Peabody

CHAIN VALLEY COLLIERY
CONTINUATION OF MINING
PRELIMINARY ASSESSMENT

Lake Coal

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PRELIMINARY ASSESSMENT

May 2009

Document No. Chain Valley PDR 8.doc

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1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

This Preliminary Assessment has been prepared for the Chain Valley Coal Project (the Project) in accordance with Part 3A of the *Environmental Planning and Assessment Act, 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation,2000 (*EP&A Regulation). The EP&A Act and EP&A Regulation set the framework for planning and environmental assessment in New South Wales (NSW). Part 3A of the EP&A Act provides an approval framework for projects deemed by the NSW Minister for Planning to be Part 3A Projects.

In accordance with the *Steps in the Assessment and Approval of Major Projects under Part 3A* (the Draft Major Project Guideline) (Department of Infrastructure, Planning and Natural Resources [DIPNR], 2005a), this Preliminary Assessment provides the information outlined in Table 1.

Table 1

Draft Major Project Guideline Requirements – Reference Summary

Draft Major Project Guideline Requirement*	Relevant Section(s)
Information to confirm that the project is a project to which Part 3A of the EP&A Act applies.	Section 3
Information to confirm whether a Concept Plan will be required or authorised by the Minister.	Section 3
A description of the project and any ancillary components.	Section 2
The location and a map identifying the site.	Sections 1.2.1 and 2.1 Figures 1 to 4
The capital investment value and other relevant information in relation to parameters set out in the *State Environmental Planning Policy (Major Projects), 2005* (Major Projects SEPP) for determining whether Part 3A applies to the project.	Sections 2.10 and 3
The planning provisions applying to the site.	Section 3
The views of other agencies, local council or the community if known.	Section 4
Any other approvals required. In particular, if a licence from the Department of Environment and Climate Change (DECC) is required under the *Protection of the Environment Operations Act 1997* (PoEO Act).	Section 3
Justification as to why the project should be considered to be a major project under Part 3A of the EP&A Act, taking into consideration the relevant criteria.	Section 3
A Preliminary Assessment to identify the likely environmental issues.	Section 5

* Adapted from DIPNR (2005a).

The Preliminary Assessment (Section 5) identifies key environmental assessment issues of particular relevance to the Project, and provides the following for each issue:

- a preliminary description of the existing environment;
- an analysis of the likely extent and nature of potential impacts; and
- identification of the proposed level and scope of environmental impact assessments to be undertaken for the Environmental Assessment (EA).

The assessment has been undertaken generally in accordance with the draft *Guideline: What is the Level and Scope of Assessment for Major Projects? Preliminary Assessment* (the draft Preliminary Assessment Guideline) (DIPNR, 2005b).

1.2 BACKGROUND

1.2.1 Existing Chain Valley Colliery Operations

Chain Valley Colliery is situated in the Newcastle coalfields of New South Wales and located at the southern end of Lake Macquarie, approximately 100 km north of Sydney and 70 km south of Newcastle (Figure 1). It is located in the Swansea-North Entrance Mine Subsidence District. It is an underground mine, operated using the bord and pillar method.

The Wallarah Coal Joint Venture (WCJV) owns the Chain Valley Colliery. The WCJV is an unincorporated joint venture between LakeCoal Pty Limited (LakeCoal or LCPL, a wholly owned subsidiary of Peabody Pacific Pty Limited) (as to 80%) and Catherine Hill Resources Pty Limited (as to 20%). LakeCoal is the manager of the WCJV and the operator of the Chain Valley Colliery. In October 2006, Peabody, a US-listed company acquired LakeCoal.

Chain Valley Colliery is a producer of high quality thermal coal. Coal from the Chain Valley Colliery is used to supply the nearby Vales Point and Munmorah power stations, and for export purposes.

Chain Valley Colliery was established in 1960, to extract coal from three seams - the Wallarah seam, the Great Northern seam (generally located approximately 30 metres below the Wallarah seam) and the Fassifern seam (generally located approximately 30 metres below the Great Northern seam). Extraction from the Wallarah seam has now been completed, and mining operations are currently in the Great Northern Seam and Fassifern Seam.

In August 1960, J&A Brown & Abermain Seaham Collieries Ltd commenced clearing the present site, with drift and shaft sinking starting a few months later. Coal was extracted initially from the Wallarah seam, with the first delivery to the adjacent Delta Electricity's Vales Point power station in April 1963. The Colliery was then operated by Coal & Allied companies for many years, until it was transferred to the WCJV in 1994. LakeCoal acquired its interest in the WCJV, and the Colliery, in 2002.

The WCJV had operated the Wallarah, Moonee and Chain Valley underground coal mines and the Catherine Hill Bay Coal Preparation Plant, all located at the southern end of Lake Macquarie. At the time of LakeCoal's acquisition, both the Wallarah and Moonee mines were closed or about to be closed. Only the Chain Valley Colliery has remaining economic reserves of any significance. LakeCoal is currently undertaking the mine closure and rehabilitation process for the Wallarah and Moonee mines and the Catherine Hill Bay Coal Preparation Plant.

Currently, Chain Valley Colliery has a workforce of approximately 120 personnel.

The underground mining operations are supported by the Chain Valley Colliery's surface facilities. The major surface facilities of the Chain Valley Colliery are situated off Construction Road, Vales Point (Figures 1 and 2a). The major surface infrastructure comprises Administration Offices, Conveyor drift, Personnel and Materials drift, surface electrical sub-station, 1000t coal storage bin, workshop, storage yard and settling ponds. The mine ventilation is provided by an upcast shaft located on the eastern side of Chain Valley Bay with a surface fan installed at this location.

Coal extracted from the underground mining operations is transferred by a cable belt conveyor in the drift to the ROM coal bin at the surface facilities. Run of mine (ROM) coal is reclaimed, screened, crushed and sized at the coal handling preparation plant (CHPP). The CHPP has a capacity of approximately 500 tonnes per hour (tph).

A ROM stockpile exists to the east of the pit top area which is designed to balance market demands to customers during times of planned mine shutdown. The stockpile has a capacity of approximately

60,000 tonnes. Product coal is conveyed to a 1200 tonne final product bin for loading on to road registered trucks.

The Chain Valley Colliery currently produces up to approximately 750,000 tonnes per annum of thermal product coal. The majority of product coal is transported by road to the Port Waratah Coal Services (PWCS) Carrington Terminal to overseas customers (Figure 1). However, a proportion of the product is also transported by truck to domestic customers, including Munmorah and Vales Point Power Station.

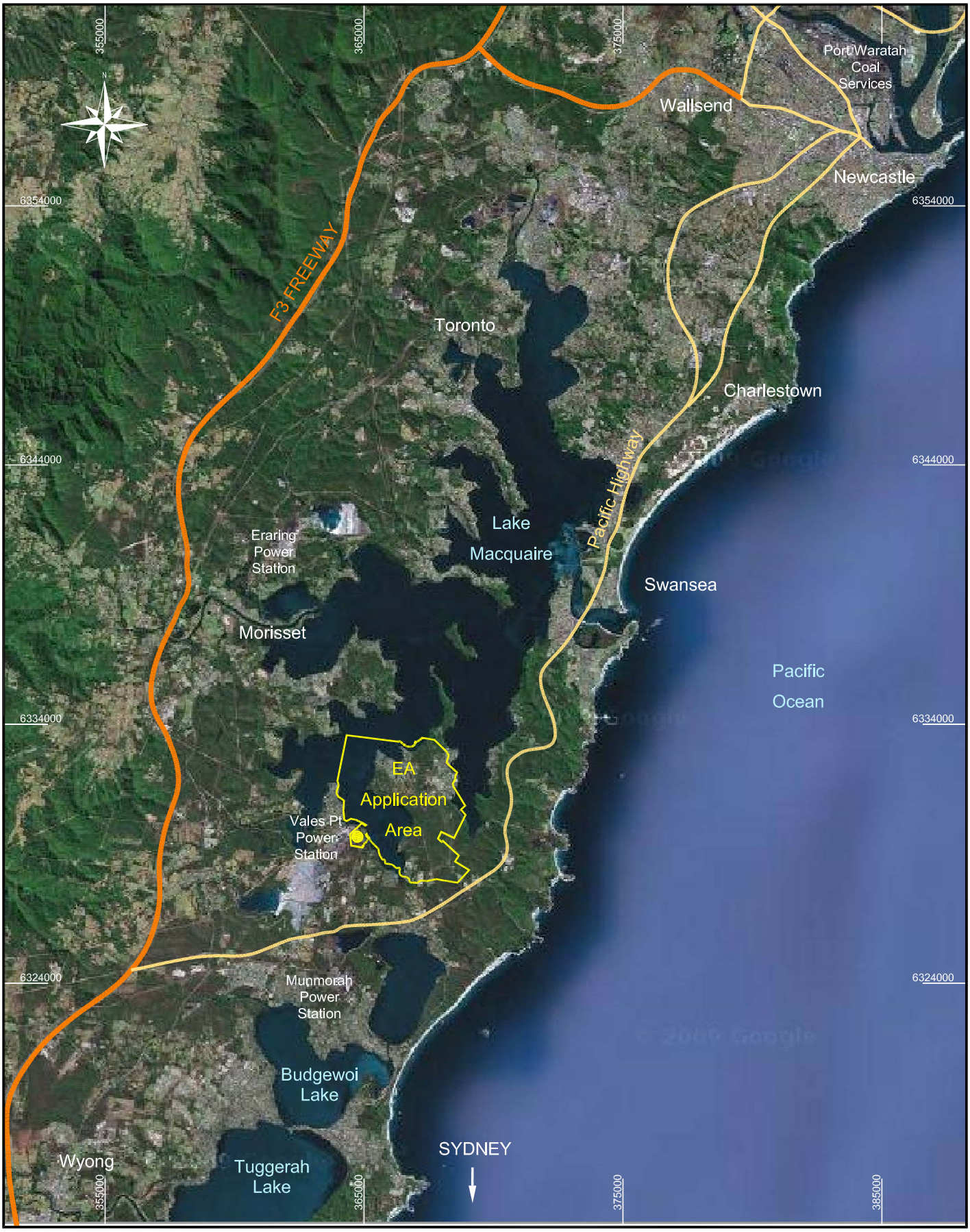
There is no coal reject produced at Chain Valley Colliery.

1.2.2 Project Integration

LakeCoal is seeking Project Approval from the Minister for Planning under Part 3A of the EP&A Act for the Project. It is anticipated that the Project Approval would consolidate and replace existing approvals for the Chain Valley Colliery.

The Project would involve the continuation of underground mining operations at the Chain Valley Colliery within the area covered by the existing mining leases for the Colliery. The Project would extend the life of the Chain Valley Colliery by 21 years.

Existing surface and underground facilities at the Chain Valley Colliery (e.g. conveyors, ventilation equipment and service infrastructure) would be used to service the Project. However, some new facilities and/or modifications to existing infrastructure would be required to support the on-going mining activities and the proposed increase in mine production. A summary description of existing and new/modified infrastructure and mining is provided in Section 2.



0 2500 5000 7500 10000
(m)

Chain Valley Colliery Surface Facilities

Co-ordinate System M.G.A.94
Base Image © 2009 Google Earth

CHAIN VALLEY COLLIERY

Regional Location Plan

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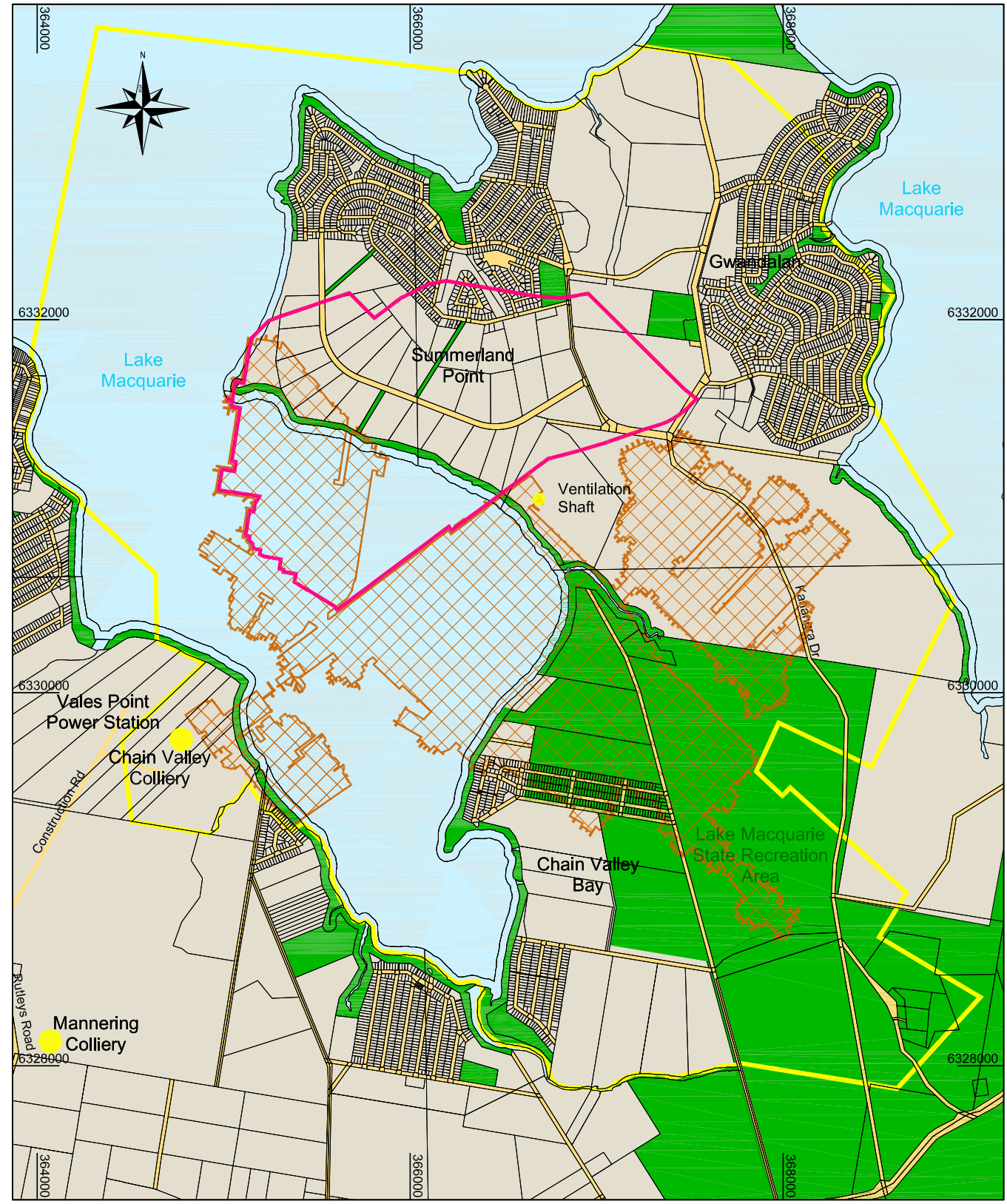
Figure 1



EA Application Boundary
Great Northern Seam Proposed Mining Area
Great Northern Seam Existing Workings
Environmental Zoning or Open Space (L.G.A.)
Freehold Land
Roads
Cadastre
Colliery Surface Facilities

0 500 1000 1500
(m)

Co-ordinate System M.G.A.94

CHAIN VALLEY COLLIERY

Location of Proposed Underground Mining Area - Great Northern Seam

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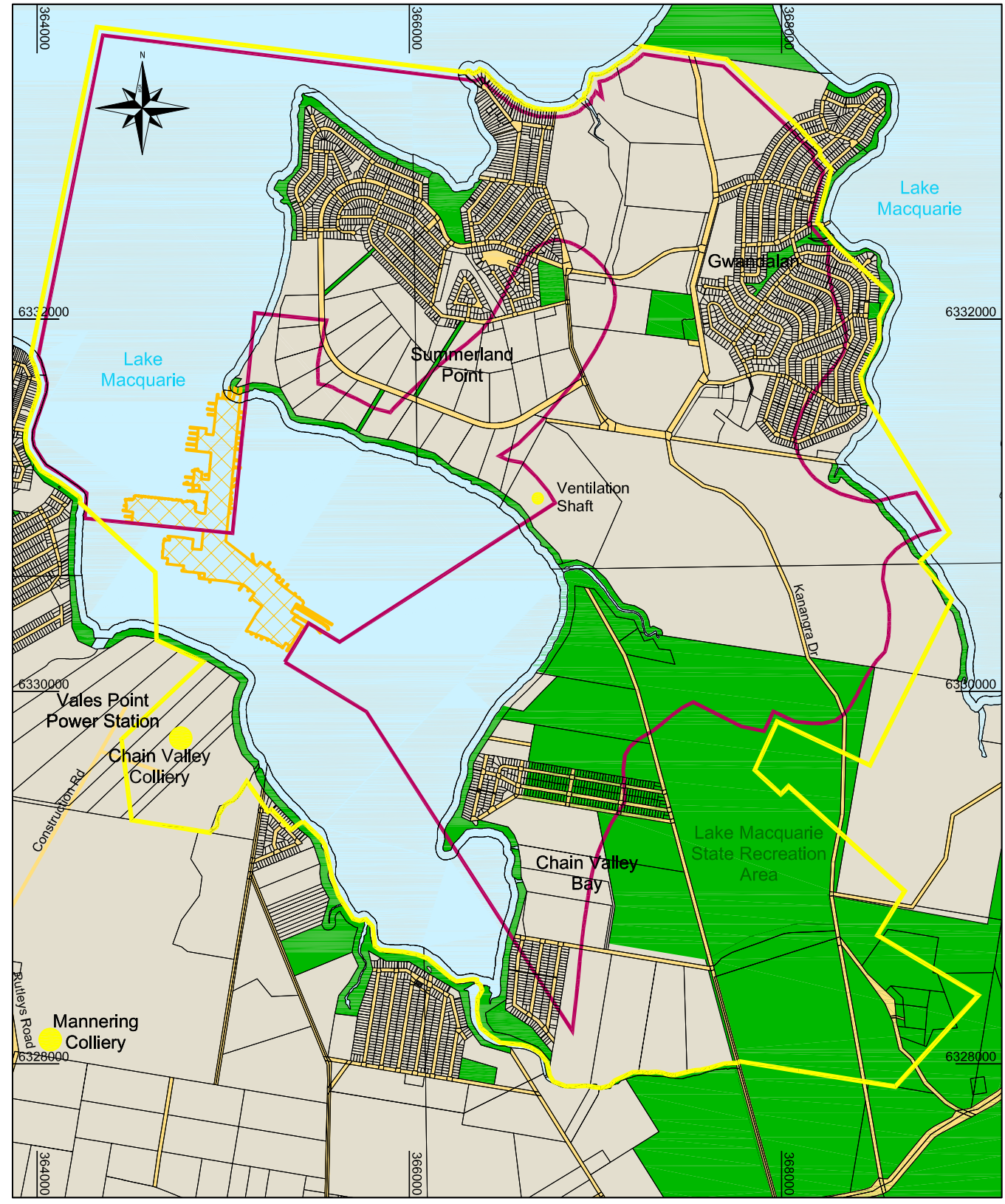
Figure 2a



EA Application Boundary
Fassifern Seam Proposed Mining Area
Fassifern Seam Existing Workings
Environmental Zoning or Open Space (L.G.A.)
Freehold Land
Roads
Cadastre
Colliery Surface Facilities

0 500 1000 1500
(m)

Co-ordinate System M.G.A.94

CHAIN VALLEY COLLIERY

Location of Proposed Underground Mining Area - Fassifern Seam

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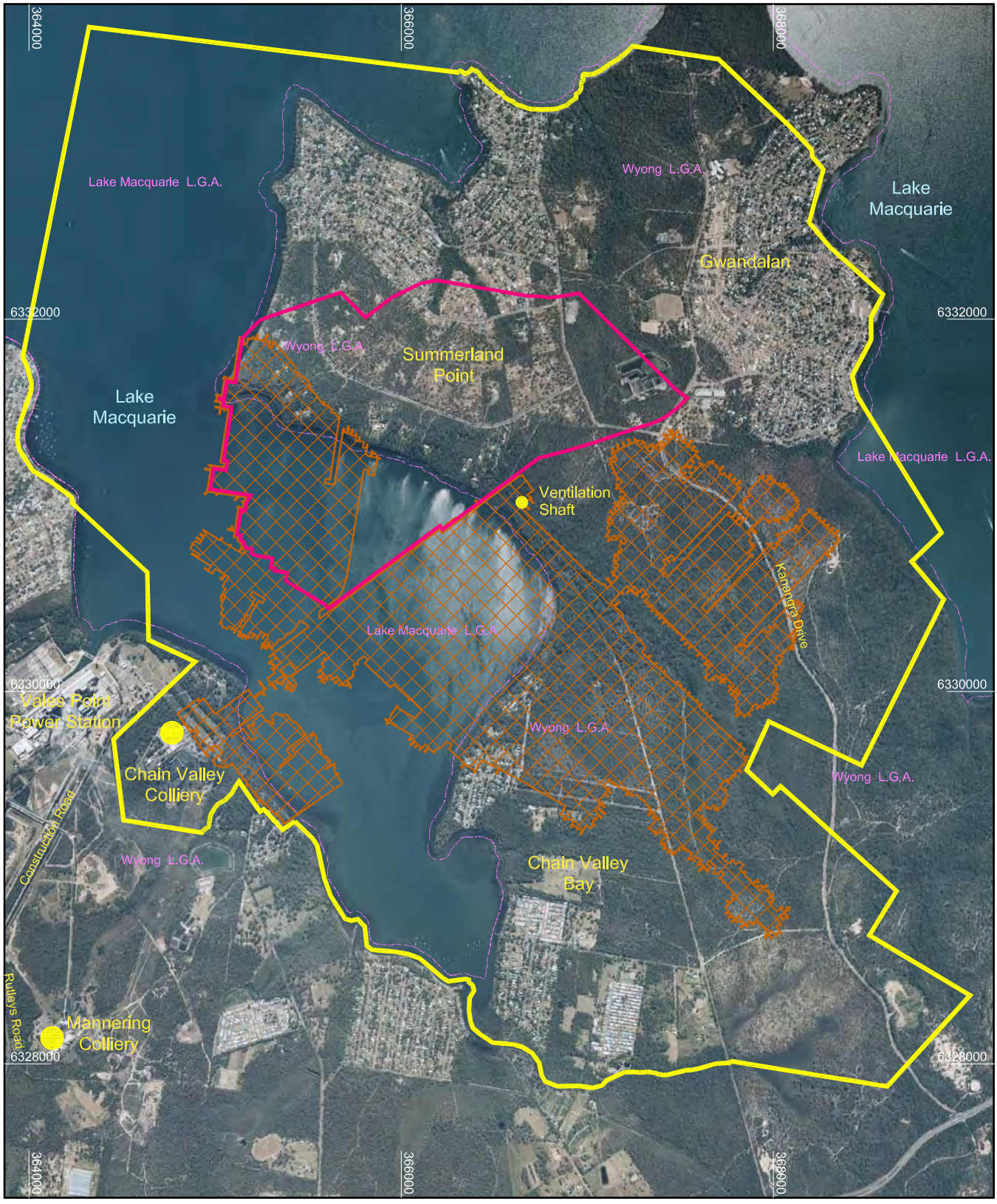
Figure 2b



EA Application Boundary
Great Northern Seam Proposed Mining Area
Great Northern Seam Existing Workings
Local Government Boundary
Colliery Surface Facilities

0 500 1000 1500
(m)

Co-ordinate System M.G.A.94

CHAIN VALLEY COLLIERY

Location of Proposed Underground Mining Areas - Great Northern Seam Aerial Map

Figure 3a

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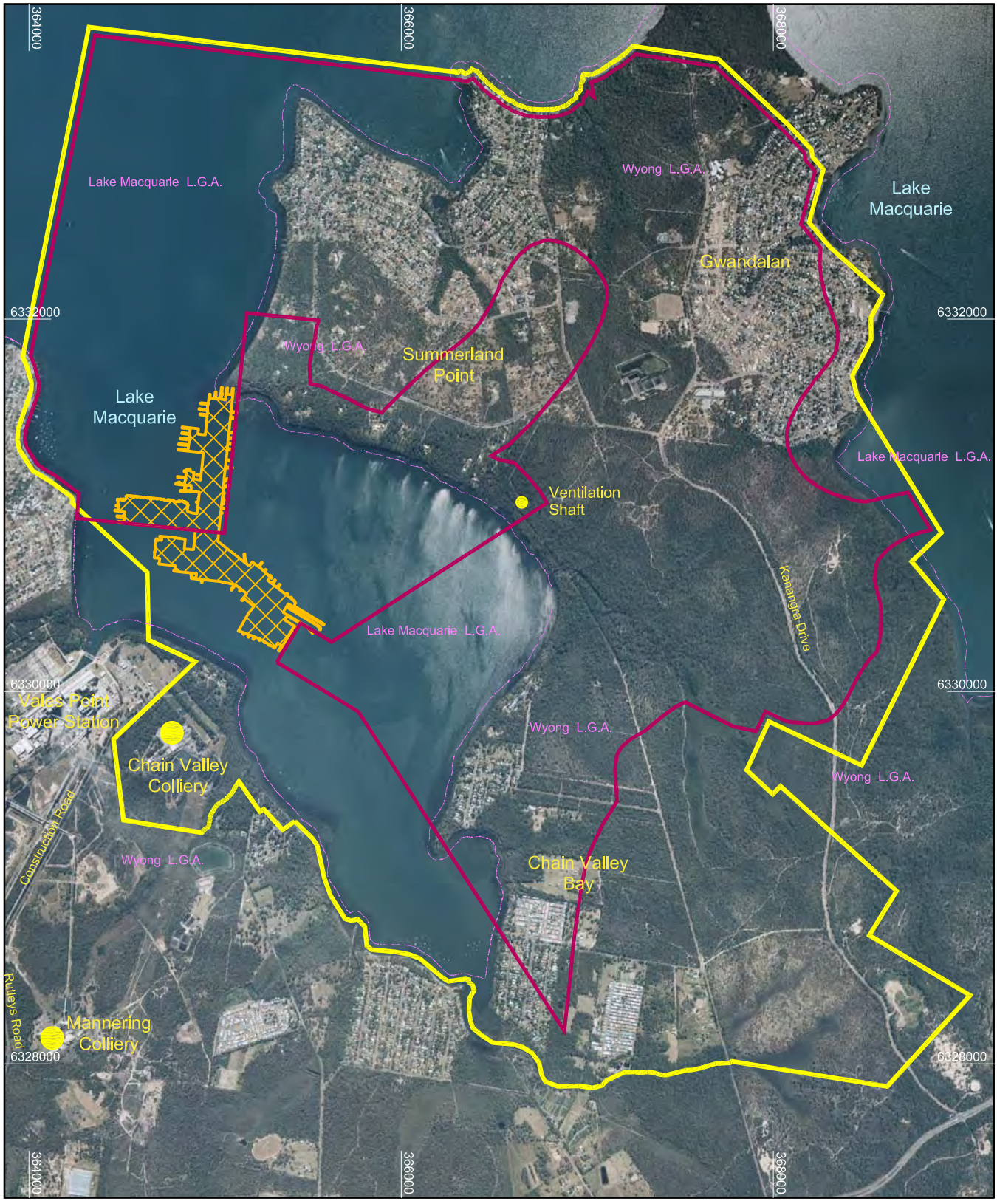

EA Application Boundary
Fassifern Seam Proposed Mining Area
Fassifern Seam Existing Workings Outline
Local Government Boundary
Colliery Surface Facilities

0 500 1000 1500
(m)

Co-ordinate System M.G.A.94

CHAIN VALLEY COLLIERY

Location of Proposed Underground Mining Areas - Fassifern Seam Aerial Map Figure 3b

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Chain Valley Colliery Surface Facilities - Ventilation Shaft

Chain Valley Colliery Surface Facilities - Pit Top

Co-ordinate System M.G.A.94

0 250 500
(m)

Freehold Boundary - LakeCoal

MPL 1349 Boundary

CHAIN VALLEY COLLIERY

Major Surface Infrastructure Areas

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Figure 4

2 PROJECT DESCRIPTION

2.1 LOCATION AND MINING TENEMENTS

The area occupied by Chain Valley Colliery lies within the Wyong Shire and Lake Macquarie City Council local government areas. The pit top area at Mannering Park, within the Wyong LGA (WLGA) covers 28 hectares. The pit top area is on land leased from Delta Electricity. The rest of the Environmental Assessment (EA) area includes both freehold and Crown land. Land owner's consent to the project is not required, due to the operation of clause 8F(c) of the EP&A Regulation.

The Colliery Holding for Chain Valley Colliery is the same as the EA boundary shown in Figures 1, 2a and 2b. Chain Valley mines within Consolidated Coal Lease 707 (CCL 707) and part of Consolidated Coal Lease 706 (CCL 706). CCL 707 has been renewed until 30 December 2023 and CCL 706 renewed until 29 April 2022. Mining Leases 1051 and 1052 are also within the holding and both have been renewed until 2022.

The surface facilities are located within Mining Purposes Lease (MPL) 1349 and it has been renewed until 2028.

2.2 PROPONENT

LakeCoal is the Project proponent on behalf of the WCJV.

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Sydney NSW 2000

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2.3 PROJECT SUMMARY

LakeCoal intends to consolidate existing Chain Valley Colliery activities into the Project Approval. Therefore, this Preliminary Assessment has been prepared to provide an overview of existing and proposed activities and infrastructure. Table 2 provides a summary of the existing Chain Valley Colliery and the proposed alterations to the existing operation for the Project.

Table 2

Project Summary

Project Development Component	Summary of Existing Chain Valley Colliery Operations	Summary of Chain Valley Continuation of Mining
Underground Mining and ROM Coal Production	• Bord and pillar mining methods to extract coal from the Wallarah, Great Northern and Fassifern Seams have been employed at the Chain Valley Colliery since 1963. • Production of approximately 750,000 tonnes per annum of Run-of-mine (ROM) coal.	• Continuation of bord and pillar mining operations to extract coal from the Great Northern and Fassifern Seams. • Production of up to 1.2 million tonnes per annum (Mtpa) of ROM coal.
Coal Handling and Preparation Plant (CHPP)	• ROM coal is conveyed from the underground mine workings to the surface and is processed in the CHPP. • The CHPP has a capacity of approximately 500 tph.	• The CHPP and associated material handling systems would be upgraded to increase CHPP throughput up to approximately 600 tph.
Product Coal	• Production of approximately 750,000 tonnes of low-sulphur, high ash thermal coal for export and domestic markets., including Munmorah and Vales Point Power Station • Product coal is transported by truck to the PWCS Carrington Coal Terminal and by truck to domestic customers.	• Production of up to 1.2 Mtpa of low-sulphur, high ash thermal coal for export and domestic markets. • Product coal would continue to be transported by truck to the PWCS Carrington Coal Terminal and by truck to domestic customers.
Surface Stockpiles	• There is an existing 60,000 tonne capacity ROM coal stockpile.	• Existing facilities would continue to be utilised.
General Surface Facilities and Supporting Infrastructure	• Existing general surface facilities include administration buildings, coal handling infrastructure, bathhouse, workshops, equipment service facilities, car park, washdown and fuel storage facilities. • Extensive supporting infrastructure including systems associated with: - underground drift access and conveyors; - electricity supply, reticulation and control; and - ventilation.	• The existing surface facilities would be utilised, however, the Project would include the upgrade of some infrastructure and construction of additional components as required. • Subject to investigation of ventilation requirements, the ventilation fan will be relocated from the existing location back to a site adjacent to the pit top on the western side of Chain Valley Bay, within the MPL1349 • Supporting infrastructure systems would be upgraded as required.
Water Management	• Fresh water supplied by Wyong Shire Council for ablutions, fire control and dust suppression. A water management plan has been in place since 2006.	• Continued use and (where required) upgrade or modification of existing water management infrastructure.
Life of Mine	• The life of mine is currently approximately 21 years.	• Coal resources indicate an additional mine life of 21 years.
Employment	• LakeCoal currently employs approximately 120 operational employees.	• Continued employment at approximately this level.
Hours of Operation	• The Chain Valley Colliery currently operates 24 hours per day.	• Continued 24 hour operations.
Mine Closure & Rehabilitation		• Closure of the mine and rehabilitation of the site after exhaustion of the coal resource

2.4 UNDERGROUND MINING

LakeCoal is currently mining a series of bord & pillar extraction panels ("West" panels) in the Fassifern Seam under the Chain Valley Bay in Lake Macquarie (Figure 2b) in accordance with a Subsidence Management Plan (SMP) approval (April 2008) obtained from the Department of Primary Industries (DPI) - Minerals.

It is anticipated that if the Project is approved, the area of land to which the Project Approval would apply would include all the existing and completed mining areas, as well as all the proposed underground mining areas (Figures 2a & 2b). Future workings will occur in the Fassifern and Great Northern Seams.

The layout and design of panels within the proposed underground mining area would be subject to the subsidence assessment, environmental assessment and panel layout evaluation process as described in Section 5.3.1.

Within the general class of mining known as bord and pillar mining, there are three sub-types of mining method that may be utilised at Chain Valley Colliery over the life of the Project:

- *First workings;*
- *Partial extraction*; and
- *Full extraction.*

First workings is the method of mining whereby only roadways (also known as bords, and approximately 5 metres wide and up to the full thickness of the coal seam) are developed within the coal seam. The solid coal between the bords is referred to as a pillar. The bords are generally formed in a rectilinear pattern leading to square or rectangular pillars. Provided the coal pillars are of such dimensions that the pillars remain stable permanently, then no surface subsidence results from first workings mining. This method of mining will be applied in areas of the Project where surface features properly preclude subsidence. For example, within the zone known as the foreshore protection zone around the foreshores of Lake Macquarie, only first workings will be undertaken.

Partial extraction is when the coal pillars are "partially extracted" (i.e. not all of the coal pillar is removed), during the mining sequence. As a result of partial extraction, some surface subsidence may result. The design of the partial extraction mining, including the size of the pillars and the percentage of the pillars extracted, is undertaken such that the resulting subsidence will be no greater than design limits. The use of partial extraction at the Project will be undertaken in areas where the surface subsidence must be limited, but can still exceed zero. For example, under roads and some other surface infrastructure (including some buildings within a Mine Subsidence District), a certain amount of surface subsidence may be able to be tolerated. In such locations, the mine design will be undertaken such that the resulting subsidence remains within the tolerable limits which may be up to 0.25 metres or higher.

Full extraction is when the majority of the coal pillars are removed during the mining sequence. When full extraction is undertaken, higher levels of surface subsidence result, for example up to 1.0 metres of vertical subsidence may result. This mining method will be undertaken in areas where such levels of surface subsidence can be tolerated, such as in the areas under Lake Macquarie (excluding the foreshore protection zone) and under open space.

Additional and/or replacement underground mining equipment would be required over the life of the Project in order to adjust production capacity up or down as required from time to time.

2.5 CHPP UPGRADES

The CHPP comprises conveyors, bins, crushers, and screens, to size the coal to contract specifications. The CHPP may be upgraded resulting in some components being altered, replaced or duplicated to increase throughput capacity. For example, there is currently a potential need to increase throughput capacity from 500 tph to a nominal 600 tph. The upgrade is undergoing feasibility assessment and will ensure improved efficiency and product control.

2.6 PRODUCT COAL TRANSPORT

The majority of product coal is currently transported by truck to the Carrington Coal Terminal at the Port of Newcastle (Figure 1), with up to 150 trucks being loaded each day. The average number of trucks loaded each day is approximately 75. Truck loading is currently undertaken between the times of 5:30 am and 6:30 pm. A lesser proportion of product coal is transported by truck to other domestic customers including the neighbouring Vales Point Power Station.

The bulk of Project product coal would continue to be transported by truck to the Carrington Coal Terminal. A proportion of product coal would continue to be transported by truck to domestic customers, including Munmorah and Vales Point Power Stations.

LakeCoal would investigate a range of product coal transport options for the Project.

The mining leases include a “Special Condition – Road Transport” relating to conditions and actions for the transport of coal to PWCS.

2.7 COAL REJECT MANAGEMENT

LakeCoal does not produce any coal reject with the current operations.

Consideration of limited coal beneficiation may result in the production of some coal reject. If that occurs, LakeCoal would look to identify disposal options for this reject in the Environmental Assessment.

2.8 WATER SUPPLY

The development of the proposed underground mining area would increase the area underground that requires water supply and/or water management. Water management infrastructure such as sumps, pumps, pipelines and storages would be extended as required.

The mine uses fresh water supplied by Wyong Shire Council for ablutions, fire control and dust suppression. The mine operates with a Water Management Plan, implemented in 2006, and further opportunities to reduce the use of freshwater are continually reviewed.

2.9 UPGRADE OF GENERAL SUPPORTING INFRASTRUCTURE

Where required, various supporting infrastructure systems would be upgraded in support of the Project, including but not limited to the following:

- extension and/or upgrade of underground drift access and materials handling and conveyor transport systems;
- development and/or upgrade of electricity supply, reticulation and control systems; and
- development and/or upgrade of ventilation systems.

2.10 CAPITAL INVESTMENT VALUE

The estimated total capital cost for the Project is AUD $7.5 million (M).

2.11 WORKFORCE

As outlined in Table 2, the operational workforce would continue at approximately 120 employees.

3 PLANNING PROVISIONS AND PROJECT APPROVAL CONSIDERATIONS

NSW Environmental Planning and Assessment Act, 1979

Approval for the Project would be sought under Part 3A of the EP&A Act. The EP&A Act and EP&A Regulation set the framework for planning and environmental assessment in NSW. Part 3A of the EP&A Act provides an approval process for Major Projects. The Project is considered a project to which Part 3A of the EP&A Act applies under Schedule 1, Group 2, clause 5(1)(a) of *State Environmental Planning Policy (Major Projects), 2005* (Major Projects SEPP), as the Project is development for the purpose of mining that is coal mining.

LakeCoal is seeking:

- confirmation from the Minister for Planning, under clause 6 of the Major Projects SEPP, that the Minister is of the opinion that the Project is a Part 3A project; and
- project approval for the Project under Part 3A of the EP&A Act.

LakeCoal considers that a concept plan is not warranted for the Project, and therefore a Concept Plan is not required.

Environmental Planning Instruments

Chain Valley Colliery is located within both the Wyong and Lake Macquarie LGA's, with the relevant Local Environmental Plans being the Wyong Local Environmental Plan 1991 (WLEP) and the Lake Macquarie Local Environmental Plan 2004 (LMLEP).

The Chain Valley Colliery major surface infrastructure is situated on land zoned 5a (Special Uses – Power Station) in the WLEP.

Parts of the proposed and existing underground mine workings situated in the WLGA are within land zoned (WLEP):

- Zone 2 (Residential)
- Zone 3 (Business)
- Zone 4 (Industrial)
- Zone 5 (Special uses)
- Zone 6 (Open Space)
- Zone 7 (Environmental Protection)

Part of the underground mine workings are situated within land zoned 11 (Lake and Waterways) in the LMLEP.

Road transport of product coal to the Carrington Coal Terminal is undertaken in the Wyong (WLGA), Lake Macquarie (LMLGA) and Newcastle (NLGA) Local Government Areas.

The carrying out of development for the purpose of mining is permissible with development consent in all of the abovementioned zones (in both LEPs), other than the land zoned 2 (Residential), land zoned 3 (Business), and parts of the land zoned 7 (Environmental Protection).

The Chain Valley Colliery is also subject to *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries)* 2007 (Mining SEPP), which permits various mining activities with or without development consent. The Mining SEPP prevails over Local Environmental Plans such as WLEP and LMLEP to the extent of any inconsistency. Therefore, the Mining SEPP provides that the whole of the Project is permissible.

Parts of the Chain Valley Colliery also run beneath areas which are mapped for the purpose of *State Environmental Planning Policy 14 - Coastal Wetlands* (SEPP14). SEPP14 requires development consent for certain activities within such areas and, in some cases, makes those activities "designated development". However, SEPP14 does not prohibit development.

By reason of the combined operation of sections 75J(3) and 75R of the EP&A Act, the Mining SEPP and the provisions of the Major Projects SEPP (see above), the Minister for Planning is conferred with authority to grant a Part 3A approval for the entirety of the Project.

There are a number of State environmental planning policies (SEPPs) and regional environmental plans (REPs) which may apply to the Project, and these will be considered in further detail in the EA. Relevant SEPPs and REPs include:

- State Environmental Planning Policy No 4 - Development Without Consent and Miscellaneous Exempt and Complying Development
- State Environmental Planning Policy No 33 - Hazardous and Offensive Development
- SEPP No. 44 - Koala Habitat Protection
- State Environmental Planning Policy No 60 - Exempt and Complying Development
- State Environmental Planning Policy No 71 - Coastal Protection
- State Environmental Planning Policy (Infrastructure) 2007
- Hunter Regional Environmental Plan 1989
- Hunter Regional Environmental Plan 1989 - Heritage

Commonwealth Environment Protection and Biodiversity Conservation Act, 1999

In addition to planning approval under Part 3A of the EP& A Act, the project might require approval of the Commonwealth Minister for Environment, Heritage and the Arts under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act).

In January 2007, the Commonwealth and NSW governments signed a Bilateral Agreement which accredits the NSW assessment regime under Part 3A of the EP&A Act for assessment purposes under the EPBC Act. The Bilateral Agreement applies to actions that the Commonwealth Minister has determined are controlled actions under the EPBC Act.

The Project will be referred to the Commonwealth Minister for Environment, Heritage and the Arts for consideration as to whether it is a controlled action and would require approval under the EPBC Act.

In the event that the Commonwealth Minister for Environment, Heritage and the Arts determines that the Project is a controlled action under the EPBC Act, it is understood that the following steps would apply:

- the NSW Department of Planning (DoP) would notify the Commonwealth Department of Environment Water Heritage and the Arts (DEWHA) that the assessment process under Part 3A of the EP&A Act is underway and would forward the DEWHA a copy of the environmental assessment requirements issued for the preparation of the Project EA;
- if the DEWHA has any additional matters that require consideration in the preparation of the EA, supplementary environmental assessment requirements would be issued by the DoP;
- LakeCoal would complete the EA in accordance with the environmental assessment requirements; and
- the Project would be publicly advertised and assessed by the DoP under the NSW Bilateral Agreement.

Protection of the Environment Operations Act, 1997

The *Protection of the Environment Operations Act, 1997* (PoEO Act) and the regulations under the PoEO Act set out the general obligations for environmental protection.

The Chain Valley Colliery currently operates under Environmental Protection Licence (EPL) No. 1770 issued by the DECC under the PoEO Act. The EPL contains conditions that relate to discharge, environmental limits, environmental monitoring, recording and reporting.

It is important to note that, under section 75V of the EP&A Act, once project approval under Part 3A of the EP&A Act has been granted, an EPL cannot be refused and must be issued on terms which are substantially consistent with the terms of the project approval.

4 STAKEHOLDER CONSULTATION

4.1 CONSULTATION UNDERTAKEN TO DATE

Project consultation with NSW Government agencies commenced in 2008. Project briefings and discussions have been held with the Department of Planning and the Department of Primary Industries – Minerals.

Consultation with the following agencies will be undertaken during the preparation of the EA:

- Department of Planning
- Department of Environment & Climate Change
- DPI – Minerals
- DPI – Fisheries
- Road and Traffic Auhority
- Wyong Shire Council
- Lake Macquarie City Council
- NSW Mine Subsidence Board

Further stakeholder consultation (including the local and broader community) will be undertaken during the preparation of the EA following lodgement of this Preliminary Assessment. A stakeholder engagement strategy will be implemented for the Project as described below.

4.2 STAKEHOLDER ENGAGEMENT STRATEGY

A stakeholder engagement strategy will be developed for the Project. The strategy will include the proposed use of a variety of consultation mechanisms which may include:

- Public exhibition of key documents (e.g. Project Application and EA).
- Development of a Stakeholder Focus Group to include a cross-section of representatives including community and interest groups.
- Provision of information regarding the Project on a website.
- Providing briefing information on the Project, EA, approval process and opportunities for interested parties to contribute to the overall assessment process.
- Meetings with public authorities and other stakeholders.

5 PRELIMINARY ASSESSMENT

5.1 OVERVIEW

The following Preliminary Assessment has been prepared to identify the potential environmental issues associated with the Project. This information has been prepared to assist the DoP with the issuing of the environmental assessment requirements for the Project under section 75F(2) of the EP&A Act.

The following is provided for each of the issues identified:

- a description of the existing environment, where appropriate;
- an analysis of the likely extent and nature of potential impacts; and
- identification of the level and scope of environmental assessment proposed for the EA.

The assessment has been undertaken in accordance with the draft Preliminary Assessment Guideline (DIPNR, 2005b).

In undertaking this Preliminary Assessment, LakeCoal has drawn on:

- experience from key environmental management and impact assessment issues at the Chain Valley Colliery; and
- feedback obtained during stakeholder consultation to date.

5.2 PRELIMINARY RISK ASSESSMENT

A preliminary risk assessment has been undertaken for the Project to assess the potential environmental impacts. The potential environmental impacts are ranked by the risk assessment as being of either High, Medium, Low or Very Low risk to the environment.

The risk assessment involved the following steps:

- **Identification of Potential Issues** - Consideration of how the Project is likely to affect the physical or biological aspects of the environment; natural or community resources; environmentally sensitive areas; areas allocated for conservation purposes; and areas sensitive because of community factors.
- **Risk ranking of Key Potential Environmental Issues** - From the potential issues above, what are the key issues, considering the extent of the impacts; the nature of the impacts; and the impacts on environmentally sensitive areas as determined by the risk assessment.
- **Preliminary Consideration of the Study Requirements** - Each of the key potential environmental issues identified above were considered with respect to the level and scope of assessment that would be required for the Project EA.

The risk assessment is detailed in Table 3. Table 3A shows the risk ranking matrix. Table 3B shows the risk rankings and the level of corrective action anticipated.

Table 3 **Preliminary Risk Assessment**					
Environmental Issue	**Activity/Impacts**	**Consequence**	**Likelihood**	**Ranking**	**Section**
Mine Subsidence and Extraction Design	Subsidence impacts generally	3	A	Medium (5)	5.3.1
	Subsidence impacts on Lake Macquarie	3	A	Medium (5)	
	Subsidence impacts on infrastructure (including residential development)	3	C	Medium (9)	
	Subsidence impacts on wetlands	3	C	Medium (9)	
Groundwater	Impacts to other groundwater users	3	C	Medium (9)	5.3.6
	Permanent loss of groundwater from aquifer systems	3	C	Medium (9)	
	Contamination of groundwater	2	D	Low (14)	
Surface Water	Fuel or chemical spill	3	C	Medium (9)	5.3.5
	Dirty water management	3	D	Low (15)	
Noise	Surface coal handling plant	3	A	Medium (5)	5.3.3
	Ventilation fans	3	A	Medium (5)	
	Road traffic to/from mine	3	A	Medium (5)	
Air Quality	Dust generated from surface coal handling plant and stockpile	3	B	Medium (6)	5.3.4
	Greenhouse gas emissions	3	A	Medium (5)	
	Exhaust emissions from ventilation fans	4	A	Low (10)	
	Exhaust emissions from surface plant and equipment	4	A	Low (10)	
Road Traffic	Coal haulage to Port of Newcastle	3	A	Medium (5)	5.3.2
	Coal Haulage to local power stations	3	A	Medium (5)	
	Coal haulage to other domestic customers	3	A	Medium (5)	
	Mine employees travel to/from mine	4	A	Low (10)	
	Deliveries to the mine	4	A	Low (10)	

Table 3 **Preliminary Risk Assessment**					
Environmental Issue	**Activity/Impacts**	**Consequence**	**Likelihood**	**Ranking**	**Section**
Visual and Lighting	Surface facilities visible from public locations	4	C	Low (12)	5.3.12
	Lighting impacts from surface facilities during 24 hour operation	4	C	Low (12)	
Socio-Economics	Workforce need for community infrastructure	4	D	Low (16)	5.3.11
	Mine closure	4	A	Low (10)	
Aquatic Ecology	Water discharges to Lake Macquarie	3	D	Low (15)	5.3.7
	Subsidence impacts on Lake Macquarie	3	A	Medium (5)	
Terrestrial Flora and Fauna	Subsidence impacts on flora and fauna	4	A	Low (10)	5.3.8
Aboriginal Cultural Heritage	Damage to Aboriginal sites or artefacts from subsidence impacts	4	C	Low (12)	5.3.9
Non Aboriginal Cultural Heritage	Damage to heritage items from subsidence impacts	4	C	Low (12)	5.3.10

Table 3A **Environmental Risk Assessment Ranking**							
Potential Consequences or Impacts			**Likelihood of Adverse Impacts**				
			A Almost Certain	B Likely	C Possible	D Unlikely	E Rare
Consequences	1	Broad scale environmental impact	High (1)	High (3)	Medium (7)	Low (13)	Very Low (21)
	2	Regional environmental impact	High (2)	High (4)	Medium (8)	Low (14)	Very Low (22)
	3	Local environmental impact	Medium (5)	Medium (6)	Medium (9)	Low (15)	Very Low (23)
	4	Minor environmental impact	Low (10)	Low (11)	Low (12)	Low (16)	Very Low (24)
	5	Insignificant environmental impact	Very Low (17)	Very Low (18)	Very Low (19)	Very Low (20)	Very Low (25)

The key potential environmental impacts identified by the Preliminary Risk Assessment were as follows:

- potential transport related impacts on road network and on surrounding community (road movements, noise);
- potential subsidence related impacts on:
    - key natural features (e.g. Lake Macquarie and wetlands);

  - aquatic ecology;
  - terrestrial flora and fauna;
  - surface infrastructure;
- potential noise impacts on surrounding community;
- potential air quality impacts on surrounding community;
- greenhouse gas emissions;
- mine closure; and
- continued operation of the mine and its continuing economic contribution.

5.3 KEY POTENTIAL ENVIRONMENTAL IMPACTS ANALYSIS

5.3.1 Subsidence and Extraction Design

Existing Environment

Mining has been undertaken under a range of man-made and natural features at the Chain Valley Colliery (Figures 3a & 3b) since 1963. As a result of the mining the maximum subsidence levels to 1.0 metre have been experienced. The surface land areas are located within the Swansea North Entrance Mine Subsidence District (NSW Mine Subsidence Board, 2009).

Likely Extent and Nature of Potential Impacts

Potential subsidence movements include vertical subsidence, tilt, curvature and strain. The majority of subsidence movements would generally be defined by an angle of draw of 35 degrees from the perimeter of the extraction panels.

Maximum subsidence levels would be between 0.5 and 1.0 metres. In many areas of the future mine workings, subsidence levels would be significantly below this (as low as zero) due to the design of the extraction panels being targeted to minimise surface subsidence where subsidence impacts must be avoided or mitigated.

As discussed in Section 2.4, bord and pillar mining will be undertaken during the life of the Project. When First Workings mining is undertaken, the resulting subsidence will be zero. Where Partial Extraction mining is undertaken, then the resulting surface subsidence will be generally less than 0.25 metres. Where Full Extraction mining is undertaken, then the resulting surface subsidence may be up to 1.0 metres.

Proposed Level and Scope of Subsidence Assessment

A subsidence impact assessment would be conducted for the EA. The proposed scope of the subsidence impact assessment is described below:

- description of the geology and known geological structures;
- subsidence predictions for the proposed underground mining area including subsidence prediction method, previous subsidence experience at the Chain Valley Colliery, description of predicted subsidence movements (summary of vertical subsidence, tilt, curvature and strain), valley related subsidence movements and far-field subsidence effects;

- identification of significant natural features and man-made structures potentially impacted by the project and completion of specific subsidence predictions and impact assessments for these features; and
- measures to avoid, mitigate, monitor and/or remediate potential subsidence impacts on significant surface features.

Extraction Panel Design

Within the proposed underground mining area (Figures 2a, 2b, 3a, 3c) the layout and design of the bord and pillar panels would be undertaken by LakeCoal through an iterative evaluation process. The layout/design would be determined following consideration of:

- geotechnical and/or geological limitations that may be identified during ongoing exploration drilling;
- evaluation of potential subsidence impacts on identified significant man-made and natural surface features;
- evaluation of the costs and benefits associated with minimising and/or avoiding subsidence impacts on any significant surface features (i.e. by altering the nature or extent of mining in the vicinity of the features); and
- consideration of likely remediation costs of various layout/design options.

The extraction panel evaluation process and the adopted extraction panel design would be described in the Project EA.

5.3.2 Road Transport

Existing Environment
Major roads in the vicinity of the Project include Rutleys Road, the Pacific Highway, the F3 Northern Freeway, and the Motorway Link Road.

The mine is accessed via Rutleys Road and Construction Road.

The major proportion of existing coal production from the mine is transported via Rutleys Road, Pacific Highway, Motorway Link Road and the F3 to the Port of Newcastle.

Likely Extent and Nature of Potential Impacts

The proposed increase in the ROM coal production rate will result in an increase in truck movements to PWCS, Munmorah and Vales Point Power Stations

The proposed increase in the ROM coal production rate may also result in some small increases in regular transport movements associated with delivery of general consumables.

A temporary increase in heavy vehicle movements would occur for the delivery of materials and equipment during construction/upgrade of on-site facilities in support of the Project.

Proposed Level and Scope of Assessment

An assessment of the potential impacts of Project traffic would be undertaken for the EA considering the requirements of the Roads and Traffic Authority (RTA) *Guide to Traffic Generating Developments* (RTA, 2002) and the *Road Design Guide* (RTA, 2000). The scope of the assessment would include:

- characterisation of the existing road transport network;
- collation of existing traffic count data from Council, RTA and other relevant sources and conduct of supplementary traffic surveys on the relevant routes;
- assessment of the potential road transport impacts of the Project; and
- development of measures to avoid and/or mitigate potential impacts.

5.3.3 Noise

Existing Environment

Chain Valley Colliery surface facilities are located immediately adjacent to the Vales Point Power Station.

Noise emissions associated with the surface works and ventilation infrastructure above the mining area are limited in nature and are generally removed from population centres and sensitive receptors.

Road transport noise associated with the haulage of product coal is a component of existing road transport noise on the applicable haulage routes (Figure 1 and Section 5.3.2).

Likely Extent and Nature of Potential Impacts

Noise and vibration impacts may occur as a result of the following activities:

- upgrade and operation of the CHPP (including crushing, conveyors, and coal product circuits);
- fixed and mobile plant for coal handling, stockpiling, and reclaim ;
- use of other surface infrastructure items (e.g. ventilation fans, pumps, compressors etc);
- short-term construction or surface development activities (may include some limited construction blasting);
- loading and road transport of product coal;
- transport of construction materials, consumables, waste materials and personnel to and from the site.

Proposed Level and Scope of Assessment

A noise impact assessment would be undertaken in accordance with the *Industrial Noise Policy* (INP) (EPA, 2000), *Environmental Noise Control Manual* (EPA, 2004)*, Environmental Criteria for Road Traffic Noise* (EPA, 1999) and *Assessing Vibration: A Technical Guideline* (DEC, 2006a), where relevant. The scope of the impact assessment would include:

- characterisation of background noise levels and determining Project specific noise criteria;
- compilation and evaluation of available meteorological data;
- development of a predictive noise model;
- assessment of the potential noise impacts (including road transport) associated with construction and operation of the Project;
- analysis of vibration and/or blasting impacts at potentially sensitive receptors (if relevant);
- comparison of the predicted Project emissions against relevant criteria;
- cumulative assessment of noise emissions including surrounding mining and other activities; and
- development of measures to avoid and/or mitigate potential impacts.

5.3.4 Air Quality

Existing Environment

The air shed in the vicinity of Chain Valley Colliery is mostly impacted by the Vales Point Power Station.

Chain Valley Colliery has a sprinkler system installed to minimise dust from the haulage roads around the pit top area. Sprinklers are installed around the access roads to the final product bin and coal stockpile areas, utilising town water.

Trucks hauling coal from the site have canopies installed to reduce dust and product to the environment.

A road sweeper is contracted to sweep the internal roads on a twice weekly basis.

The Chain Valley Colliery liberates limited amounts of coal seam gases from the coal prior to mining and via the ventilation system during mining.

Likely Extent and Nature of Potential Impacts

Potential air quality impacts associated with the Project primarily relate to surface activities such as the operation of the CHP (including conveying, stockpiling and crushing activities), construction and development activities, windblown emissions from exposed stockpiles, product coal handling, surface operation of mine mobile fleet and emissions from the Chain Valley Colliery's ventilation system.

Potential greenhouse gas emissions associated with the Project include carbon dioxide (CO_2) emissions from the use of fixed and mobile plant (e.g. diesel usage), as well as indirect emissions through the use of electricity, and coal seam gas emissions in the mine ventilation air (MVA).

Proposed Level and Scope of Assessment

An air quality impact assessment would be undertaken in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South* Wales (DEC, 2005a). The scope of the assessment would include:

- characterisation of background air quality, including dust deposition and suspended particulates (total suspended particulates and PM_{10});
- compilation and evaluation of relevant meteorological data;
- development of a predictive air quality model;
- assessment of the potential air quality impacts associated with construction and operation of the Project;
- comparison of the predicted dust deposition and suspended particulates levels against relevant criteria;
- assessment of potential coal seam gas emissions;
- assessment of potential greenhouse gas emissions (including consideration of Scope 3 emissions associated with the use of product coal);
- cumulative assessment of air quality impacts including surrounding mining and other activities; and
- development of measures to avoid and/or mitigate potential air quality impacts.

5.3.5 Surface Water

Existing Environment

The Chain Valley Colliery is principally located within small local catchments draining to Lake Macquarie.

Likely Extent and Nature of Potential Impacts

Potential impacts of the Project on surface water resources include:

- subsidence induced impacts including: cracking; acceleration of erosion; and/or changes in the hydrological aspects of surface water features); and
- water quality impacts associated with surface infrastructure and surface disturbance areas where runoff could contain contaminants such as sediments, soluble salts, flocculants, and hydrocarbons.

Proposed Level and Scope of Assessment

A surface water assessment would be conducted for inclusion in the Project EA. The proposed scope of the surface water assessment would include the following:

- examination of existing surface water regimes;
- review of surface water quality against relevant Australian and New Zealand Environment and Conservation Council (ANZECC) criteria;
- assessment of potential impacts on surface water flows and water quality in potentially affected stream systems;
- calculation of a water balance for various phases of Project development, including consideration of climatic variability and any water disposal or supplementary water supply requirements;
- assessment of improved potable water usage at Chain Valley Colliery; and
- development of measures to avoid, mitigate and/or remediate potential impacts on surface water resources.

5.3.6 Groundwater

Existing Environment

Extensive underground mining has already been undertaken across the project area and surrounding district. The mine currently pumps out and discharges approximately 75 Ml per week of principally saline water.

Likely Extent and Nature of Potential Impacts

Potential impacts of the Project on groundwater resources include:

- subsidence induced impacts including: cracking and/or changes in sub-surface hydrology of perched groundwater lenses and saturated zones; and
- groundwater pressure effects.

Proposed Level and Scope of Assessment

A groundwater impact assessment would be conducted for inclusion in the Project EA. The proposed scope of the groundwater impact assessment would include the following:

- characterisation of the existing groundwater regime including review of relevant exploration drilling bore logs and review of geological structures and existing mine water management records;
- assessment of the potential groundwater impacts of the Project on the local and regional groundwater regime; and
- development of measures to avoid, mitigate and/or remediate potential impacts on groundwater resources.

5.3.7 Aquatic Ecology

Existing Environment

Seagrasses are found throughout Lake Macquarie foreshore and lake bed and are known to be important nursery areas for fish. A prior study of aquatic biology (reference) found that there were no threatened or endangered species.

Likely Extent and Nature of Potential Impacts

A Seagrass Management Plan has been approved by the Department of Primary Industries – Fisheries for the current secondary extraction process to protect the seagrass communities. Future mine workings if approved by this Project would continue to avoid impacts to the seagrass communities.

During previous mining at Chain Valley Colliery a Foreshore Buffer Zone has been maintained around the foreshores of Lake Macquarie. In this zone, only First Workings mining has been undertaken and LakeCoal understands that therefore there has been no subsidence within this zone. This will be maintained during the Project and thus provides protection to the seagrass beds.

Proposed Level and Scope of Assessment

An aquatic ecology assessment would be conducted for the Project and would be included in the EA. The proposed scope of the aquatic ecology assessment would include the following:

- compilation of existing aquatic ecology information;
- characterisation of aquatic biota (including macroinvertebrate, macrophyte and fish assemblages) and aquatic habitats;
- assessment of threatened aquatic biota;
- assessment of potential impacts of the Project on aquatic ecology; and
- development of measures to avoid, mitigate and/or remediate potential impacts on aquatic ecology.

5.3.8 Terrestrial Flora and Fauna

Existing Environment

Munmorah Conglomerate Geology forms gently undulating terrain and this formation occurs south of Lake Macquarie and north through to the Awaba Hills Area. Outcrops are pebbly sandstone, siltstone

and claystone. Munmorah Conglomerate Geology comprises the Doyalson and Awaba Soil Landscape Units (Murphy, 1993) and in turn forms low nutrient soils. These low nutrient soils give rise to Woodlands of Scribbly Gum, Narrow-leaved Scribbly Gum, Sydney Red Gum and the Red Bloodwood, either with a shrubby or grassy under-storey.

Much of the study area is naturally vegetated and parts of the area incorporate the Lake Macquarie State Recreation Area (Figure 1). Due to the relatively flat terrain and easy access to the coal seams, residential subdivision, power station and the coal mining activities are becoming the main land uses. Pockets of rural-residential areas do occur, however.

Along the drainage lines and major re-entrants deltaic floodplain areas and alluvial flats are evident. These areas have been formed from material from the Quaternary Sequence and usually comprise sands, silts and clays. Generally these areas are low lying and subject to inundation. The Wyong Soil Landscape Unit (Murphy, 1993) is found in these areas and the vegetation that is present ranges from mangroves, saline wetlands to Swamp Mahogany-Broad-leaved Paperbark-Forest Red Gum forests. Development has been generally avoided in these habitats.

Table 4 Vegetation Communities in the Vicinity of the Project

Title	Description and Attributes
Coastal Woodland	Munmorah Conglomerates on gently sloping topography of the coastal plain. Dominated by Scribbly Gum with a dense heathland understorey. *Angophora inopina, Tetratheca juncea* and *Diuris praecox* all occur. The Squirrel Glider is also present.
Swamp Mahogany- Red Mahogany Woodland	Drainage lines on alluvium are apparent with significant water filled pock marked undulations which may be a result of previous subsidence. Amongst the pock marks a new vegetation woodland community is emerging of Swamp Mahogany and Red Mahogany. All trees are less than 20 years old. The understorey is a combination of Impeded Wet Heath and Hanging Swamp. The Wallum Froglet was recorded in this community especially in Tiembula Creek.
Broad leaved Paperbark-Swamp Mahogany-Forest Red Gum Forest	Occurs along the lake foreshore, sometimes as remnant trees but mainly as a dense forest. The sedge *Gahnia clarkei* makes up the majority of the understorey but sometimes more saline areas have *Baumea juncea.* The latter supports the Wallum Froglet. The presence of Forest Red Gum and Swamp Mahogany is why the Koala is present. Small patches of mangroves and Swamp Oak (the latter being an endangered ecological community (EEC) are also present.
Impeded Wet Heath	This community occurs at the interface of the Coastal Woodland and the drainage lines on Munmorah Conglomerates. Trees are absent and the heath is dominated by *Banksia oblongifolia.*
Hanging Swamp	Drainage lines dominated by stands of *Melaleuca seiberi* with a dense understorey of *Xanthorrhoeaceae, Haemodoraceae* and *Xyridaceae* and *Proteaceae (Banksia robur).* Water filled pock marked undulations dominate this habitat, which is partly being colonised by Swamp Mahogany trees (Unit 2). Extensive populations of the Wallum Froglet.
Tall Melaleuca Woodland	Drainage lines dominated by tall trees *Melaleuca quinquenervia* and *Melaleuca seeberi.* Occurs in upper reaches of Karignan Creek.

A search of the *NSW National Parks and Wildlife Service* wildlife atlas records has revealed that a number of threatened species have now been recorded in the study area. These species and their habitats are presented in **Table 5**.

Table 5 Habitats of Threatened Flora and Fauna

Species	Habitat
Angophora inopina	Coastal Plains Scribbly Gum Woodland Coastal Plains Smooth-barked Apple Forest
Tetratheca juncea	Coastal Plains Smooth-barked Apple Forest
Diuris praecox	Coastal Plains Scribbly Gum Woodland Coastal Plains Smooth-barked Apple Forest
Caladenia tesselata	Coastal Plains Scribbly Gum Woodland Coastal Plains Smooth-barked Apple Forest
Grey-headed Flying Fox	Riparian Melaleuca Swamp Woodland Wyong Paperbark Swamp Forest Swamp Mahogany Paperbark Forest Mangrove Estuarine Complex
Common Bent-wing Bat	All the habitats including water and roosting site in the Power Station
Little Bent-wing Bat	All the habitats including water and roosting site in the Power Station
Large-footed Myotis	All waterbodies. Roosting site in the Power Station
Squirrel Glider	Roosting and feeding sites in Coastal Scribbly Gum Woodland and Coastal Smooth-barked Apple Forest. Additional Winter feeding sites in the Swamp Mahogany Paperbark Forest
Regent Honeyeater	Winter feeding sites in the Swamp Mahogany Paperbark Forest
Swift Parrot	Winter feeding sites in the Swamp Mahogany Paperbark Forest
Black Bittern	Secluded streams and wetlands
Masked Owl	Roosting and feeding sites in Coastal Scribbly Gum Woodland and Coastal Smooth-barked Apple Forest.
Koala	Swamp Mahogany Paperbark Forest and Red Gum Rough-barked Apple Forest
Sooty Oystercatcher	Rocky shore platforms around the lake foreshore
Pied Oystercatcher	Sandy and muddy shores around the lake
Glossy Black Cockatoo	Coastal Plains Scribbly Gum Woodland and Coastal Plains Smooth-barked Apple Forest
Osprey	All waterbodies
Wallum Frog	Coastal wet sand cyperoid heath and Swamp Mahogany Paperbark Forest
Green Turtle	Lake Macquarie

Likely Extent and Nature of Potential Impacts

Potential impacts of the Project on terrestrial flora and fauna primarily relate to potential subsidence-induced effects such as alteration of hydrological processes above the proposed underground mining area. Other potential impacts on flora include vegetation clearance and/or modification from the construction/development of surface infrastructure, introduction or spread of weed species and dust generation.

Proposed Level and Scope of Assessment

A terrestrial flora and fauna assessment would be conducted for the Project and would be included in the EA. The proposed scope of the flora assessment would include the following:

- compilation of existing terrestrial flora and fauna information;
- review of existing vegetation community mapping;
- conduct of surveys including targeted searches for threatened flora and fauna (listed in the schedules of the NSW *Threatened Species Conservation Act* 1995 and Commonwealth EPBC Act) that may potentially occur in the study area;
- assessment of threatened flora and fauna;
- assessment of potential impacts of the Project on terrestrial flora and fauna; and
- development of measures to avoid, mitigate and/or remediate potential impacts on flora and fauna.

5.3.9 Aboriginal Cultural Heritage

Existing Environment
A number of studies of Aboriginal Cultural Heritage have been undertaken in the vicinity of the Project.

The major environmental relationships with respect to Aboriginal occupation appear to be related to the following:

- A large proportion of sites are associated with sandstone outcrops.
- Aboriginal rock shelters only occur where sandstone crops out and will form a shelter. Thus the highest number of sites occurs in areas of Hawkesbury Sandstone Geology.
- Where sites are not associated with sandstone, they are mostly open campsites in the Hunter Valley or open shell middens along the marine and estuarine coastlines.
- Hawkesbury Sandstone rock surfaces appeared to be a favoured medium for producing rock art.
- Rock engravings also prolifically occur on surfaces of Hawkesbury Sandstone, but are not common on other sandstone geological units.
- Axe grinding grooves also occur commonly throughout the Hawkesbury Sandstone, but they are evident on other sandstone types.

Likely Extent and Nature of Potential Impacts

Potential impacts on Aboriginal Cultural Heritage include direct disturbance associated with surface works or indirect disturbance associated with subsidence effects above the proposed underground mining areas (Figure 2).

Proposed Level and Scope of Assessment

An Aboriginal Cultural Heritage assessment would be undertaken for the EA in accordance with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, 2005c). The assessment process would also be undertaken with consideration of the *Aboriginal Cultural Heritage Standards and Guidelines Kit* (DEC, 1997). The proposed scope of the Aboriginal cultural heritage assessment is described below:

- review of existing Aboriginal Cultural Heritage information (e.g. Department of Environment and Climate Change (DECC) databases) and relevant past studies;
- field survey/site inspection of a selection of Aboriginal Cultural Heritage sites;
- assessment of Aboriginal Cultural Heritage items or places identified;

- consultation with relevant Aboriginal groups/representatives in consideration of the *Interim Community Consultation Requirements for Applicants* (DEC, 2004) (Section 4.1); and
- development of measures to avoid, mitigate and/or remediate potential impacts on Aboriginal Cultural Heritage.

5.3.10 Non-Aboriginal Cultural Heritage

Existing Environment
The Project area is generally characterised by residential development, industrial development, Lake Macquarie and open space. At this point time a study of Non-Aboriginal Cultural Heritage has not been undertaken.

Likely Extent and Nature of Potential Impacts
LakeCoal has not identified any major Non-Aboriginal Cultural Heritage issues for the purposes of this Preliminary Assessment. As noted in earlier sections, the mine design can be modified to reduce or eliminate surface subsidence. If the EA studies identify any heritage resources within the EA area, then the Project mine design can be modified if necessary, to provide appropriate mitigation of any mining impacts.

Proposed Level and Scope of Assessment

A Non-Aboriginal Cultural Heritage assessment would be undertaken for the EA. The proposed scope of the assessment is described below:

- review of existing Non-Aboriginal Cultural Heritage information and relevant National and State databases;
- review of known Non-Aboriginal Cultural Heritage sites and survey of Project surface development areas;
- assessment of the heritage significance of any identified items within proposed disturbance areas in accordance with the relevant guidelines (such as the NSW Heritage Manual);
- identification of the potential impacts of the Project on sites of Non-Aboriginal Cultural Heritage significance; and
- development of measures to avoid, mitigate and/or remediate potential impacts on Non-Aboriginal Cultural Heritage.

5.3.11 Socio-Economics

Existing Environment
The Chain Valley Colliery has operated within the Lower Hunter area for approximately 50 years with an existing supply of community infrastructure and level of economic activity.

Likely Extent and Nature of Potential Impacts

The mining of the proposed underground mining area would extend the life of the Chain Valley Colliery by up to approximately 21 years. The continuation of operations would maintain employment, further strengthen the local economy and create significant revenue at a state and federal level.

Proposed Level and Scope of Assessment

A socio-economic assessment would be conducted for the Project and would be included in the EA. The proposed scope of the Project socio-economic assessment would include:

- a benefit cost analysis (threshold value analysis);
- a regional economic impact assessment;
- an employment, population and community infrastructure assessment; and
- development of measures to avoid or mitigate potential socio-economic impacts (e.g. at mine closure).

5.3.12 Visual Amenity

Existing Environment

The Chain Valley Colliery's major surface facilities are located off Construction Road at Vales Point. The facilities are immediately adjacent to the Vales Point Power Station. The surface facilities are generally not visible to most publicly accessible viewpoints.

Likely Extent and Nature of Potential Impacts

There will be no significant change to the surface facilities that would lead to an increase in impacts on visual amenity from the Chain Valley Colliery Project.

Proposed Level and Scope of Assessment

Given the limited views of the surface facilities described above, a detailed visual assessment is not proposed to be undertaken for the EA. However, the EA would include measures to manage/mitigate/avoid potential visual impacts as appropriate.

5.4 LEVEL AND SCOPE OF ASSESSMENT

The key potential environmental issues associated with the Project identified in this Preliminary Assessment are summarised in Table 6 along with associated proposed EA requirements.

Table 6

Key Environmental Issues, Key Potential Impacts and Proposed Environmental Assessment Requirements

Key Environmental Issue	Key Potential Impacts	Proposed Environmental Assessment Requirements
Subsidence and Extraction Panel Design	• Potential subsidence related impacts on key man-made surface infrastructure (e.g. Residential Development, Kanangra Drive and services infrastructure). • Potential subsidence related impacts on significant natural features (e.g. Lake Macquarie and wetlands).	• Subsidence predictions for key surface infrastructure and significant natural features. • Consideration of avoidance, mitigation and remediation options.
Road Transport	• Potential traffic impacts on the road network.	• Assessment of potential traffic impacts on the surrounding road network. • Consideration of mitigation options.
Noise	• Potential noise impacts on the surrounding community (including construction, operational, and road transport noise).	• Assessment of potential noise impacts on the surrounding community, including construction and operational noise, and road transport noise). • Consideration of avoidance and mitigation options.
Air Quality	• Potential fugitive seam gas emissions. • Potential air quality impacts associated with surface operations on the surrounding community. • Potential for greenhouse gas emissions.	• Assessment of potential fugitive seam gas emissions. • Assessment of potential air quality impacts, including dust deposition and suspended particulates. • Assessment of potential greenhouse gas emissions. • Consideration of avoidance and mitigation options.
Surface Water and Groundwater	• Potential hydrological impacts of subsidence on surface water features (e.g. Lake Macquarie). • Potential hydrological impacts of surface development works and ongoing operational discharges. • Potential impacts of mining and subsidence on groundwater systems.	• Assessment of potential impacts on surface water and groundwater • Consideration of avoidance, mitigation and remediation options.
Aquatic Ecology	• Potential subsidence related impacts on aquatic ecology (e.g. hydrological change).	• Assessment of potential impacts on aquatic ecology. • Consideration of avoidance, mitigation and remediation options.
Terrestrial Flora and Fauna	• Potential subsidence related impacts (i.e. hydrological change) on: – riparian vegetation; – wetlands; and – water dependent terrestrial fauna.	• Assessment of potential impacts on terrestrial flora,. • Assessment of threatened flora species, populations, ecological communities, and their habitats. • Assessment of potential impacts on terrestrial fauna, including water dependent terrestrial fauna. • Assessment of threatened fauna species, populations, ecological communities, and their habitats. • Consideration of avoidance, mitigation and remediation options.

Table 6 (Continued)
Key Environmental Issues, Key Potential Impacts and
Proposed Environmental Assessment Requirements

Key Environmental Issue	Key Potential Impacts	Proposed Environmental Assessment Requirements
Environmentally Sensitive Areas	• Potential impacts on environmentally sensitive areas.	• Assessment of potential impacts on environmentally sensitive areas • Consideration of avoidance, mitigation and remediation options.
Aboriginal and Non-Aboriginal Cultural Heritage	• Potential subsidence related and infrastructure development impacts on Aboriginal and Non-Aboriginal heritage.	• Assessment of potential impacts on Aboriginal cultural heritage. • Assessment of potential impacts on non-Aboriginal cultural heritage. • Consideration of avoidance, mitigation and remediation options.
Socio-Economics	• Continued operation of the mine and continuing economic contribution. • Mine closure.	• Assessment of the potential socio-economic impacts and benefits. • Development of a framework for a mine closure strategy.

5.4.1 Ecologically Sustainable Development

Project design, planning and assessment will be carried out applying the principles of Ecologically Sustainable Development (ESD, as outlined in section 6 (2) of the Protection of the Environment Administration Act 1991) through:

- incorporation of risk assessment and analysis at various stages in the Project design and environmental assessment and within decision-making processes;
- adoption of high standards for environmental and occupational health and safety performance;
- consultation with regulatory and community stakeholders; and
- optimisation of the economic benefits to the community arising from the ongoing operation of the Project.

Through the Environmental Assessment it will be demonstrated that the Project can be operated in accordance with ESD principles through the design of the Project (including the application of mitigation and management measures) to minimise the environmental impacts of the Project.

6 REFERENCES

Department of Environment and Conservation (DEC) (1997) *Aboriginal Cultural Heritage Standards and Guidelines Kit*.

Department of Environment and Conservation (DEC) (2004) *Interim Community Consultation Requirements for Applicants*.

Department of Environment and Conservation (DEC) (2005a) *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*.

Department of Environment and Conservation (DEC) (2005c) *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*.

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