, siltstones, sandstones and conglomerates, with occasional persistent marker bands and beds of tuffaceous claystones. The Singleton Super Group has been subdivided into Wollombi and Wittingham Coal Measure sequences.

The coal bearing strata within the ML and CL belong to the Wittingham Coal Measures of the Singleton Super Group. The Wittingham Coal Measures are up to 1,200 m thick and it is the coal seams towards the base of this sequence that outcrop and become mineable in the Rix's Creek area.

At the base of the coal measures a distinctive formation, known as the Saltwater Creek Formation, represents a shoreline deposit separating the underlying marine sediments, called the Maitland Group, from the terrestrial sediments of the basal coal bearing sequence of the Wittingham Coal Measures, designated the Foybrook Formation. The Saltwater Creek Formation is significant because it not only marks the limit of coal bearing strata, but it also contains a massive, erosion resistant sandstone bed called the Caswell Sandstone. This sandstone forms the prominent ridge separating the open cut mining operations from the Singleton Heights residential area situated to the east.

Within the area to be mined, the coal seams in ascending order from the base of the coal measures include the Hebden, Barrett, Liddell, Arties, Pikes Gully and Lemington Seams. These seams vary widely throughout the area and often occur as several dispersed splits. Altogether the coal sequence is represented by up to thirty well-recognised separate coal beds, which converge together in different combinations in different parts of the area to yield the various mineable seam sections or subsections. Geology of the area and the coal seam cross section are shown in **Figure 6** and **Figure 11** respectively.

The site lies mostly within the Roxburgh and Sedgefield soil landscapes, with a small area within the Dartbrook soil landscape (Soil Landscapes of the Singleton 1:250 000 Sheet SI 56-1, Kovac and Lawrie, 1990). These soil landscapes generally cover undulating low hills. The land rises beyond the site to the east and west to form the prominent ridgelines reflecting the underlying Caswell Sandstone. The ridgelines in the east separate the catchment of Rix's Creek from the urban areas of Singleton Heights, while a spurline trending northwest off the eastern ridge separates the site from development at the eastern end of Maison Dieu Road. The New England Highway follows this spurline to the northwest. The valley of Rix's Creek widens to the south of the site beyond Maison Dieu Road until it joins the floodplain of the Hunter River.

A soil survey of the site was undertaken for the original EIS (Croft and Associates, 1988) in which soil types were identified and mapped. Podzolic and solonetzic type soils were predominant, which were classified to be red and yellow duplex soils. Analysis of the chemical properties of the samples indicated that the nutrient levels in the soils were poor and that fertiliser applications would be required to remedy nutrient deficiencies for rehabilitation. Updated topsoil studies have also been prepared as part of the Mine Operation Plan (MOP) approved by the Department of Resources and Energy in early 2013.

Areas of the Rix's Creek Mine site are undermined by historic underground workings of the New Park Colliery, which date back to the 1800's. These underground workings are more extensive than documented which has led to relocation of operations to the north of the Mining Lease. Sink holes associated with shallow workings are infrequent, but if identified they are managed according to standard procedures which include restricting access, back filling the holes and stabilising the area.

7.4.2 Issues for Consideration

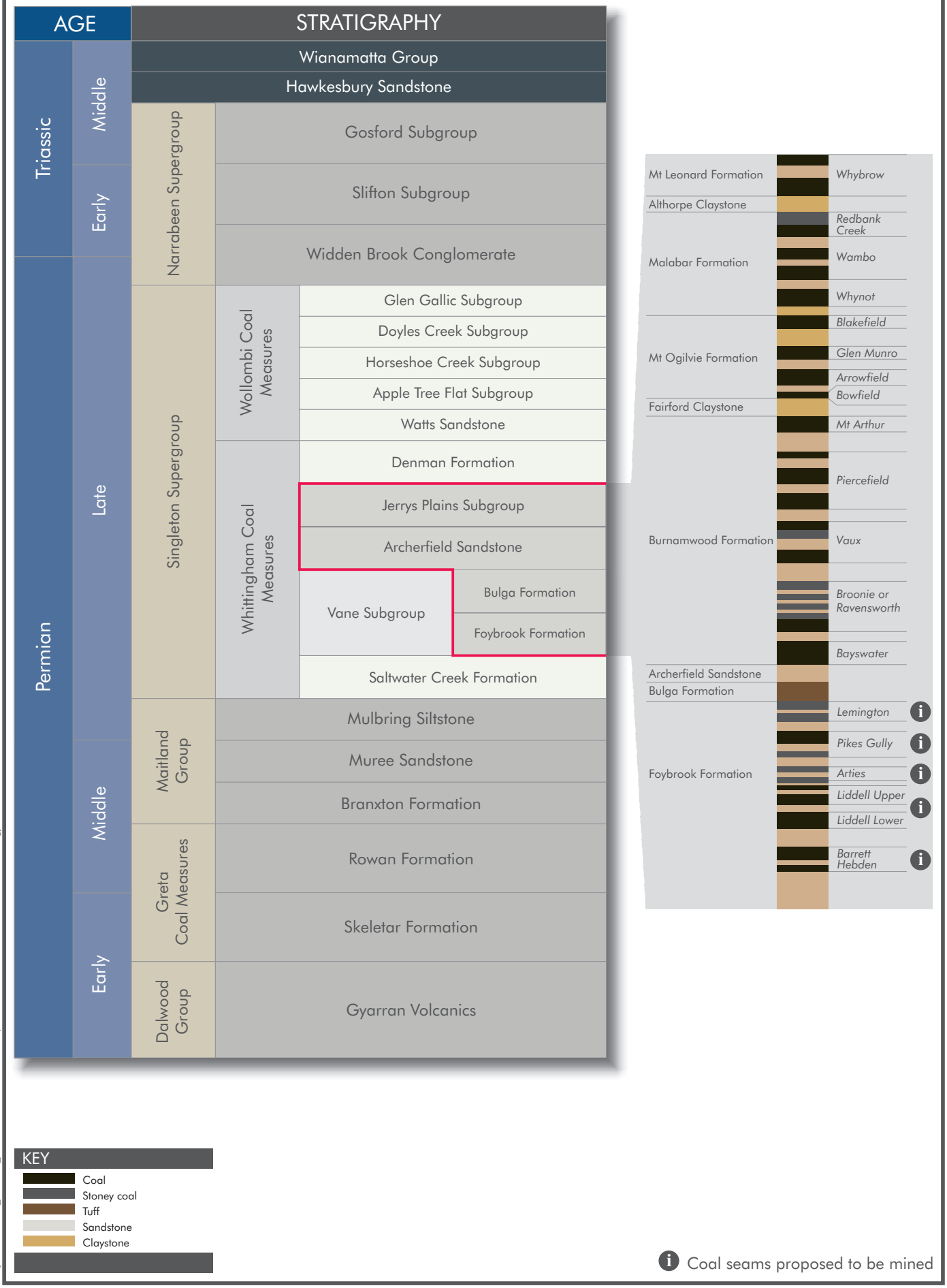
There is potential for erosion and sedimentation to occur as a result of mining activities as part of ongoing site operations. The following issues would be considered in assessing the environmental impact of the proposed project:

- Overburden removal and management;
- Exposure of soils due to vegetation clearance;
- Increased erosion of soils;
- Soil contamination from windblown dust or from chemical spills and residues;

- Subsidence in relation to the historic underground workings; and
- Post mining landform and stability.

7.4.3 Method of Assessment

Potential impacts to soils and geology will be assessed via a desktop study of available information including previous environmental assessments and soil surveys undertaken for the site. The assessment will consider the potential soil impacts in the context of existing operations and will recommend additional mitigation measures to manage these potential impacts on the site if required.



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MINE GEOLOGY NOMENCLATURE

Rix's Creek Continuation of Mining
Preliminary Environmental Assessment

FIGURE 11

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7.5 Surface Water

7.5.1 Existing Environment

Natural Surface Water Features

There are no permanent watercourses that flow through the ML, CL or the site. However, several non-perennial watercourses and minor drainage lines traverse the area (**Figure 12**). The main watercourse through the Mine Lease is Rixs Creek. All other watercourses are unnamed. Diversions of Rixs Creek are currently in place. The watercourses across the site range from first order (majority) to fourth order streams using the Strahler stream order system (1952).

Current Water Management Systems

There are seven surface catchment areas across the Mine. The main types of water managed in these catchments include saline water, runoff water, licensed water extraction and imported fresh water.

Stormwater and surface water runoff from disturbed areas of the existing Mine are stored in storage areas and dams across the site. Stored water is generally used in the coal preparation plant and for dust suppression.

Stormwater and surface water runoff from undisturbed areas is directed away from mining operations through diversion banks, which direct runoff into natural water courses or into a number of clean water dams which overflow into natural drainage systems.

Rix's Creek Mine has an existing Water Management Plan *(Mining Operations (Rix's Creek Mine): Water Management Plan* (Bloomfield 2013) for the current operations at the site. The Water Management Plan includes:

- Site water balance including description of current use and on site management;
- Erosion and sediment control plan including monitoring of controls;
- Surface water monitoring including baseline data, assessment criteria and monitoring plan;
- Groundwater monitoring including baseline data, assessment criteria and monitoring plan; and
- Surface and groundwater response plan.

Although the Mine is licensed for water discharge under EPL 3391, and is part of the Hunter River Salinity Trading Scheme (HRSTS), the Mine operates under nil discharge conditions.

7.5.2 Issues for Consideration

The continuation of mining operations would be considered in context of existing activities on the site. The following issues would be considered in assessing the environmental impact of the project:

- Catchment and drainage modifications associated with the continuation of the Mine;
- Changes to the existing site water balance, including water use, the treatment of mine water, potential increases and potential need for operational discharge to the environment, and the likelihood of uncontrolled surface run-off to adjacent watercourses from site drainage; and
- Erosion, sedimentation or contamination resulting from ground disturbance.

Catchment and Drainage Change

It is intended that surface water run-off from the project will be captured, treated and incorporated into the existing water management system, reusing water collected from disturbed areas and diverting clean water into natural drainage lines. Nonetheless, mining will result in landform alterations that would change the natural catchment area for several of these small watercourses and drainage lines. This could potentially affect the volume and rate of flow in adjacent drainage lines and may result in downstream impacts.

Site Water Balance

While an existing site water balance exists, consideration of changes to the water balance for the project will relate to issues such as management of surface water run-off volumes, potential for localised flooding and a review of potential operational discharge.

In addition, the project may require additional water supply for its expanded operations. Water supply for the project may be needed depending on the quantities required and the volumes able to be obtained from existing sources.

Flooding is not expected to be a key issue for the project as the Mine is not located within an active floodplain or flood prone area.

Erosion and Sedimentation

Watercourses are susceptible to environmental degradation through erosive action, weed infestation and changes to water quality. Continuation of mining may potentially impact local surface water through erosive action and sedimentation, and as a result of uncontrolled surface run-off. Specifically, potential erosion and sedimentation, as well as the potential for contamination to occur, may relate to:

- The contamination of soils due to accidental spillages of chemicals/ fuel by plant and equipment; and
- Erosion and sedimentation, prior to the area being incorporated into the existing operational water management system.

7.5.3 Method of Assessment

A surface water impact assessment would be completed as part of the EIS and will include:

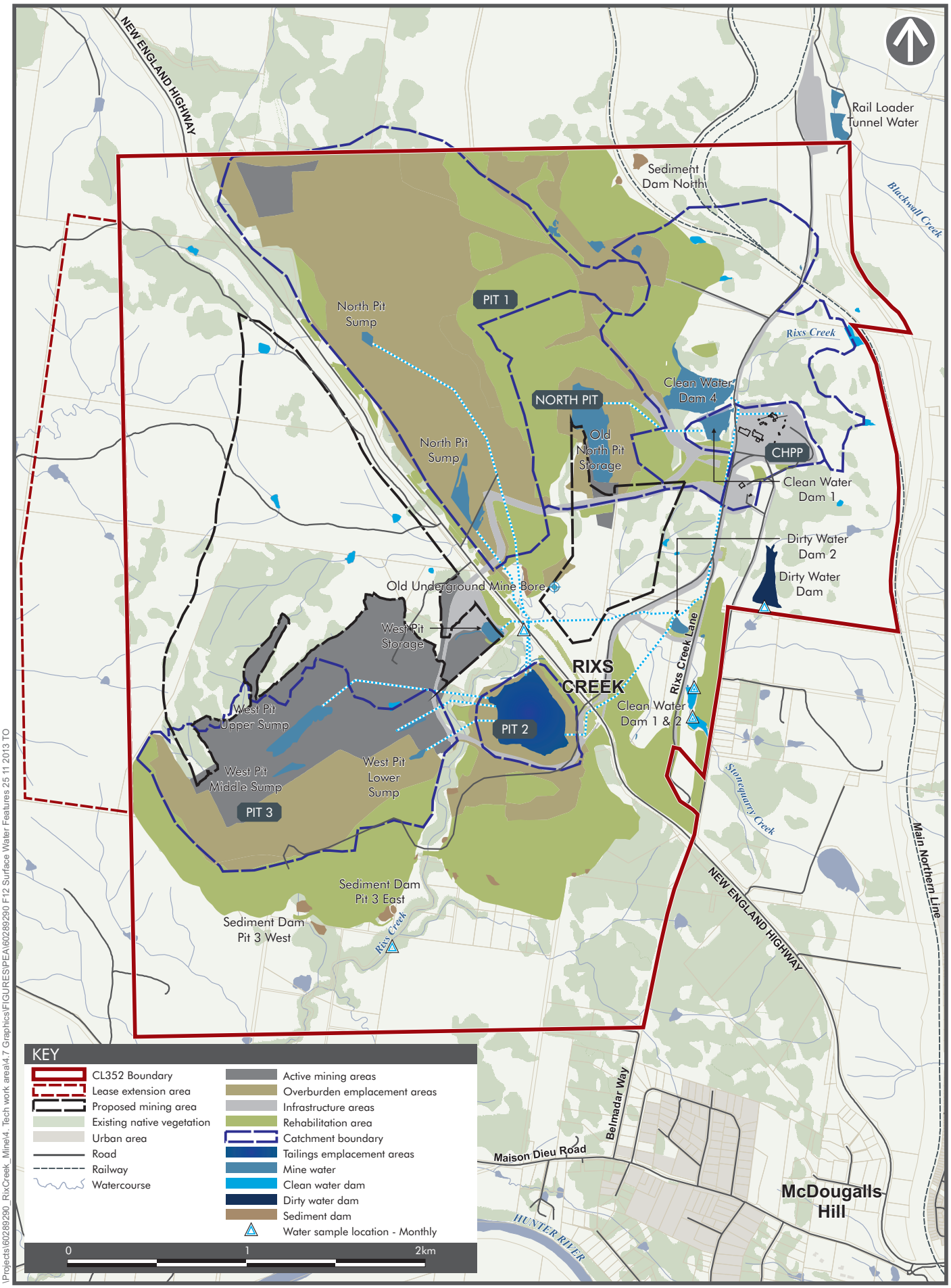
- A review of existing watercourses and catchments;
- A review and update of the existing site water balance; and
- An assessment of potential erosion and sedimentation impacts.

Initially, a review of available information and an evaluation of the existing surface water environment will be undertaken. The review will include further analysis of data from the existing surface water monitoring program, including information about water features such as catchment boundaries, catchment areas, flow paths, stream flow volumes, water quality, as well as evaporation and rainfall data.

A watercourse and catchment assessment will be undertaken, involving the identification and ranking of watercourses that may be directly impacted by the mine continuation. An assessment of potential impacts on the surface flow of these watercourses will also be undertaken to inform the potential for diversion or other mitigation measures to ensure the natural drainage catchment is not significantly impacted.

An updated site water balance will be prepared for the project. This would identify additional site water demands (deficit/ surplus), increased volumes of saline water, and water storage requirements (dam sizes).

There is potential for erosion and sedimentation to occur as a result of ongoing site operations associated with the continuation of mining. The EIS for the project will consider the potential impacts to soils, such as erosion and sedimentation, spills and leaks, and site run-off. In addition, a suite of effective and practical mitigation measures to be applied to works to manage these potential impacts within acceptable environmental limits will be outlined in the EIS.



\Projects\60289290_RixCreek_Mine\4. Tech work area\4.7 Graphics\FIGURES\PEA\60289290 F12 Surface Water Features 25 11 2013 TO

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SURFACE WATER FEATURES

Rix's Creek Continuation of Mining
Preliminary Environmental Assessment

FIGURE 12

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7.6 Groundwater

7.6.1 Existing Environment

The coal seams are the principal bedrock aquifers on the site. The hydraulic conductivity (permeability) of the coal seams is generally low and groundwater flow is dominated by fracture flow. Groundwater levels in the upper parts of the coal seams generally reflect the local topography, with higher groundwater levels in elevated areas and lower levels in the valleys.

Rixs Creek is classified as a losing (influent) stream. The elevation of the bottom of the Creek is above the groundwater level and therefore the creek does not receive a base flow contribution from groundwater.

With the exception of one licensed bore (GW052121), all registered water bores or wells are located more than 4.5 km from the centre of the Mining Lease (refer **Figure 13**). The bores are generally more than 16 m deep and target alluvial deposits associated with the Hunter River. Bore GW052121 is a domestic stock bore located to the south-east of the mine. It is 30.5 m deep and is screened from 24.5 m to 30.5 m.

A groundwater monitoring program for the site has been established to provide baseline data and to allow ongoing monitoring of groundwater parameters. The monitoring program includes measurement of water levels and analysis of physical properties (electrical conductivity, total dissolved solids, and pH), major cations and anions, nutrients and dissolved metals across five monitoring bores (BH1 to BH5) situated at various points around the mine and one production bore (20BL170864).

An assessment of the Mine's ongoing groundwater impacts (RPS, 2011) made the following conclusion regarding the Mines ongoing groundwater impacts:

- Historic mining in the area has had limited impacts on groundwater level. Drawdown impacts observed have been restricted to areas immediately adjacent to the open cut pits with no regional groundwater level impacts associated with mining activities;
- Rixs Creek is a losing stream with limited hydraulic connectivity to the colluviums/regolith within the project area;
- Groundwater quality shows high levels of salinity and slightly elevated levels of trace metals indicating slow recharge and low permeability leading to prolonged groundwater residence times within the coal seams; and
- The observed dewatering of the Lower Barrett Seam is presumably due to the neighbouring influences of the Integra Open Cut Pit, which has mined down to the Lower Barrett seam. Pit 1 is unlikely to have contributed to the dewatering of the Lower Barrett Seam because it only extends down to the overlaying Upper Liddell Seams.

7.6.2 Issues for Consideration

Groundwater considerations associated with the project will largely relate to potential impacts on local bore users and alteration of groundwater flow associated with:

- Ongoing mining related activities (i.e. potential groundwater quality issues associated with tailings, stockpiles, waste dumps etc.);
- Ongoing open cut mining (variations of groundwater levels and quality); and
- Mine closure and rehabilitation (possibility of enhanced recharge and permeability of backfilled areas near Rixs Creek).

Development of open cut mines has the potential to form a sink into which groundwater will flow from the coal measures and will therefore control the piezometric head immediately around the pit. Due to the low hydraulic conductivities of the mined seams and minor seepages noted to date, this impact is expected to be limited to the area immediately around the pits.

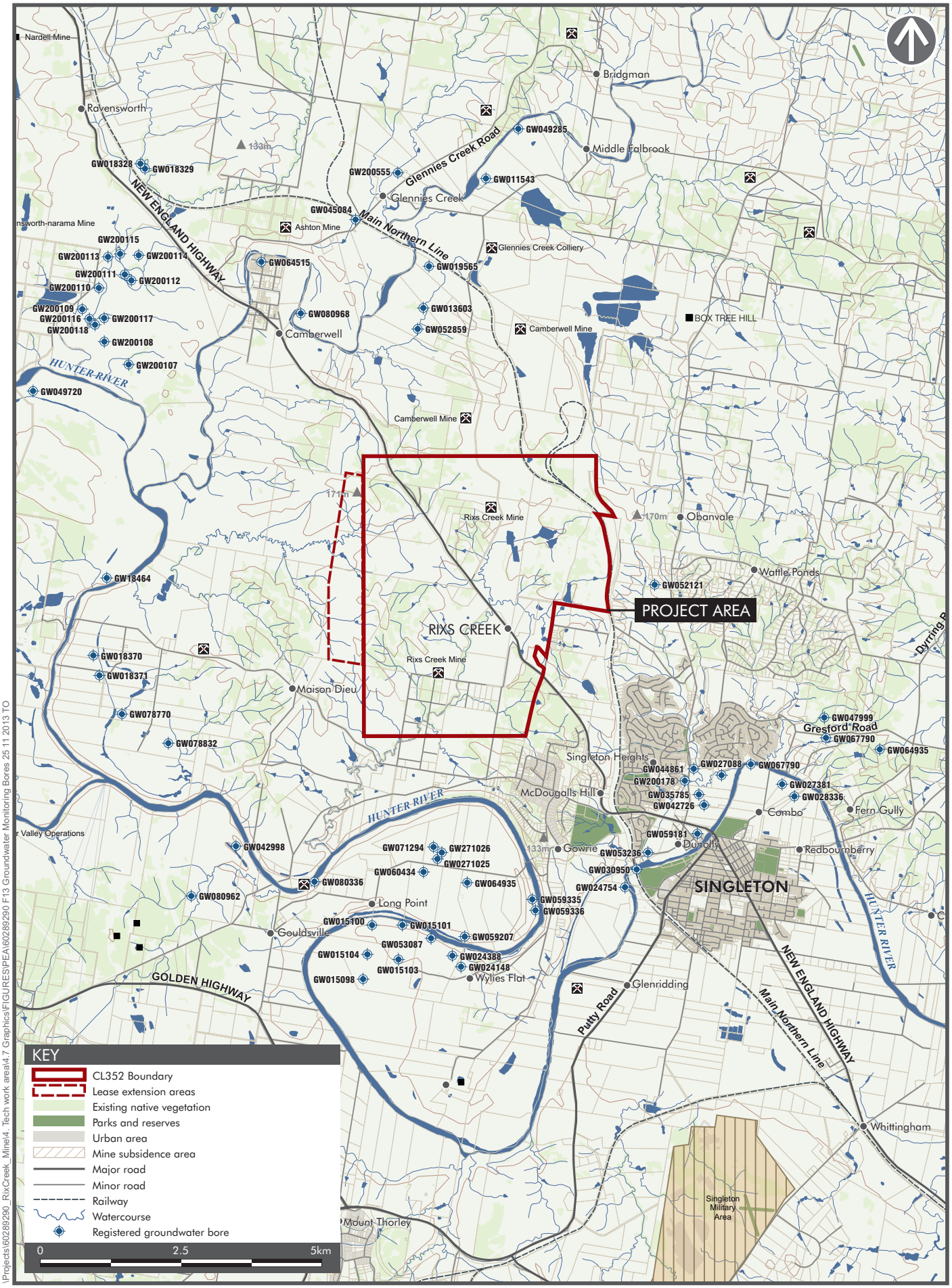
Baseline groundwater monitoring conducted for the site indicates that historic mining in the area has had limited impacts on groundwater level. Drawdown impacts observed have been restricted to areas immediately adjacent to the open cut pits with no regional groundwater level impacts associated with mining activities. Groundwater quality results have shown high levels of salinity and slightly elevated levels of trace metals indicating slow recharge and low permeability leading to prolonged groundwater residence times within the coal seams.

The alluvium aquifers targeted by existing bore users do not extend into the mined area and are considered to be in hydraulic isolation to the mined aquifers (coal seams). Hence there would be negligible groundwater impacts to existing users. Mining activities are not expected to impact bore GW052121 as the bore is located at distance outside of the basin structure and hence should be outside of the influence of drawdown from the pit.

7.6.3 Method of Assessment

An assessment of potential impacts to groundwater as a result of the proposed project will be undertaken and will include a detailed review of existing groundwater conditions, including analysis of data collected through the groundwater monitoring program. The groundwater monitoring program will be reviewed and additional mitigation measures will be recommended if required to manage potential impacts. Specifically, the following documents will be considered as part of the assessment of the project:

- *NSW Aquifer Interference Policy* (DPI, 2012); and
- *Water Sharing Plan for the Hunter Regulated River Water Source 2003.*



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REGISTERED GROUNDWATER BORES

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Preliminary Environmental Assessment

FIGURE 13

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7.7 Heritage

7.7.1 Existing Environment

Searches of relevant heritage inventories have been undertaken to identify heritage items within ML1432 and are summarised in **Table 15** and illustrated in **Figure 14**.

Table 15 Heritage Items in the Rix's Creek Mining Lease 1432

Heritage Inventory	Number of Heritage Items Identified
Register of the National Estate (RNE) (Non-statutory)*	0
National Heritage List (NHL)	0
Commonwealth Heritage List (CHL)	0
NSW State Heritage Register (SHR)	0
National Trust of Australia	0
Singleton LEP 2013	1
Aboriginal Heritage Information Management System (AHIMS)	36

*As of 19 February 2012, items listed on the RNE were removed from the EPBC Act as these parts have been superseded by stronger ongoing heritage protection provisions under national environment law.

There are no heritage items listed in the RNE, NHL, CHL, SHR or National Trust of Australia that are located within the existing ML1432 area that may be directly affected by the project. There is one item listed under the Singleton LEP 2013 that is relevant to the project which is the Rixs Creek Coke Ovens (**Figure 15**). The potential for this item to be impacted by the project is considered low as it is not located within, or in close proximity to, the project. The Coke Ovens lie on the south-eastern side of the Mining Lease in an area that will remain undisturbed by the project.

Aboriginal Heritage Information Management System

The nature and distribution of items of Aboriginal heritage significance within the vicinity of the project can be predicted by considering the environmental, archaeological and ethno-historical context of the area.

Three previous surveys have been undertaken at Rix's Creek Mine during 1981, 1994 and 2006. The sites discovered were all low level artefact scatters of generally under 10 artefacts, comprised of predominantly early production chert, mudstone and silcrete flakes. All of the sites were located in disturbed contexts, routinely adjacent extensive erosion channels and/or first order creeks. Items of Aboriginal heritage significance in the vicinity of the project are therefore also most likely to include artefact scatters in the vicinity of drainage channels.

A search of the Aboriginal Heritage Information Management System (AHIMS), managed by the Office of Environment and Heritage, was conducted as part of previous assessments and includes all data up to February 2013. Thirty six registered Aboriginal sites were identified within ML1432. Of these, nine are located within the project area. All sites recorded are open artefact sites. The locations of these sites are illustrated in **Figure 14**.

7.7.2 Issues for Consideration

The nearest historic heritage item in the vicinity of the project is located within the existing Mining Lease but is not in close proximity to areas likely to be affected by the project. Consideration of potential impacts on this item is nonetheless required.

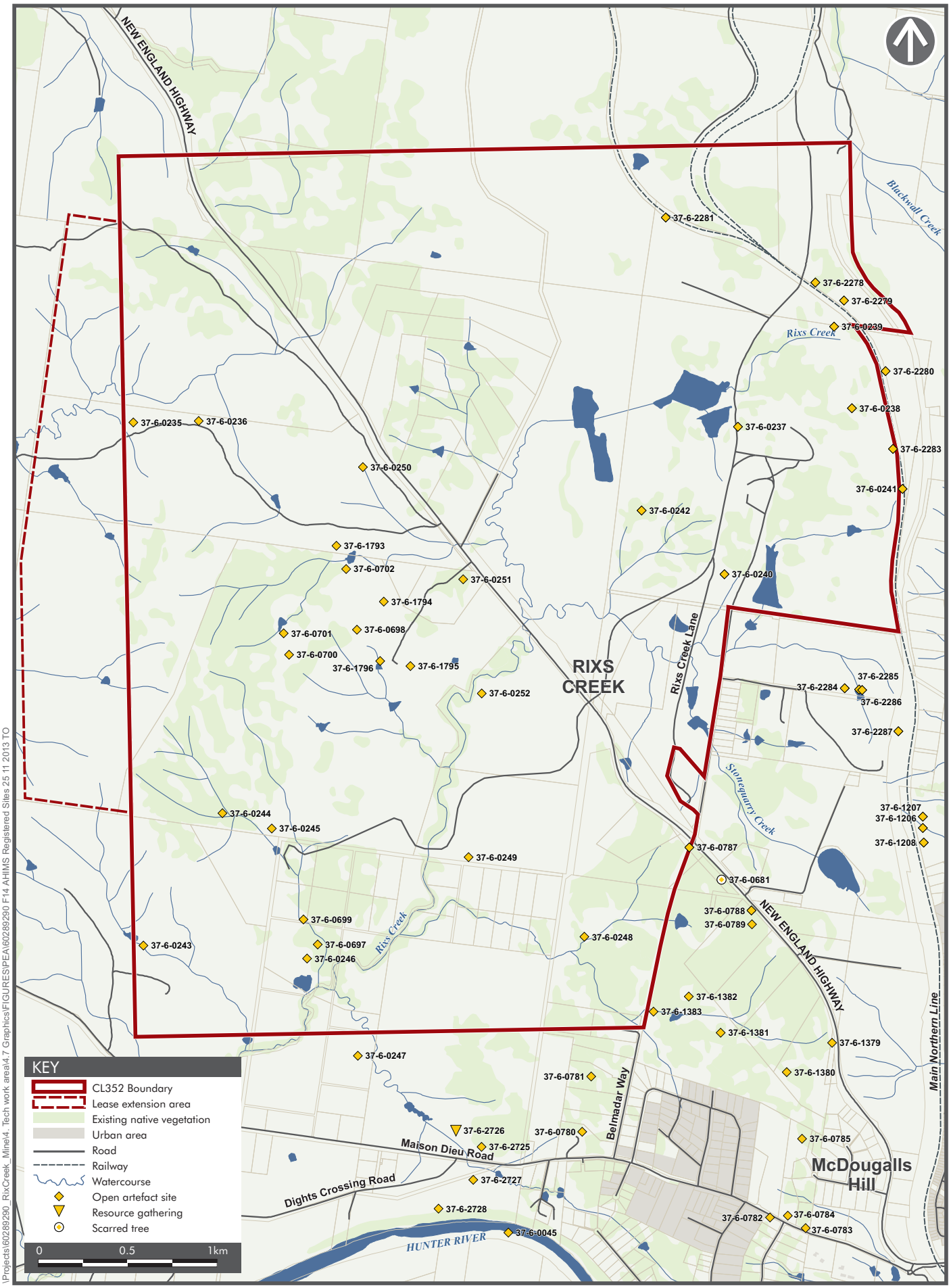
Items of Aboriginal heritage significance may be directly impacted by the continuation of mining activities at Rix's Creek Mine. The dominant features of Aboriginal heritage in the vicinity of the project are artefact scatters associated with Rixs Creek and major creek lines. These areas are identified as environmentally sensitive with regard to items of Aboriginal heritage significance and will need to be targeted by survey effort.

7.7.3 Method of Assessment

A heritage impact assessment will be included in the EIS. The assessment will include a survey of areas where open-cut mining activities are proposed, primarily focused on areas identified as having high sensitivity or potential for archaeological sites. This will include environmentally sensitive areas, particularly along major rivers

and creek lines, where there is the greatest potential for items of Aboriginal heritage significance to exist, and a visual inspection of previously identified Aboriginal and European heritage sites (refer to **Section 7.7.1**). Aboriginal stakeholders will be identified prior to the survey and invited to register their interest in the project. Identified stakeholders would then be invited to participate in the site heritage surveys.

The heritage impact assessment will be undertaken in accordance with *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECC, 2010) and the *NSW Heritage Manual* (NSW Heritage Office and DUAP, 1996). A central component of the assessment will be the development of a risk-based landscape assessment to identify landscape features likely to be associated with items of heritage significance.



\Projects\60289290_RixCreek_Mine\4. Tech work area\4.7 Graphics\FIGURES\PEA\60289290 F14 AHIMS Registered Sites 25 11 2013 TO

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INDIGENOUS HERITAGE

Rix's Creek Continuation of Mining
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FIGURE 14

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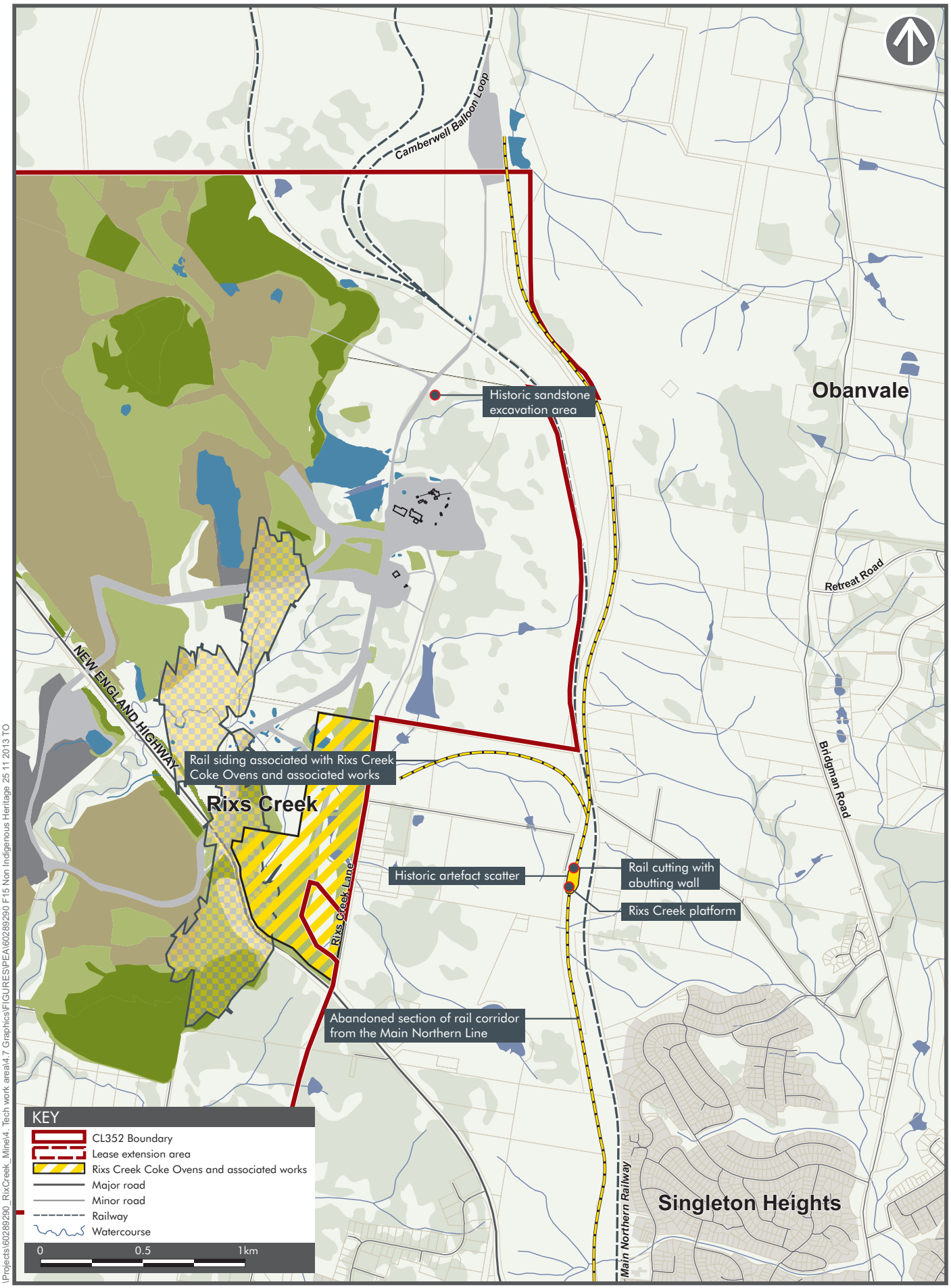

\Projects\60289290_RixCreek_Mine\4. Tech work area\4.7 Graphics\FIGURES\PEA\60289290 F15 Non Indigenous Heritage 25 11 2013 TO

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NON-INDIGENOUS HERITAGE
Rix's Creek Continuation of Mining
Preliminary Environmental Assessment

FIGURE 15

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7.8 Traffic and Transport

7.8.1 Existing Environment

The entrance to the Mine's current operations and associated surface infrastructure facilities, including staff parking and amenities, is located on Rixs Creek Lane off the New England Highway (**Figure 4**). The New England Highway connects the Hunter Region to Tamworth before continuing north to Queensland. The Hunter section of the highway provides for two-way traffic and carries inter-regional as well as local traffic, many of which are heavy vehicles associated with the regional mining and industrial activities.

A bridge constructed over the New England Highway initially connected Pit 2 and the West Pit to the surface facilities. Now the West Pit is connected to the surface facilities by a shorter haul route through a cut-and-cover tunnel under the Highway.

Product coal is currently trucked internally to the Rix's Creek - Camberwell Joint Venture rail loop for transport to Newcastle. A current development proposal exists for a dedicated Rix's Creek Rail Loop to be constructed and eventually used in place of the existing joint venture loop. Draft conditions of approval for this rail loop had been issued by Department of Planning and Infrastructure at the time of writing.

At present the New England Highway is protected from mining by means of a 100 m barrier (from the Highway centreline) in which no mining can take place. In addition, Rix's Creek Mine cannot blast within 500 m of the highway while it is open for traffic. The highway is closed when blasting within 500 m instead of diverting traffic onto a side track. Approval to close the highway has to be renewed every six months by RMS via a Road Occupancy License (ROL).

Rix's Creek Mine currently implements a Traffic Management Plan which includes measures to minimise traffic and road safety impacts, and traffic control measures for vehicle movements along the New England Highway.

7.8.2 Issues for Consideration

The project may temporarily result in increased heavy vehicle traffic for initial site preparation activities. To accommodate the increased ROM capacity of the Mine, there may be some additional light vehicle traffic as a result of a slight increase in personnel travelling to and from site. The proximity of mining activities to the New England Highway will also have traffic flow implications during blasting.

Operational traffic (namely coal haulage) would not be a significant issue for the project as coal would be transported via existing rail infrastructure to Newcastle (or the new Rix's Creek Rail Loop once it is operational). The project may result in a slight increase in the number of rail movements as a result of the increased ROM capacity.

Due to the progression of mining operations in a northerly direction, the need for an additional crossing of the New England Highway at the northern end of Pit 3 has been identified as necessary to allow continuation of mining. The EIS will consider the impacts this may have on traffic along the New England Highway.

7.8.3 Method of Assessment

Potential impacts of the project on local traffic conditions and the transport route of coal products by rail from the Mine to Newcastle will be assessed in a traffic and transport impact assessment that will be included in the EIS.

The impact assessment will include an analysis of the existing traffic control measures along the New England Highway, including investigation of potential impacts of blasting activities and highway closures. The assessment will also address the impacts of additional traffic on the wider local and regional road networks, and will consider impacts to road safety and general traffic conditions.

There is potential for the structural integrity of local roads to be affected by blasting activities associated with the project. Potential impacts to transport infrastructure as a result of blasting will be assessed in the relevant blasting assessment, as outlined in **Section 7.4**.

7.9 Social and Economic

7.9.1 Existing Environment

The Mine is located within the Singleton Local Government Area (LGA) and the Singleton statistical area (Australian Bureau of Statistics, 2011). The Singleton statistical area covers 4,893 km^2 and spans the entire Singleton LGA. As of 2011, the Singleton statistical area had a total population of 22,695 persons, with approximately 51% male and 49% female residents. More than three quarters (approximately 78%) of this population were aged 15 years and over, approximately 10% were aged 65 and over, and the median age was 35. The population of the Singleton LGA is projected to grow to 28,800 persons by 2026 (Singleton Council, 2012).

The total labour force in 2011 for the Singleton statistical area was 11,791, of which 394 (approximately 3.3%) were unemployed. The main sources of employment for people living in the Singleton statistical area include coal mining (22.0%), food services (3.5%), school education (3.2%), defence (2.8%) and machinery and equipment repair and maintenance (2.3%). The coal mining industry is therefore a significant provider of employment for the area.

The Mine has been operating on the site for over 20 years and currently employs 130 personnel across its operations, including in the mining, administration and maintenance sectors. Existing operations are economically beneficial at a local, regional and State level through the generation of coal royalties, employment, contributing to the operation of local businesses and involvement with the local community.

7.9.2 Issues for Consideration

Potential social impacts associated with the project will primarily relate to local increases in demand for accommodation, health and educational services, childcare and early childhood services as a result of an increase of workers into the local area as a result of the proposed ROM increase. It is noted however that the Mine will utilise existing employees from its Bloomfield Colliery operation at East Maitland where possible. This will reduce demands on local services as these employees already reside in the region.

The project will generate locally sourced employment opportunities, as services in excavation, earthmoving, general and specialist contractors works, and transport would be required. Employment opportunities will be provided for residents of Singleton and the wider Hunter region. It is therefore anticipated that the project would have a beneficial effect on local and regional economies.

Direct economic impacts of the project will include an increase in employment of personnel and the use of services and materials onsite during operations. Indirect economic effects will flow on to other industries and services in the Hunter region through wage expenditure. Direct and indirect impacts of the project will be considered as part of the social and economic impact assessment component of the EIS.

7.9.3 Method of Assessment

Social, economic and community impacts will be determined based on the generation of a profile of the surrounding community. Identified impacts would be assessed and evaluated against the likely direct, indirect and cumulative impacts of other developments in the surrounding area. The assessment will include development of measures to avoid or mitigate potential social and economic impacts (e.g. at mine closure).

The assessment will consider the guidance outlined in the *Draft Economic Evaluation in Environmental Impact Assessment* (Department of Planning) and *Techniques for Effective Social Impact Assessment: A Practical Guide* (Office of Social Policy, NSW Government Social Policy Directorate).

7.10 Visual Amenity and Landscape

7.10.1 Existing Environment

The dominant rural activity in the region is agricultural grazing. However, open cut and longwall mining activities are also a consistent visual element in the regional landscape.

The landscape character of the site is influenced by the existing topography which is generally of low relief with some more prominent ridgelines up 165m AHD along the western and northern boundaries of the site. These higher relief areas feed the drainage lines that also dominate the landscape. Vegetation across the site also contributes to the existing local landscape character, which is primarily vegetated by grassland with pockets of taller vegetation (eucalypts). Elements within the existing Mine that can be readily seen from New England Highway include:

- West Pit active open cut mine area;
- A bund wall with tree plantings designed to screen the Tailings Dam from the road; and
- Old North Pit and North Pit access tracks, spoil mounds, stockpiles and bunds.

Trees line the New England Highway for the majority of its length through ML 1432, some purposely planted as part of previous mining activities to act as a screening barrier from the highway.

There are no public lookouts or viewing points within the vicinity of the project.

Rix's Creek Mine maintains an existing *Mining Operations (Rix's Creek Mine): Landscape Management Plan* (Bloomfield, 2011) which is comprised of three separate management plans being: *Mining Operations (Rix's Creek Mine): Rehabilitation Management Plan* (Bloomfield, 2011), *Rix's Creek Mine Final Void Management Plan* (RPS Aquaterra, 2012) and the *Mining Operations (Rix's Creek Mine): Mine Closure Plan* (Bloomfield, 2012). The purpose of this Plan is to describe landscape management responsibilities during the operation and subsequent closure of the current mining operations.

7.10.2 Issues for Consideration

As the project will necessitate the clearance of vegetation and will disturb the existing topography, the visual landscape is likely to be affected. The site is in close proximity to the New England Highway and is likely to visually impact on road users in a similar manner as the existing West and North Pits.

The nearest sensitive receivers are located south of the site beyond the West Pit and may be potentially impacted by the project. The nearest township of Singleton is located over 3 km from the site and is unlikely to be visually impacted by the project.

7.10.3 Method of Assessment

The visual impact of the project will be assessed through site inspections of the surrounding area, topographic map interpretation and photographs of the existing environment to understand the nature and extent of various elements including vegetation cover, with particular regard to vegetation suitable for screening or landscape remediation. The design of the project, including bunding, mound heights and location of access tracks, will be assessed having regard to a range of observer locations, including surrounding residential and rural residential development, as well as from surrounding roads, in particular the New England Highway. An assessment of the potential improvements to the visual impact of the project on the New England Highway will also be undertaken in regards to the reductions in impacts that will result from the change to the ML boundary.

7.11 Hazard and Risk

7.11.1 Existing Environment

Potential hazards associated with the Mine include storage of hazardous goods and the potential for underground fire/ explosion (spontaneous combustion or outburst). The Mine is also subject to potential bushfire risk.

Storage of Hazardous Goods

In line with the *Explosives Act 2003* and *Explosives Regulation 2005*, Bloomfield has developed and submitted a site security plan and has also notified WorkCover NSW of the dangerous goods kept onsite, detailed in **Table 16** below. Operation of the project is unlikely to result in greater volumes of these materials being stored at the Mine.

Table 16 Summary of Dangerous Goods Stored on the Premises of the Existing Rix's Creek Mine

Depot	Class	Type of Storage	Product Name	Quantity
1	C1	Above ground tank	Diesel Fuel	80,000L
2	C1	Above ground tank	Diesel Fuel	70,000L
5	C1	Above ground tank	Diesel Fuel	50,000L
6	3	Above ground tank	Aldehydes, N.O.S.	10,000L
8	C1	Above ground tank	Diesel Fuel	40,000L
Gas 1	2.1	Cylinder Store	Acetylene, Dissolved	800L
Gas 2	2.2	Cylinder Store	Argon Compressed	100L
Gas 2	2.2	Cylinder Store	Oxygen Compressed	800L
RCN 1	5.1	Above ground tank	Ammonium Nitrate	40,000Kg
TKN 1	5.1	Above ground tank	Ammonium Nitrate Emulsion	30,000Kg
TKN 2	5.1	Above ground tank	Ammonium Nitrate Emulsion	30,000Kg
MAG 1	1.1D	Above ground magazine	Explosive: Boosters	2,500Kg
4	1.4B	Above ground magazine	Detonators: Non-Electric for blasting	8,000

Bushfire

The potential hazard that a bushfire poses arises from a combination of local topographic features and the type and amount of vegetation present in a defined area. The landscape of the mine is dominated by undulating terrain, with an effective north to south oriented ridgeline along the eastern side of the ML.

Areas of land under the control of the Mine are periodically inspected, and managed in a manner which reduces available fuel loading (i.e. grazing or slashing).

7.11.2 Issues for Consideration

The issues for consideration are similar for the storage of hazardous goods and the potential for fire/ explosion, namely:

- Risk from blasting, including:
  - Risks to employees on site;
  - Risk to adjacent residents and communities;
  - Risk of a dangerous goods spill causing contamination;
  - Risk of an ignition that may potentially initiate a bushfire; and
  - Damage to surface infrastructure.

- Spontaneous combustion risks; and
- Risks to the New England Highway users.

Consideration will also be given to the potential for hazards inside the Mine to impact on regionally significant infrastructure such as the New England Highway and the Main Northern Rail Line.

7.11.3 Method of Assessment

The risk posed by bushfire during the operation of the project will be assessed with reference to applicable guidelines, standards and policies, including:

- *Rural Fires Act 1997*;
- *Planning for Bushfire Protection: A guide for Councils, Planners, Fire Authorities and Developers* (Rural Fire Service, 2006);
- *Singleton Council Emergency Risk Management Study and Plan* (Singleton Shire Council, 2007); and
- *AS3953-2009 Construction of buildings in bushfire prone areas*.

The assessment will identify the extent of bushfire hazards in the vicinity of the project, including known bushfire behaviour.

The project will be subject to the application of a risk screening for potentially hazardous development as defined by SEPP 33. Application of a risk screening will be undertaken in accordance with *Applying SEPP 33* (DP&I, 2011). In the event that screening thresholds are exceeded an appropriate level of risk assessment will be conducted in accordance with *Multi-Level Risk Assessment* (DP&I, 2011) and *Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis* (DP&I, 2011).

7.12 Greenhouse Gas

7.12.1 Existing Environment

Greenhouse gas emission sources listed in the Australian Government reporting legislation include:

- Carbon dioxide (CO_2);
- Sulphur hexafluoride (SF_6);
- Methane (CH_4);
- Nitrous oxide (N_2O);
- Hydrofluorocarbons (HFCs); and
- Perfluorocarbons (PFCs).

Emissions of these greenhouse gases are categorised into three different scopes (1, 2 or 3) in accordance with the World Business Council for Sustainable Development and World Resources Institute Greenhouse Gas Protocol (2004), and the Australian Government greenhouse gas accounting and reporting systems. The definitions of each of these scopes are as follows:

- Scope 1 emissions: also referred to as “direct emissions”, are emissions which are generated directly by the proposed project, e.g. emissions generated by the use of diesel fuel by plant/equipment.
- Scope 2 emissions: also referred to as “indirect emissions”, are emissions which are generated outside of the proposed project’s boundaries to provide energy to the proposed project, e.g. the use of purchased electricity from the grid.
- Scope 3 emissions: also referred to as “indirect upstream emissions”, due to third party supply chains that are in direct relation to the proposed project (e.g. extraction, production and transport of purchased materials and waste disposal offsite).

7.12.2 Issues for Consideration

Potential emission sources from the project could include:

- Operation of the CHPP and coal clearance facilities;
- Fugitive emissions from fuel burning (onsite and offsite);
- Vegetation clearance;
- Embodied energy of carbon in materials;
- Gas management; and
- End-use of coal mined at the facility.

The potential for incorporating energy efficiencies into the project will be assessed during the EIS and mine planning phases through the consideration of plant and technologies with improved energy efficiencies.

7.12.3 Method of Assessment

A greenhouse gas assessment will be conducted for the project in accordance with the standards outlined in the following documents:

- *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)*, World Resources Institute and World Business Council for Sustainable Business Development (2004);
- *The Greenhouse Gas Protocol: Corporate Value Chain (Scope 3) Accounting and Reporting Standard,* World Resources Institute and World Business Council for Sustainable Business Development (2011);
- *National Greenhouse Accounts (NGA) Factors,* Commonwealth Department of Climate Change (2012);
- *National Carbon Accounting Toolbox (FullCAM Carbon Accounting Model 3.1*0), Australian Department of Climate Change and Energy Efficiency;
- *National Greenhouse and Energy Reporting System*, Technical Guidelines (2012);
- *Life Cycle Assessment (LCA) Australian and New Zealand Standards (AS/NZS ISO 14040 series)*; and

- *Greenhouse Gas Part 1: Specification with guidance at the organisational level for quantification and reporting of greenhouse gas emissions and removals, Australian Standard (AS ISO 14064.1 – 2006)*.

Following identification of emission sources from the project, the assessment will estimate equivalent total carbon dioxide emissions from these emission sources. The assessment will also recommend mitigation measures appropriate for the project.

7.13 Land Use

7.13.1 Existing Environment

Land use regionally is characterised by a mix of agricultural (grazing, viticulture and equine industry) and mining with towns servicing these industries located at intervals along the New England Highway. A number of smaller settlements generally lie off smaller arterial roads connecting further afield. These townships are separated by semi-rural and partly forested landscapes.

Land within the vicinity of the project has historically been used for a mix of land uses which primarily relate to agriculture and mining. Urban development associated with Singleton is also located to the south and east of the site. These existing land uses have resulted in moderate level of landscape disturbances, mostly due to large-scale vegetation clearance.

There are also several transport routes and other general service infrastructure routes directly adjoining or passing through the ML area. These include the New England Highway and the Main Northern Rail Line (refer to **Figure 2**). General service infrastructure within the vicinity of the project includes various transmission line easements with utility infrastructure also located within the New England Highway road reserve.

Land within the ML is made up predominantly of grazing or former grazing land which is experiencing varying levels of regrowth. Watercourses across the site exhibit varying levels erosion due to historical vegetation removal and cattle grazing impacts. There are some stands of remnant and regrowth vegetation located across the site.

The project will occur across several of the land use zones outlined in the Singleton LEP 2013, as listed and described in **Table 17**.

Table 17 Land Use Zones within ML1432

Land Use Zone	Description	Potential to be Impacted by the Project
Draft Singleton LEP 2012		
RU1	Primary Production	Yes – Open cut mining and use of existing mine infrastructure.
SP2	Infrastructure – Railways	Indirect impacts – the project will utilise existing rail corridors for the transportation of product coal.
SP2	Infrastructure – Classified Road	Indirect impacts – the New England Highway corridor bisects the ML in a north-south manner. No mining will occur in this corridor however mining in close proximity to the New England Highway requires consideration of potential impacts to the operation of road corridor, particularly in the context of potential blasting impacts.

7.13.2 Issues for Consideration

Land uses within the area identified for the continuation of mining are largely made up of land used for grazing. Following completion of mining, areas will be identified that are suitable for rehabilitation to grazing land use to reduce the net impact on grazing land regionally.

Consideration will be provided in the EIS in relation to replacing Endangered Ecological Communities as part of whole-of-site requirements to achieve desirable biodiversity and conservation outcomes, while also replacing grazing land impacted during mining.

7.13.3 Method of Assessment

The assessment of the effects of the project on land use including the impact of the project on agricultural land will address matters such as:

- Land sterilisation;
- Vegetation clearance and the potential for rehabilitation; and
- Short and long term impacts to land uses in surrounding areas.

7.14 Waste

7.14.1 Existing Environment

The primary waste management facility in the Singleton LGA is the Singleton Council Waste Depot. It is operated by Singleton Council, and can accept both putrescible and non-putrescible material. The waste management centre also hosts a recycling collection facility for transport offsite for further recycling, reuse or processing.

Apart from overburden, coal rejects material is the most significant waste material arising from operation of the existing Mine. This material is stored in the existing storage areas in former Pits No. 1 and 2 for course rejects and the tailings emplacement area shown on **Figure 4** for fine rejects material.

7.14.2 Issues for Consideration

Waste generated by the project during operations will be classified in accordance with the categories defined in the *Waste Classification Guidelines* (DECC, 2008).

Operational waste would likely consist of:

- Waste rock (overburden);
- Coal wash rejects (course and fine);
- Special waste (tyres);
- Liquid waste (wastewater, liquid hydrocarbons, waste oil);
- Hazardous waste (coolant pods, batteries and containers with hazardous liquid residue);
- General solid non-putrescible waste (steel, timber pallets, pipeline, aluminium, paper, cardboard, glass, wood, concrete, conveyor belts);
- General solid putrescible waste (food waste); and
- Vegetation waste (minor amount during maintenance of surface landscaping).

Ongoing open cut mining operations are unlikely to produce new waste streams in addition to those already managed by current operations. However, the project will increase the amount of coal rejects material, necessitating the expansion of the existing reject emplacement areas. Trials of drying tailings, with the successful installation of the first module, will lower the rate of disposal to tailings emplacement, with the aim of eventually eliminating the need for a tailings emplacement with tailings being co-disposed with coarse rejects and overburden.

Annual volumes of operational waste produced currently by the Rix's Creek Mine are initially unlikely to change as a result of the project however there may be some increase over time of waste rock and coal rejects as production increases, subject to market forces. Waste will be handled in accordance with the Group Waste Management System currently in place as part of Rix's Creek Mine's Environmental Management System, which will be amended to include operational requirements for the project. Where appropriate and possible, operational waste will be transported offsite for recycling or to a licensed waste facility. The management of waste will be prioritised according to the waste control hierarchy currently employed onsite, following this preferred order:

- Elimination;
- Reduction;
- Re-use or recycling; and
- Treatment and disposal.

7.14.3 Method of Assessment

A waste impact assessment to be included in the EIS will identify waste streams likely to be produced during operation of the project. Waste categories will be determined based on the *Waste Classification Guidelines* (DECC, 2008), and approximate volumes will be identified. Local facilities that are appropriately licensed to accept waste streams associated with the project will be identified and referenced for inclusion in future environmental management plans.

7.15 Rehabilitation

7.15.1 Existing Environment

Land to be directly affected by the project is primarily open grassland and has been historically used for grazing. Most of the taller vegetation across the site is regrowth vegetation following previous land clearing activities.

Rehabilitation is being progressively undertaken at the Mine with the aim of reinstating the pre-mining land capability (of grazing land), with stable landforms that are compatible with the surrounding landscape, and to allow for a range of possible post-mining land-uses. Rehabilitation measures are also aimed at minimising offsite impacts such as dust, water pollution, weed spread and impacts to visual amenity. Rehabilitation activities include revegetation of completed mine footprints, weed control programs and maintenance inspections.

Rehabilitation Management Plan

The Mine operates under the existing *Mining Operations (Rix's Creek Mine): Rehabilitation Management Plan* (Bloomfield, 2011) and *Mine Operations Plan* (Bloomfield, 2103) prepared under the current MOP guidelines. These documents identify the following for the formerly mined and currently active mine areas:

- Rehabilitation objectives;
- Short, medium and long-term rehabilitation measures;
- Performance and completion criteria;
- Monitoring and assessment of performance against performance and completion criteria; and
- Risks and contingency measures.

7.15.2 Issues for Consideration

The project will impact on the existing landform and remove this land from grazing or other rural capabilities during mining operations.

The project is located adjacent to the New England Highway and may be visible by motorists. The project will undertake rehabilitation of bunds and other landscaping features, built progressively during mining to minimise visual impacts. Rehabilitation activities will be developed to provide for consistency with previous and adjoining vegetation communities. Once completed, post-mining landforms and land use options also need to be consistent with surrounding rural landscapes.

7.15.3 Method of Assessment

An assessment of rehabilitation measures to be undertaken as part of the project will be detailed within the EIS. This will include progressive rehabilitation during operational activities, and final rehabilitation proposed following completion of the mine pit.

An update of the existing Rehabilitation Management Plan will also be undertaken, detailing rehabilitation techniques and proposed landforms to be completed as part of, and following completion of, the project in line with the existing requirements of the plan.

8.0 Conclusion

This PEA has been prepared to inform the preparation of DGRs for the proposed project. Following the receipt of DGRs, an EIS will be prepared to be submitted in support of an application for development consent for the project under the *Environmental Planning and Assessment Act 1979*. Key environmental assessment issues identified for the project, which will be assessed in greater detail during the preparation of the EIS are:

- Operational air quality impacts;
- Noise; and
- Ecological impacts.

Other relevant environmental issues will also be considered in the EIS.

As part of the preparation of the EIS, assessments will be carried out to refine the potential environmental impacts of the project. The key focus of these assessments will be the avoidance and minimisation of impacts on the environment and local communities, while also taking into account engineering constraints and cost implications.

The assessment will also identify mitigation and management measures to minimise impacts on the environment. Consultation with affected property owners, stakeholders and the local community will continue throughout the assessment of the project, as well as during the continuation of mining in future.

Concurrent to the preparation of the EIS, Rix's Creek Mine will seek confirmation that the area over which the proposed change to ML1432 will occur does not represent Biophysical Strategic Agricultural Land, through application for a Site Verification Certificate.

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Appendix A

Threatened Flora and Fauna Species Lists

Appendix A Threatened Flora and Fauna Species Lists

Threatened Flora listed under the TSC Act and/or EPBC Act within 10km of the Proposed Project

Scientific Name	Common Name	NSW status	Comm. status
Flora			
Cynanchum elegans	White-flowered Wax Plant	E1,P	E
Thesium australe	**Austral Toadflax**	**V**	**V**
Ozothamnus tesselatus	-	V,P	V
Rutidosis heterogama	Heath Wrinklewort	V,P	V
Tetratheca juncea	Black-eyed Susan	V,P	V
Chamaesyce psammogeton	Sand Spurge	E1,P	-
Monotaxis macrophylla	Large-leafed Monotaxis	E1,P	-
Pultenaea maritima	Coast Headland Pea	V,P	-
Acacia bynoeana	Bynoe's Wattle	E1,P	V
Acacia pendula	*Acacia pendula* population in the Hunter catchment	E2	-
Maundia triglochinoides	-	V,P	-
Prostanthera cineolifera	Singleton Mint Bush	V,P	V
Prostanthera cryptandroides subsp. *cryptandroides*	Wollemi Mint-bush	V,P	V
Angophora inopina	Charmhaven Apple	V,P	V
^^*Callistemon linearifolius*	Netted Bottle Brush	V,P,3	-
Eucalyptus camaldulensis	*Eucalyptus camaldulensis* population in the Hunter catchment	E2	-
Eucalyptus camfieldii	Camfield's Stringybark	V,P	V
Eucalyptus castrensis	Singleton Mallee	E1,P	-
Eucalyptus fracta	Broken Back Ironbark	V,P	-
Eucalyptus glaucina	**Slaty Red Gum**	**V,P**	**V**
Eucalyptus parramattensis subsp. *decadens*	-	V,P	V
Eucalyptus pumila	Pokolbin Mallee	V,P	V
Melaleuca biconvexa	Biconvex Paperbark	V,P	V
Melaleuca groveana	Grove's Paperbark	V,P	-
Syzygium paniculatum	Magenta Lilly Pilly	E1,P	V
^*Corybas dowlingii*	Red Helmet Orchid	E1,P,2	-
^*Cryptostylis hunteriana*	Leafless Tongue Orchid	V,P,2	V
^*Cymbidium canaliculatum*	*Cymbidium canaliculatum* population in the Hunter Catchment	E2,P,2	-
^*Diuris pedunculata*	Small Snake Orchid	E1,P,2	E
^*Diuris praecox*	Rough Doubletail	V,P,2	V
^*Diuris tricolor*	Pine Donkey Orchid	V,P,2	-

Scientific Name	Common Name	NSW status	Comm. status
Prasophyllum sp. Wybong	**-**	**P**	**CE**
^Pterostylis gibbosa	**Illawarra Greenhood**	**E1,P,2**	**E**
Bothriochloa biloba	**Lobed Bluegrass**	**P**	**V**
Persicaria elatior	Tall Knotweed	V,P	V
Grevillea parviflora subsp. *parviflora*	Small-flower Grevillea	V,P	V
^^Persoonia pauciflora	North Rothbury Persoonia	E4A,P,3	CE
Pomaderris bodalla	Bodalla Pomaderris	V,P	-
Pomaderris queenslandica	Scant Pomaderris	E1,P	-
Pomaderris reperta	Denman Pomaderris	E4A,P	CE
Asperula asthenes	Trailing Woodruff	V,P	V
^Leionema lamprophyllum subsp. *obovatum*	*Leionema lamprophyllum* subsp. *obovatum* population in the Hunter Catchment	E2,2	-
Philotheca ericifolia		P	V
Zannichellia palustris		E1,P	-
Euphrasia arguta	**-**	**CE**	**CE**
Streblus pendulinus	**Siah's Backbone**	**-**	**E**

Threatened Fauna Listed under the TSC Act and/or EPBC Act within 10km of the Proposed Project

P = Protected, V = Vulnerable, E = Endangered, CE = Critically Endangered, J = Jamba, C = Camba, K = Rokamba

Scientific Name	Common Name	NSW status	Comm. status
Frogs			
Crinia tinnula	Wallum Froglet	V,P	-
Pseudophryne australis	Red-crowned Toadlet	V,P	-
Litoria aurea	**Green and Golden Bell Frog**	**E1,P**	**V**
Litoria brevipalmata	Green-thighed Frog	V,P	-
Litoria booroolongensis	**Booroolong Frog**	**E2**	**E**
Mixophyes balbus	**Stuttering Frog**	**E1**	**V**
Reptiles			
Caretta caretta	Loggerhead Turtle	E1,P	E
Hoplocephalus bitorquatus	Pale-headed Snake	V,P	-
Hoplocephalus stephensii	Stephens' Banded Snake	V,P	-
Birds			
Erythrotriorchis radiatus	**Red Goshawk**	**E1**	**V**
Leipoa ocellata	**Malleefowl**	**E1**	**V**
Dromaius novaehollandiae	Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	E2,P	-

Scientific Name	Common Name	NSW status	Comm. status
Anseranas semipalmata	Magpie Goose	V,P	-
Oxyura australis	Blue-billed Duck	V,P	-
Stictonetta naevosa	Freckled Duck	V,P	-
Ptilinopus magnificus	Wompoo Fruit-Dove	V,P	-
Ptilinopus regina	Rose-crowned Fruit-Dove	V,P	-
Ptilinopus superbus	Superb Fruit-Dove	V,P	-
Ephippiorhynchus asiaticus	Black-necked Stork	E1,P	-
Ardea ibis	Cattle Egret	P	C,J
Botaurus poiciloptilus	**Australasian Bittern**	**E1,P**	**E**
Ixobrychus flavicollis	Black Bittern	V,P	-
Circus assimilis	Spotted Harrier	V,P	-
Haliaeetus leucogaster	White-bellied Sea-Eagle	P	C
Hieraaetus morphnoides	Little Eagle	V,P	-
^^Lophoictinia isura	Square-tailed Kite	V,P,3	-
^^Pandion cristatus	Eastern Osprey	V,P,3	-
Burhinus grallarius	Bush Stone-curlew	E1,P	-
Haematopus fuliginosus	Sooty Oystercatcher	V,P	-
Haematopus longirostris	Pied Oystercatcher	E1,P	-
Charadrius leschenaultii	Greater Sand-plover	V,P	C,J,K
Charadrius mongolus	Lesser Sand-plover	V,P	C,J,K
Irediparra gallinacea	Comb-crested Jacana	V,P	-
Rostratula australis	**Australian Painted Snipe**	**E1,P**	**V**
Calidris ferruginea	Curlew Sandpiper	E1,P	C,J,K
Calidris tenuirostris	Great Knot	V,P	C,J,K
Limicola falcinellus	Broad-billed Sandpiper	V,P	C,J,K
Limosa limosa	Black-tailed Godwit	V,P	C,J,K
Xenus cinereus	Terek Sandpiper	V,P	C,J,K
Sternula albifrons	Little Tern	E1,P	C,J,K
^^Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3	-
^Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2	-
Glossopsitta pusilla	Little Lorikeet	V,P	-
^^Lathamus discolor	**Swift Parrot**	**E1,P,3**	**E**
^^Neophema pulchella	Turquoise Parrot	V,P,3	-
^^Ninox connivens	Barking Owl	V,P,3	-
^^Ninox strenua	Powerful Owl	V,P,3	-
^^Tyto novaehollandiae	Masked Owl	V,P,3	-
^^Tyto tenebricosa	Sooty Owl	V,P,3	-

Scientific Name	Common Name	NSW status	Comm. status
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P	-
Chthonicola sagittata	Speckled Warbler	V,P	-
Anthochaera phrygia	**Regent Honeyeater**	**E4A,P**	**E**
Epthianura albifrons	White-fronted Chat	V,P	-
Grantiella picta	Painted Honeyeater	V,P	-
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V,P	-
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V,P	-
Daphoenositta chrysoptera	Varied Sittella	V,P	-
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V,P	-
Petroica boodang	Scarlet Robin	V,P	-
Petroica phoenicea	Flame Robin	V,P	-
Stagonopleura guttata	Diamond Firetail	V,P	-
Mammals			
Dasyurus maculatus	**Spotted-tailed Quoll**	**V,P**	**E**
Phascogale tapoatafa	Brush-tailed Phascogale	V,P	-
Planigale maculata	Common Planigale	V,P	-
Phascolarctos cinereus	**Koala**	**V,P**	**V**
Cercartetus nanus	Eastern Pygmy-possum	V,P	-
Petaurus australis	Yellow-bellied Glider	V,P	-
Petaurus norfolcensis	Squirrel Glider	V,P	-
Petrogale penicillata	**Brush-tailed Rock-wallaby**	**E1,P**	**V**
Pteropus poliocephalus	**Grey-headed Flying-fox**	**V,P**	**V**
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P	-
Mormopterus norfolkensis	Eastern Freetail-bat	V,P	-
Chalinolobus dwyeri	**Large-eared Pied Bat**	**V,P**	**V**
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P	-
Miniopterus australis	Little Bentwing-bat	V,P	-
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V,P	-
Myotis macropus	Southern Myotis	V,P	-
Nyctophilus corbeni	**Corben's Long-eared Bat**	**V,P**	**V**
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P	-
Vespadelus troughtoni	Eastern Cave Bat	V,P	-
Pseudomys oralis	**Hastings River Mouse**	**E**	**E**
Pseudomys novaehollandiae	**New Holland Mouse**	**P**	**V**