



Preliminary Environmental Assessment

Wongawilli No.2 Ventilation Shaft Project

Project Number 111032-02 Report 001 Rev 1

Prepared for Gujarat NRE

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Cover Image: Nebo No.4 Shaft – NRE Wongawilli Colliery

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Executive Summary

NRE Wongawilli Colliery is an underground coal mine located in the Southern Coalfield of NSW. NRE Wongawilli Colliery primarily uses longwall mining techniques to extract coal from the Wongawilli Seam of the Illawarra Coal measures. The Colliery includes workings and mining domains associated with a number of former collieries in the area, being; Nebo, Huntley, Avondale, Wongawilli and Elouera.

Extraction of Run of Mine coal is currently occurring from Longwall 11 in the Elouera domain and NRE holds current Subsidence Management Plan approval for the mining of Longwalls 11, 12, 15, 16, 19 and 20 in this area.

NRE has lodged an application with the Department of Planning (DoP) for the continuation of current mining activities in the Elouera domain. As part of this application, NRE has applied for the extraction of a further six longwall panels from the Nebo domain and the development of the drivage into the western areas. NRE intends to extend their mining activities into the western areas after the completion of mining in the Nebo and Elouera domains.

The proposed western areas are essentially a new mining domain and therefore cannot be serviced by the existing NRE Wongawilli Colliery access, coal clearance or ventilation systems. A new ventilation system will therefore be required to service this mining area and to supply an adequate and reliable source of fresh air to the underground operations.

This report is a Preliminary Environmental Assessment (PEA), prepared to support NRE's forthcoming Major Project Application under Part 3A of the Environmental Planning & Assessment Act 1979 for the project. This PEA describes NRE's proposal to undertake construction (and then operation) of a new upcast ventilation shaft, known as the Wongawilli No.2 Ventilation Shaft and associated surface infrastructure.

The Wongawilli No.2 Ventilation Shaft Project (including associated infrastructure) which this Part 3A Application seeks approval for, consists of:

- Upcast ventilation shaft
- Extraction fans and housing
- Electrical switchyard (on or near to the shaft site)
- Electrical switch house
- 33 kV power connection from the NRE Wongawilli Colliery Pit Top to the new switchyard
- 11 kV power supply from switchyard to switch house
- Upgrades to power supply infrastructure at the NRE Wongawilli Pit Top (including new HV substation and switchyard)
- Surface to in-seam service boreholes (for the provision of power and water to the underground workings)
- Water supply pipeline from Avon Dam
- Pump house
- Water tank
- Site amenities.

The Wongawilli No.2 Shaft Site is located in the Metropolitan Special Area west of Wollongong and approximately 5 km west of the NRE Wongawilli Pit Top. The Special Area is owned and managed by the Sydney Catchment Authority (SCA) in order to protect Sydney's water supply. The existing landscape can be described as natural bushland, however a portion of the shaft site has been subject to past disturbance due to the establishment of an exploration borehole at the site.

The proposed ventilation shaft has been positioned as close as possible to the underground workings as the surface features allow. The location of the shaft site takes into account the local underground geology and is designed to minimise the potential impacts on surface features and the environment.

This PEA describes the proposal, identifies benefits, reviews the applicable regulatory framework and identifies agency and community stakeholders. This PEA also reviews potential environmental impacts of the proposal and identifies areas that require assessment. The potential environmental impacts of the proposal are:

- *Biodiversity*
- *Aboriginal and European Cultural Heritage*
- *Water resources*
- *Surface water management*
- *Sediment and erosion control*
- *Bushfire*
- *GHG emissions*
- *Noise and vibration*
- *Air quality*
- *Visual*
- *Traffic*
- *Waste management.*

Any potential impacts to the environment and/or community will be detailed, assessed and the appropriate management and mitigation measures developed (if required) in the forthcoming Environmental Assessment (EA) Report. Expectations are that mitigation and management measures will appropriately reduce the more significant impacts such that the resulting environmental impacts of the proposed development will be minimal.

The information provided in this PEA allows DoP to prepare and issue the Director-General's Requirements for the proposal, such that a full EA can be prepared.

Prepared by
for and on behalf of
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1 Introduction

This section describes the background to the proposal and the reason for change.

1.1 Background

NRE Wongawilli Colliery is an underground coal mine located in the Southern Coalfield of NSW. The mine's pit top is located immediately west of the township of Wongawilli and approximately 15 km southwest of Wollongong, NSW (refer **Figure 1**). The mine is owned by Gujarat NRE FCGL Pty Ltd (NRE) and operated by Gujarat NRE Coking Coal Limited (GNCCL), which is a wholly owned subsidiary of the Indian based Gujarat NRE Coke Limited.

NRE Wongawilli Colliery primarily uses longwall mining techniques to extract coal from the Wongawilli Seam of the Illawarra Coal measures. The colliery includes workings and mining domains associated with a number of former collieries in the area, being; Nebo, Huntley, Avondale, Wongawilli and Elouera. A full history of the collieries operations can be found in **Section 2.1**.

The colliery has been operated by NRE since 2007. In 2010, NRE made an application under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to continue operations at the colliery, for the development of six longwalls in the Nebo domains and for first workings along the western drivage to access the "western areas". NRE intend to expand their Wongawilli Colliery operations into these western areas in the near future once reserves in the Elouera and Nebo domains expire.

The expansion into the western areas is proposed to be undertaken in stages with separate applications made to DoP for each stage of the works. Due to the long lead times associated with ventilation shaft construction, this must commence as soon as possible to ensure that the shaft is complete prior to the planned commencement of mining in the western areas (which is anticipated to begin in ~2014).

It is therefore necessary for the application for the ventilation shaft to pre-date the application for mining in the western areas. This is to ensure that the relevant stages of the development can be achieved in time to meet NRE's anticipated operational timeframes. Further detail justifying this approach is provided in **Section 4.1**.

Current operations in the Nebo and Elouera domains of the NRE Wongawilli Colliery are ventilated by one upcast ventilation shaft (Nebo No.4) and one downcast shaft (Nebo No.3) and numerous portals. The colliery also owns the decommissioned Wongawilli Shaft and the rehabilitated Nebo No.1 and No.2 Shaft Site (refer **Figure 1**).

The proposed western areas are essentially a new mining domain and therefore cannot be serviced by the colliery's existing ventilation system. A new ventilation system will therefore be required to service these areas and supply an adequate and reliable source of fresh air to the underground operations.



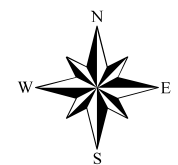
Regional Context

WONGAWILLI NO.2 VENTILATION SHAFT PROJECT

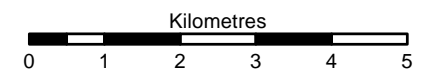
Legend

- Proposed Wongawilli No.2 Ventilation Shaft (NRE)
- Asset Locations (NRE)
- Major Roads (LPMA)
- Railway (LPMA)
- Local Roads (LPMA)
- Mining Leases
- Waterbodies (LPMA)
- NPWS Reserve (LPMA)
- Built Up Areas (LPMA)
- Rural and Other Non-Urban
- SCA Freehold Land (SCA)
- Metropolitan Special Area (SCA)

FIGURE 1



Scale 1:100,000 (at A3)



Map Produced by Cardno Wollongong
 Date: 10/01/2011
 Coordinate System: GDA 1994 MGA Zone 56
 Project: 111032-01
 Map: 1802_RegionalContext.mxd 08

1.2 Project Objectives

The overall objective of the Wongawilli No.2 Ventilation Shaft Project is ***to provide a reliable and efficient ventilation system for future operations in the new western mining areas of the NRE Wongawilli Colliery.***

In order to ensure the safety of underground employees and to facilitate the mining of the western areas, NRE require Project Approval for the construction and operation of a new upcast ventilation shaft and associated ancillary infrastructure as described in this application.

The following surface works and activities associated with construction and operation of ventilation shaft and associated infrastructure include:

- Upcast ventilation shaft
- Extraction fans and housing
- Electrical switchyard (on or near to the shaft site)
- Electrical switch house
- 33 kV power connection from the NRE Wongawilli Colliery Pit Top to the new switchyard
- 11 kV power supply from switchyard to switch house
- Upgrades to power supply infrastructure at the NRE Wongawilli Pit Top (including new HV substation and switchyard)
- Surface to in-seam service boreholes (for the provision of power and water to the underground workings)
- Water supply pipeline from Avon Dam
- Pump house
- Water tank
- Site amenities.

Refer to **Figure 2** for a site location plan showing the general area of activities described in this PEA.

NRE will work to achieve these objectives whilst understanding that each has various constraints.



Project Area

WONGAWILLI NO.2 VENTILATION SHAFT PROJECT

Legend

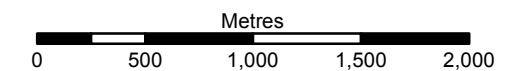
- Proposed Wongawilli No.2 Ventilation Shaft
- Water Pump Station (2 Options)
- Electrical Switchyard (3 Options)
- Water Tank
- HV Switchroom
- HV Substation and Switchroom (2 Options)
- Roads (LPMA)
- Railway (LPMA)
- Access Road (Ventilation Shaft to Cordeaux Road)
- 11kV Power to Switch House
- 33kV and Communications Route (Preferred)
- 33kV and Communications Route (Alternative)
- Water Supply Overland Route (Preferred)
- Water Supply Overland Route (Alternative)
- 33kV and Communications Overhead (Option A)
- 33kV and Communications Underbore (Option B)
- 33kV and Communications Route (2 Options)
- Cadastre (LPMA)
- NPWS Reserve (LPMA)
- Major Waterbodies (LPMA)
- SCA Freehold Land (SCA)
- Metropolitan Special Area (SCA)
- NRE Wongawilli Colliery Site Boundary

1/2552 Lot/DP

FIGURE 2

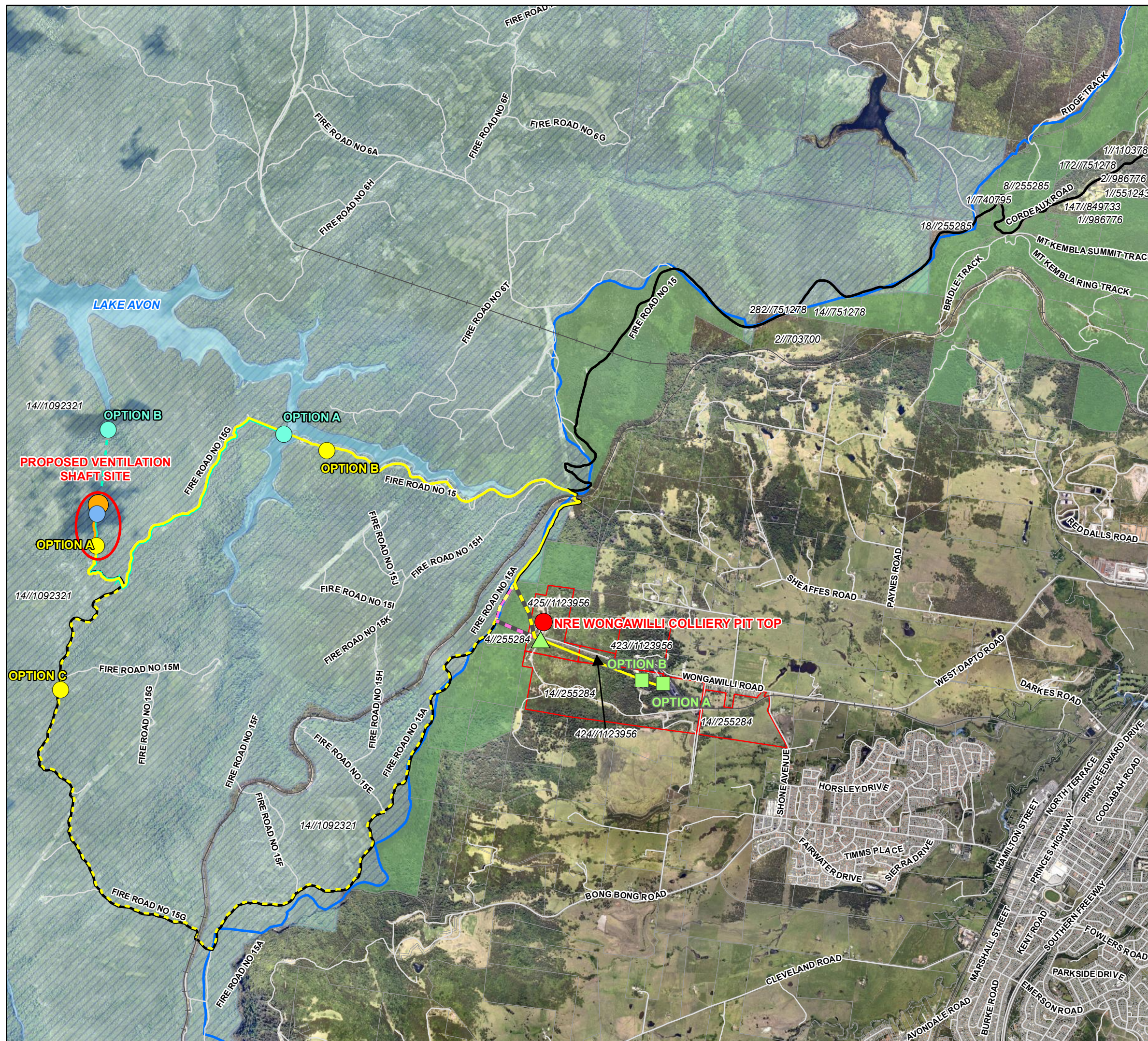


Scale 1:35,000 (at A3)



Map Produced by Cardno Wollongong
 Date: 27/01/2011
 Coordinate System: GDA 1994 MGA Zone 56
 Project: 111032-01
 Map: 1817_ProjectArea.mxd 13

Aerial imagery supplied by Near Map and associated third party suppliers (November 2010)



1.3 Major Project Classification

This project is classified as a Major Project under Part 5(1)(a) of Schedule 1 of *the State Environmental Planning Policy (SEPP) (Major Development) 2005*, because it is development for the purposes of coal mining, viz:

5. Mining

- 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 or employs 100 or more people.
- 2) Extracting a bulk sample as part of resource appraisal or a trial mine comprising the extraction 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:
 - d) is ancillary to or an extension of another Part 3A project, or
 - e) has a capital investment value of more than \$30 million or employs 100 or more people.

A Part 3A Application for the development is therefore required pursuant to Part 5 of Schedule 1.

1.4 Purpose of this Report

The purpose of this PEA is to advise DoP of the following:

- General project activities
- Proposed construction methodology
- Justification for the proposed development
- Applicable legislation and planning policies
- Anticipated consultation requirements and methodology
- Potential environmental impacts.

The information provided in this PEA is intended to allow DoP to better understand the scope of the proposed development and to provide an overview of the anticipated potential environmental impacts. It will assist the Director-General to issue their requirements for the project which will guide and direct the future EA for this project.

1.5 Anticipated Timing of the Project

NRE currently has an application before DoP for the development of the first workings in the western drivage (MP 09_0161). It is anticipated that the extension of mining into the western areas will be undertaken once the current resources in the northern precincts are exhausted, subject to the appropriate approvals being granted. According to NRE's current projections, mining in the western areas is proposed to commence in 2014, and first workings will commence immediately on approval of the abovementioned application currently before DoP.

The construction of the ventilation shaft would be required to commence in 2011 to ensure that it is operational in time to meet the ventilation requirements of the western areas. NRE aim to commence development of the Wongawilli No.2 Ventilation Shaft Project immediately following approval.

Table 1.1 shows the anticipated approval programme for the Wongawilli No.2 Ventilation Shaft application:

Table 1.1 – Anticipated Timing of the Part 3A Application

Stage	Due Date
1. Prepare Preliminary Environmental Assessment	December 2010
2. Submission of PEA to Department of Planning	January 2011
3. Issue of Director-General's Requirements	February 2011
4. Submission of EA to DoP for Adequacy Review	April 2011
5. Public Exhibition of EA and Agency Consultation	May 2011
6. Completion of DoP assessment	July 2011
7. Minister's Decision	August 2011

This anticipated approval timeframe will facilitate the commencement of shaft construction in October 2011 as required to achieve completion by March 2013 (~18 months later) to ensure that there are no delays to the anticipated mining program for the western areas.

1.6 Structure of this Report

The structure of this PEA is as follows:

- **Section 2** – explains how the project relates to the historic and current operations at NRE Wongawilli Colliery.
- **Section 3** – describes the proposed development.
- **Section 4** – provides the project justification and details the alternatives considered.
- **Section 5** – reviews planning policies relating to the proposed development.
- **Section 6** – details consultation undertaken thus far and that proposed to be undertaken.
- **Section 7** – provides details of the preliminary risk assessment.
- **Section 8** – identifies key potential environmental impacts.
- **Section 9** – identifies secondary potential environmental impacts.
- **Section 10** – reviews construction management and safety.
- **Section 11** – concludes the PEA.

2 NRE Wongawilli Colliery Mining Operations

This section describes the proposed development in relation to current and future mining operations at NRE Wongawilli Colliery. Information in the following sections has been provided by NRE or sourced from <http://www.illawarracoal.com>.

2.1 History of Wongawilli Colliery

NRE Wongawilli Colliery is a consolidation of the former Avondale and Elouera Collieries, located to the south west of Wollongong, NSW. The mine has been owned by NRE since 2007 with the inclusion of Avondale Colliery into the NRE Wongawilli Colliery holdings formalised in October 2009.

2.1.1 Wongawilli Colliery

Mining at the Wongawilli Colliery began between 1906 and 1912. In 1916, the mine was purchased by Hoskins to provide coke to the Lithgow Iron and Steel Works. Hoskins established a washery and beehive coke ovens below the mine adit and coal was washed and coked on site, prior to being transported by rail to Lithgow.

In 1928, Australian Iron and Steel (AI&S) started operating a blast furnace at Port Kembla using coke provided from the Wongawilli Colliery. Coal washed at Port Kembla was shipped to both national and international markets from the Port Kembla Coal Terminal (PKCT) and the washery rejects were transported back to Wongawilli by rail for emplacement in the designated area adjacent to the pit top.

In 1935, BHP acquired AI&S, whose local operations included both the Wongawilli Colliery and the Port Kembla Steelworks. BHP owned and operated the mine for the following 70 years. Some of the key milestones from that period are presented in the timeline below:

- **1936** – New (and worlds longest) coal haulage incline established.
- **1946** – Coal from Nebo Colliery brought to Wongawilli Pit Top for washing and processing.
- **1947** – Commencement of mechanised mining.
- **1948** – Wongawilli washery and coke ovens decommissioned and demolished. Coal washed and processed at Port Kembla.
- **1952** – Continuous miner used at the mine.
- **1961** – Colliery commences mining of the Bulli Seam.
- **1971/1972** – Wongawilli No.1 Ventilation Shaft completed and commissioned.
- **1977** – Mining of the Bulli Seam ceases.
- **1991** – Mining of the Bulli Seam recommences.
- **1993** – Elouera Colliery established through the merging of Wongawilli and Nebo Collieries.
- **2005** – Contract miner Delta takes over Elouera Colliery from BHP Billiton.
- **2005** – Wongawilli Emplacement Area decommissioned and rehabilitated by BHP Billiton.
- **2007** – Gujarat NRE acquires the Elouera mining leases and renames mine NRE Wongawilli Colliery. NRE ships ROM coal from the mine from PKCT to India for processing.

2.1.2 Avondale Colliery

Avondale Colliery opened in 1911 and was operated by the Illawarra Steam and Coal Company, mining coal from both the Wongawilli and Tongarra Coal Seams of the Illawarra Coal Measures. Coal from the mine was transported to the AI&S Washery at Port Kembla for processing. In 1982, the company lost its contract with the steelworks and the mine was placed under care and maintenance.

Avondale Colliery was purchased by the adjacent Huntley Colliery in 1983 and incorporated into their leasehold. However, Huntley also lost their contract with AI&S in 1982 and was operating solely to supply coal to the Tallawarra Power Station. In 1989, the Tallawarra Power Station was closed and the mine also closed in the same year.

The entries to Avondale Colliery were sealed in 1993 and the then Department of Mineral Resources (DMR) approved the Rehabilitation Plan for the Huntley and Avondale Collieries in 1998. Rehabilitation works included the maintenance of access to the Avondale portals and works to make the Huntley site suitable for a proposed golf course.

NRE purchased the Avondale coal lease and the un-mined portion of the Huntley lease from HTT Huntley Heritage Pty Ltd, and combined them to form a new mining lease for the area (ML 1565).

In 2005, NRE was granted approval to re-open two of the Avondale portals to undertake investigations into the quality of the Wongawilli Seam coal at this location. An application to DoP to extract coal from the Avondale Colliery lease areas followed in 2006, however this application was not progressed as NRE acquired the Elouera Lease (ML 1596) in 2007 and decided that it was preferable to access the Avondale workings from the NRE Wongawilli Colliery Pit Top.

2.2 Current Operations

NRE holds current Subsidence Management Plan (SMP) approval (granted in July 2009 by Industry and Investment NSW (I&I NSW)) for the mining of Longwalls 11,12,15,16,19 and, after a modification in June 2010, Longwall 20 at the NRE Wongawilli Colliery. Mining of Longwall 12 was completed on 26 November 2009 and extraction of Run of Mine (ROM) coal is currently occurring from Longwall 11.

The current NRE Wongawilli Colliery holdings comprise three mining leases described in **Table 2.1**.

Table 2.1 – NRE Wongawilli Colliery Leases

Lease	Expiry Date	Size (Ha)	Description
Consolidated Coal Lease (CCL) 766	9/10/2015	516	Underground and surface lease which makes up the south eastern portion of the NRE Wongawilli Colliery holdings and includes the former Avondale Colliery Pit Top. NRE has no underground workings proposed within this lease.
Mining Lease (ML) 1565	9/10/2015	3,177	Underground lease covering the south western portion of the colliery's holdings. Former Avondale Leases have been incorporated.
Mining Lease (ML) 1596	18/10/2015	11,074	Underground and surface lease covering the former Wongawilli and Nebo workings, Nebo (No.3 and No.4) and Wongawilli Ventilation Shafts and the NRE Wongawilli Colliery Pit Top. Former Elouera Leases have been incorporated.

On 13 August 2009, NRE lodged a Part 3A Application to DoP (MP 09_0161) for the continuation of mining activities in the Elouera domain including the extraction and transportation of up to 2 Mtpa of ROM coal. As part of this application, NRE applied for the extraction of a further six longwall blocks from the Nebo domain and the development of the western drivage from the NRE Wongawilli Pit Top to the proposed western areas in the locality of the Wongawilli No.2 Ventilation Shaft. This application is currently under assessment by DoP.

As part of the application to continue mining operations in the Nebo domain, NRE also applied to DoP for approval to construct the western drivage and first workings in the western areas. Construction of the western drivage will involve the development of four ~5.5 m wide headings and interconnecting cut-throughs by continuous miners.

These will provide:

- Access to the mining areas within the Wongawilli Seam
- Ventilation airways
- Corridors for personnel and vehicle movements
- Corridors for the coal clearance system.

The construction of the western drivage and first workings will result in the extraction of some ROM coal from these areas, however the primary purpose of this development is to support potential future longwall mining (or secondary extraction) in the mining areas.

2.3 Future Operations

After the completion of mining in the currently approved Nebo and Elouera domains (within ML 1596), NRE intends to commence mining in the western areas (within ML 1596 and ML 1565).

NRE anticipates that the development of the western areas will increase production capacity at the colliery from the current 2 Mtpa to ~6 Mtpa by 2015. In order to achieve this NRE intends to:

- Complete the western drivage to and main roads for the proposed western areas in ML 1596 (as part of current application MP 09_0161).
- Construct a new ventilation shaft (including services to the site) to provide air to the workings in the western areas (*this application*).
- Upgrade and expend the NRE Wongawilli Colliery surface facilities and supporting infrastructure to enable the handling and transport of up to 6 Mtpa of ROM coal to PCKT for export to India.
- Develop the proposed western extraction areas to extract Wongawilli Seam coal in ML 1596 and ML 1565.

This PEA forms part of the Major Project Application to DoP for the construction and operation of the new upcast ventilation shaft.

NRE has made a strategic decision to stage the applications for the abovementioned developments to meet the necessary requirements of the colliery's development forward planning and this approach has been endorsed by the DoP. A justification of the staged approach is provided in **Section 4.1**.

2.4 Existing Ventilation System

Underground mines require adequate ventilation to provide safe, breathable air for employees underground and to maintain a non-explosive underground atmosphere for the safe operation of equipment. Adequate ventilation to ensure a safe and efficient underground working environment is an integral component of underground coal mining.

Ventilation of an underground mine primarily consists of two air flows; being intake air from mine entries and exhaust Mine Ventilation Air (MVA) which exits the mine via upcast ventilation shafts. Mine ventilation systems typically function by fans at the surface of each upcast ventilation shaft drawing or "sucking" air using negative pressure through the surface entries of the mine such as portals, adits, drifts and downcast ventilation shafts, thus creating circulation through the underground workings. The distance between the upcast ventilation shaft (where the ventilation air exits the mine) and the portals, adits, drifts and downcast ventilation shafts (where the air enters the mine) can be significant. This, and the large extent of underground mine workings, means the ventilation shaft fans must be powerful enough, and of an adequate number, to reliably circulate required volumes of air throughout the mine.

A summary of the current ventilation system at NRE Wongawilli Colliery is provided below (ERM, 2010). **Figure 1** shows the locations of this infrastructure.

- The Nebo No.3 Shaft is located 5 km north-northeast of the NRE Wongawilli Pit Top. The 3.6 m diameter shaft is currently servicing the mine as a downcast shaft. A drive house and foundations are still present on the site, however the fans have been removed.
- The Nebo No.4 Shaft is located 4.5 km north of the NRE Wongawilli Pit Top. The 5 m diameter shaft is currently servicing the mine as an upcast shaft. Infrastructure which supports the operation of the No.4 Shaft includes a drivehouse, two fans and ducting and an electrical substation. The fans at the Nebo No.4 Shaft have a combined capacity to exhaust 250 m³/s of MVA from the mine workings.
- A number of mine portals located on the escarpment provide air intakes for the mine. These portals will be rehabilitated at such a time as they are no longer required for ventilation purposes.
- The Nebo No.1 and No.2 Shafts have been sealed and are no longer in use. The Wongawilli No.1 Shaft has been decommissioned but not fully sealed. The fan housing and electricity substation are still present at this site although the fans have been removed.

The current NRE Wongawilli Colliery ventilation system services the Nebo and Elouera domains, which is a separate mining area to the proposed western areas. The ventilation requirements in the western areas will need to be met through an entirely new ventilation system as the western areas will be a new mining area completely isolated from the colliery's existing underground workings.

2.5 Future Ventilation Requirements

During the initial phases of development of the western drivage, NRE propose that ventilation be provided by temporary fans located at the newly constructed portals at the NRE Wongawilli Colliery Pit Top (ERM, 2010).

Three new portals located at the NRE Wongawilli Pit Top (for man and materials access and the conveyance of coal) will support mining in the western areas. These portals will also provide the required air intakes for the development of the western areas.

Such an arrangement is only a temporary solution, as fans located at the pit top will become less effective as the development of the western drivage progresses away from the pit top. Due to the size and capacity of the temporary fans and the long distance of the proposed western drivage, these temporary fans will be insufficient to service development areas located further from the pit top than the proposed Wongawilli No.2 Ventilation Shaft location. NRE therefore propose to construct an upcast shaft at this location to provide the required ventilation capacity to service the western areas.

It is anticipated that the required capacity of the No.2 Ventilation Shaft will be ~300m³/s. It is expected that the ventilation shaft will have an operational life of at least 20 years and will service the further development and subsequent mining of the proposed extraction of the western areas, once operational.

Further mine planning will be required to be undertaken by NRE before more detailed assessments of future ventilation needs (including requirements for additional shafts) can be undertaken.

3 Proposed Development

This section provides a description of the works proposed to be undertaken as a part of the Wongawilli No.2 Ventilation Shaft Project.

The main aspect of the development proposed in this application is a new upcast ventilation shaft (Wongawilli No.2), associated extraction fans and ancillary surface infrastructure to ensure a reliable and adequate supply of ventilation air to employees underground.

The proposed development primarily comprises of the construction and operation of:

- Ventilation shaft (5.5 m diameter to a depth of ~320 m) and supporting infrastructure.
- Surface to in-seam boreholes for the provision of power and water to the underground workings.
- Upgrades to power supply infrastructure at the NRE Wongawilli Pit Top (including new HV substation and switchyard).

3.1 Location and Existing Land Use

The proposed Wongawilli No.2 Ventilation Shaft Site is located west of Wollongong, approximately 5 km west of the NRE Wongawilli Colliery Pit Top and near the southern arm of Lake Avon (refer **Figure 1**).

The shaft site and the majority of the associated infrastructure, including the powerlines, switchyard and water supply are proposed to be located within the Metropolitan Special Area on Lot14/DP1092321, which is owned and managed by the SCA.

The powerline from the NRE Wongawilli Colliery Pit Top to the shaft site will pass through land owned by NPWS (Lot 4/ DP255284) and new power supply infrastructure will be constructed on the NRE Wongawilli Pit Top. There are also a range of lots located along the length of the access road to the site, from Harry Graham Drive, which may be impacted on by road upgrade works.

A formal description of the land which may be affected by the proposed development and identification of the relevant land owner is provided below. The works proposed on each parcel are shown in **Figure 2**.

- Lot 14 // DP1092321 (SCA)
- Lot 4 // DP255284 (NPWS)
- Lot 423 // DP1123956 (Freehold – NRE Wongawilli Colliery Pit Top)
- Lot 424 // DP1123956 (Freehold – NRE Wongawilli Colliery Pit Top)
- Lot 425 // DP1123956 (Freehold – NRE Wongawilli Colliery Pit Top)
- Lot 14 // DP255284 (Freehold – NRE Wongawilli Colliery Pit Top)
- Lot 2 // DP986776 (Freehold)
- Lot 172 // DP751278 (Freehold)
- Lot 2 // DP703700 (Freehold)
- Lot 1 // DP 1103781 (Freehold)
- Lot 1 // DP 986776 (Freehold)
- Lot 172 // DP 751278 (Freehold)
- Lot 1 // DP 551243 (Freehold)
- Lot 147 // DP 849733 (Freehold)
- Lot 18 // DP 255285 (Freehold)

- Lot 14 // DP 751278 (NPWS)
- Lot 282 // DP 751278 (NPWS)
- Lot 8 // DP 255285 (NPWS)
- Lot 1 // DP 740795 (NPWS)
- Unnamed Lot – Rail Reserve (ARTC)
- Unnamed Lot – Illawarra State Conservation Area (NPWS).

The existing landscape surrounding the shaft site can be described as natural bushland. A portion of the site has been previously cleared to facilitate NRE Wongawilli Colliery exploration activities and the construction of an exploration borehole.

The proposed shaft site is situated on the Woronora Plateau, around the tributaries that form the upper reaches of Lake Avon. The area is characterised by a sandstone plateau incised by drainage lines, forming steep sided valleys with exposed sandstone formations. The site slopes in a northwesterly direction with water runoff from the site naturally entering a gully which runs along the west of the site approximately 100 m from the proposed disturbance area. Water from the shaft site would eventually feed into Lake Avon, located approximately 1 km away.

The proposed access to the shaft site is along existing SCA fire trails from Mt Kembla. The Moss Vale to Unanderra (freight) Rail Line also passes through the locality. The proposed access to the shaft site crosses this rail line on two occasions.

The powerlines and telecommunications cable required to service the site are proposed to be co-located along the powerline route. Water to the shaft site will be provided via an aboveground pipeline from Lake Avon. The powerline and water pipeline routes have been designed to follow existing fire trails where possible to minimise disturbance and provide access to the easements for maintenance purposes (refer **Figure 2**).

3.2 Construction Phase

Prior to the commencement of shaft sinking activities, access to the shaft site will be established by the upgrade (if required) of the existing fire trails. It is anticipated that power and water supplies to the site will also be established prior to the commencement of the shaft sinking. If power is not available diesel generators will be utilised to provide power. The following activities will form part of the construction phase:

- Clearing of native vegetation to facilitate the construction of the shaft and supporting infrastructure.
- Design and implementation of a surface water management system for all areas of surface disturbance (including the ventilation shaft site, access roads, easements etc...).
- Management and on-site emplacement of excavated shaft and borehole spoil.
- Provision of additional construction phase infrastructure including concrete preparation area, compressors, diesel generators, diesel storage and an explosives magazine).

An option to run the powerlines from the NRE Wongawilli Colliery Pit Top to the top of the escarpment via underboring is being investigated. If the powerlines are unable to be underbored from pit top to the top of the escarpment this portion of the powerline may have to be comprised of overhead lines. The lines are proposed to be comprised of overhead lines for the remainder of their length to the shaft site.

The preferred powerline route to the shaft site runs along Fire Trail 15, which hugs the southern side of the most eastern arm of the Lake Avon before crossing the Lake and following Fire Trail 15G to the shaft site. The alternative powerline route is a longer route which follows the access fire trail to the site. This option will only be used if the preferred option is found to be unsuitable, however the impacts of utilising this route will also be assessed in the EA.

Power for the shaft drilling, construction phase (and operation of the extraction fans) will be provided via a new 33/11kV electrical switchyard to deliver power at approximately 415V. There are currently three options for the location of the switchyard. Option A, the preferred option, is to locate the switchyard in close proximity to the shaft site to minimise disturbance associated with its construction and maintenance. However, this requires further investigations as to the required earthing separation. Option B is located ~2 km from the shaft site along the preferred powerlines route. Option C is to locate the switchyard on the alternative power supply route, should this be required to be used.

During the construction phase, approximately 1 ML of water is anticipated to be required for construction activities such as concrete preparation, dust suppression and to provide water for site amenities and fire fighting purposes, if required. It is anticipated that the water will be sourced from a pumping station located on the shore of Lake Avon. There are two options for the supply of water from Lake Avon to the shaft site. The preferred option is to locate the water supply along the preferred powerline route as this will minimise disturbance. The alternative option, should the preferred powerline route not be viable, is to locate the pumphouse directly north of the shaft site. This site is a shorter distance from the shaft site, however the implementation of the pumphouse and pipeline in this location would require more clearing than the first option. It will therefore be assessed as a contingency option.

The proposed ventilation shaft will be constructed in a straight vertical line from the surface to intersect the mine workings ~320 m underground. It will access the headings in the western areas, which will form the basis of the future longwalls in the area. The location of the shaft has been determined based on the geometry of the underground workings, and in a designated area that is consolidated, structurally and geotechnically suitable and will remain "open" i.e. will not collapse or form part of the goaf (collapsed rock strata remaining after longwall mining roof supports are removed) as a result of mining induced subsidence.

Conventional drill and blast is the preferred method of shaft construction for the ventilation shaft. Drilling will be undertaken from the surface down to the required depth using a large diameter drill head that is rotated from a headframe at the surface. The process uses a drilling rig suspended from the headframe, with the actual drilling process being performed completely within the shaft. Blasting is used as required by the placement of explosives at the excavation face. It is anticipated that shaft construction works will be undertaken 24 hours a day, 7 days per week. The drill and blast technique is the preferred construction method for the Wongawilli No.2 Ventilation Shaft as it has a smaller disturbance footprint and requires smaller volumes of construction water as opposed to other methods, such as blind boring.

Spoil generated from the shaft construction will be progressively placed in the spoil emplacement area, which will also be progressively rehabilitated to minimise the area of surface disturbance. Storing this spoil on site will minimise vehicle movements associated with transporting the spoil off site. Emplacing the spoil on site will also make it available to be used in the rehabilitation of the shaft site, including to fill the shaft.

It is anticipated that the completed excavated shaft will be progressively lined with concrete or steel to prevent the collapse of the shaft sides and to reduce friction affecting the flow of air through the shaft during operation. The preferred option is to use shotcrete style concrete (prepared on site) to progressively line the shaft as it is constructed.

Once the sinking and lining of the shaft is complete, further construction work will be required to construct the fans, fan housings and evases. This infrastructure is anticipated to be ~6 m in height with a footprint of approximately 30 m by 50 m.

The service supply boreholes are anticipated to be approximately 200 to 300 mm in diameter, fully lined and of a similar depth to the shaft. They will intersect separate area of the mine workings not associated with the shaft. The boreholes will be designed to allow electricity, water and communications infrastructure to be supplied to the underground workings.

Surfacewater management measures, including clean water diversion drains and surface management water ponds will also be installed to manage dirty water generated during the

construction phase. The emplacement area and the other disturbed areas of the site will drain to the on site sedimentation ponds, designed to treat dirty water from the construction phase. **Figure 3** shows indicative locations of these ponds, however detailed design will be undertaken during the preparation of the EA.

Infrastructure expected to be present on the site during the construction phase includes:

- Drill rig and headframe
- Concrete preparation area
- Electric compressors/diesel generators
- Diesel storage tank
- Service boreholes
- Switch house
- Site amenities
- Carpark
- Water tank
- Explosives magazine
- Spoil emplacement area
- Water quality ponds and diversion drains.

Figure 3 provides an indicative construction phase layout for the proposed ventilation shaft site. Further detail on the shaft construction process will be provided in the EA. The construction phase of the project is anticipated to be approximately 18 months in duration.



Construction Layout

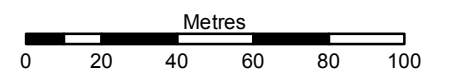
WONGAWILLI NO.2 VENTILATION SHAFT PROJECT

- Proposed Wongawilli No.2 Ventilation Shaft
- Service Boreholes
- Water Tank
- 5m Contour (NRE)
- 11kV Power to Switch House
- 33kV Route Option 1
- - - Alternative 33kV Route along Access Road
- Water Supply Overland Route
- - - Alternative Water Supply Overland Route
- ▭ Access Road
- ▭ Carpark
- ▨ Concrete Preparation Area
- ▭ Diesel Storage Tank
- ▭ Disturbed Area
- ▭ Drill Rig Infrastructure
- ▭ Explosives Magazine
- ▭ Shaft Spoil Area
- ▭ Site Amenities
- ▭ Switch House
- ▭ Electric Compressors/Diesel Generators
- ▭ Switchyard (Option A)
- ▭ Preliminary Water Quality Pond Locations

FIGURE 3



Scale 1:2,000 (at A3)



Map Produced by Cardno Wollongong
Date: 27/01/2011
Coordinate System: GDA 1994 MGA Zone 56
Project: 111032-01
Map: 1816_ConstructionLayout.mxd 08

Aerial imagery supplied by Near Map and associated third party suppliers (September 2010)



3.3 Operational Phase

The proposed extraction fan facilities at the Wongawilli No.2 Ventilation Shaft will consist of up to three centrifugal fans, connected in parallel, with vertical evases discharging approximately 300 m³/s of expired MVA. The fan facilities and shaft will be enclosed in ducting and housing.

The fans and other surface infrastructure will be powered via the electricity supply established to the site during the construction phase of the project.

During the operational phase, water use at the shaft site is anticipated to be limited to that required for maintenance and cleaning of the fans, site amenities (if they are present) and for underground fire fighting purposes, if required. It is anticipated that the water tank located on the shaft site will provide a continual gravity driven water supply to the new workings as a backup if the underground power is affected and firefighting water is required. The tank will be maintained at full capacity via a float valve or other system for this purpose.

The spoil emplacement area will be progressively rehabilitated as it is constructed to minimise the potential environmental impacts associate with the disturbed areas. It is anticipated that the water management ponds will be progressively rehabilitated as vegetation on the emplacement and other disturbed areas becomes established and they become redundant.

Operational phase infrastructure proposed at the Wongawilli No.2 Ventilation Shaft Site will include:

- Upcast ventilation shaft (including extraction fans and evases)
- Service boreholes
- Switch house
- Site amenities
- Carpark
- Water tank
- Spoil emplacement area (rehabilitated)
- Switchyard (on or near to the shaft site).

Figure 4 provides an indicative site layout plan for the operational phase. Further detail on the operational infrastructure will be provided in the EA. It is anticipated that the Wongawilli No.2 Ventilation Shaft will be operational for at least 20 years.



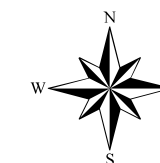
Operational Layout

WONGAWILLI NO.2 VENTILATION SHAFT PROJECT

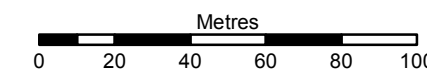
Legend

- Proposed Wongawilli No.2 Ventilation Shaft
- Service Boreholes
- Water Tank
- 11kV Power to Switch House
- 33kV Route Option 1
- Alternative 33kV Route along Access Road
- Water Supply Overland Route
- Alternative Water Supply Overland Route
- 5m Contour (NRE)
- Access Road
- Carpark
- Extraction Fan Facilities
- Shaft Spoil Area
- Site Amenities
- Switch House
- Switchyard (Option A)
- Water Quality Pond

FIGURE 4



Scale 1:2,000 (at A3)



Map Produced by Cardno Wollongong
 Date: 27/01/2011
 Coordinate System: GDA 1994 MGA Zone 56
 Project: 111032-01
 Map: 1809_OperationalLayout.mxd 10

Aerial imagery supplied by Near Map and associated third party suppliers (September 2010)

3.4 Rehabilitation

The rehabilitation planning process is currently under review in accordance with the *Mining Amendment Act 2008*. I&I NSW released draft Rehabilitation Environmental Management Plan (REMP) Guidelines for public comment in June 2010. Final guidelines had not been released prior to the preparation of this PEA.

NRE propose to undertake any future rehabilitation works in accordance with the legislative requirements at the time that rehabilitation occurs. The following guidelines outline the current best practice requirements for site rehabilitation:

- *Mine Rehabilitation – Leading Practice Sustainable Development Program for the Mining Industry* (Commonwealth of Australia).
- *Mine Closure and Completion – Leading Practice Sustainable Development Program for the Mining Industry* (Commonwealth of Australia).
- *Strategic Framework for Mine Closure* (ANZMEC).
- *EDG01 Borehole Sealing Requirements on Land: Coal Exploration* (DMR, 1997).
- *Guidelines for the Permanent Filling and Capping of Surface Entries to Coal Seams* (DPI, 2005).
- Other relevant I&I NSW guidelines.

As the proposed location of the shaft site is within the Metropolitan Special Area it is currently assumed that the site (and other areas disturbed by the project) will be returned to as close as possible to their pre-mining condition of natural bushland. Once rehabilitation of these areas is complete it is anticipated that they would be returned to the management of the SCA.

Due to the long operational life expectancy of the proposed development, it is premature to set rehabilitation completion criteria prior to the undertaking of any specialist studies or consultation with the relevant stakeholders.

The performance indicators and outcomes for the disturbed areas associated with this project will be further developed on an as needs basis subject to the outcomes of further investigations closer to the time of rehabilitation.

Progressive rehabilitation will be undertaken at the shaft site and other disturbed areas as required to minimise the environmental footprint of each site and the future rehabilitation liability. This will include the revegetation of disturbed areas and the removal of superfluous surface water management ponds as they become redundant post-construction.

When the ventilation shaft is no longer required by NRE, an appropriate stakeholder consultation process will be developed by NRE to enable all stakeholders to have their interests considered during the rehabilitation process.

Further detail regarding the requirements for the rehabilitation of the areas associated with the Wongawilli No.2 Ventilation Shaft Project and of the proposed progressive rehabilitation works will be provided in the EA.

The EA will further demonstrate that the project considers and accords, where feasible and reasonable, with the requirements of Ecologically Sustainable Development (ESD).

4 Project Justification

This section provides the justification for the proposed development.

4.1 Staged Approach to Application

NRE has made a strategic decision to stage the applications for the development of Wongawilli No.2 Ventilation Shaft and the proposed mining of the western areas as detailed in **Section 2.3**.

This decision has been guided by NRE's anticipated mining timeframes (refer **Table 4.1**) and factors influencing the timing of each aspect of the development. These include the requirement to gather two years of baseline data prior to the application for approval of a new mining domain (in accordance with the findings of the Southern Coalfield Inquiry) and the long lead times required for ventilation shaft construction.

Table 4.1 – NRE Wongawilli Colliery Expansion Project Timeframes

Task	Application	Anticipated Approval Date	Anticipated Completion Date
Western Drivage	MP 09_0161	April 2011	May 2013
Wongawilli No.2 Ventilation Shaft	Current Application	August 2011	April 2013
NRE Wongawilli Colliery Pit Top Surface Upgrades		May 2012	October 2014
Mining of Western Areas (Avon Domains)		July 2013	October 2014 (Commencement of mining)

NRE will collect two years of baseline data in the proposed western areas prior to the commencement of mining to assist in determining and assessing the potential impacts of mine subsidence. Baseline monitoring is proposed to commence in early 2011 and as such NRE will not be able to submit an application for the mining of these areas until 2013.

Due to the long lead times associated with the construction of a ventilation shaft (~18 months), NRE require approval for the Wongawilli No.2 Ventilation Shaft prior to the proposed submission date for the application to undertake mining in the western areas in 2013. The construction of the Wongawilli No.2 Ventilation Shaft is required to commence in late 2011 to ensure that it is operational in time to meet the ventilation requirements of the western drivage and then service the development and mining of the western areas should this application be approved.

If the application for the Wongawilli No.2 Ventilation Shaft Project is not undertaken prior to the application to mine the western areas, the required surface infrastructure would not be constructed in time to support the planned extraction timeframe, as shown in **Table 4.1**.

NRE understands that undertaking the first workings, and gaining approval to construct the Wongawilli No.2 Ventilation Shaft does not guarantee the subsequent approval of mining in the western areas. As such, NRE is aware that there are inherent risks in preparing and submitting applications for the Wongawilli No.2 Ventilation Shaft and NRE Wongawilli Colliery Surface Facilities Upgrade Projects prior to approval of mining in the western areas.

NRE is willing to accept this risk for the reasons outlined above. If these applications are not undertaken prior to (or concurrently with) the application to mine the western areas, the required surface infrastructure would not be constructed in time to support the planned extraction timeframe.

Should this scenario occur, whereby production at the colliery would have to halt until the required developments are operational, this would affect the supply of coal to customers. This, in turn, would

decrease the flow on effects to the local and regional economies such as the continuation of employment for mine workers, direct investment in local communities by NRE and the payment of royalties to the state government.

NRE are committed to undertaking detailed environmental assessments in accordance with the appropriate legislation and stakeholder requirements, in conjunction with continued agency and community consultation throughout the application process.

4.2 Alternatives Considered

4.2.1 Alternative Ventilation System Arrangements

The proposed western areas of the NRE Wongawilli Colliery are essentially a new mining domain to the existing operations, which will be serviced by their own portals and will not be linked to the existing mine workings. As the western areas will not be connected to the existing mine workings there are also no options to provide ventilation to these areas via upgrades to the existing NRE Wongawilli Colliery ventilation system.

As such a new ventilation system will be required to service these areas and provide an adequate and reliable supply of fresh air to the underground workings.

Essentially, there are no alternative methods for ventilating new underground mines than by the implementation of ventilation shafts. The first workings in the western areas will be serviced temporarily by fans located at the portals, however this is not a viable long term option for the ventilation of the western areas. As such, NRE believe that the only long-term viable solution for the ventilation of the western areas is the construction of an upcast ventilation shaft.

4.3 Alternative Shaft Locations

The proposed Wongawilli No.2 Ventilation Shaft and associated infrastructure have been positioned to fit in with the layout of the underground workings. The proposed shaft location also takes into account the local underground geology and is designed to minimise the potential impacts on surface features and the environment.

Alternative locations for the shaft were considered by NRE (such as a site to the east of Gallahers Creek) but deemed unsuitable, or inferior to the currently proposed site, due to a range of factors including:

- Proximity to proposed future mining areas
- Geometry of proposed underground workings
- Surface and underground geology
- Proximity to existing services (including pre-existing fire trails)
- Location of existing disturbed areas on the surface (to minimise necessary vegetation clearing)
- Distance from portals and other intake arrangements required for the ventilation system to operate effectively and efficiently.

4.3.1 Alternative Utility Supply Options

A range of options for the supply of utilities the NRE Wongawilli No.2 Ventilation Shaft Site have been presented in this PEA as shown in **Figure 2**.

In all cases the preferred options have been chosen in an attempt to minimise the impact of the proposed development by utilising existing access roads and disturbed areas. Specialist studies

undertaken for the EA, or even construction works, may reveal constraints that render the preferred options unfeasible. As such, it is advisable to have contingency options for all utilities so the discovery of a new constraint does not significantly impact on the development timeframes.

The proposed development described in **Section 2.2** of this report represents the preferred option for development and will be the proposal NRE seeks approval for from DoP. A full assessment of all options will be presented in the EA.

4.3.2 Alternative Shaft Construction Methods

In addition to the chosen drill and blast construction method, NRE also considered construction of the shaft using the blind boring method. This was deemed unsuitable for the Wongawilli No.2 Ventilation Shaft as blind boring requires large amounts of water which at this location would be required to be sourced from Lake Avon. The process water used in the shaft construction would also be required to be treated to a level acceptable for discharge into Sydney's drinking water catchment and there is a risk of pollution events if the process ponds were to overflow during a significant rainfall event. This method is therefore deemed to have a higher risk of possible adverse environmental impacts than the drill and blast method.

4.4 Consequences of Not Proceeding

If the development proposed in this Part 3A application does not proceed, there would be no adequate ventilation to service the development and subsequent mining of the western areas of the NRE Wongawilli Colliery. Precluding mining from moving into the western areas would result in a significant amount of lost production from NRE Wongawilli Colliery. This would have following effects:

4.4.1 Financial

If mining in the western areas does not progress, the NSW Government would suffer a loss in mining related taxes, charges and royalties and the communities which rely on these mines for the majority of household incomes would be significantly impacted. The estimated Capital Investment Value (CIV) of the project is \$40M.

4.4.2 Employment

If mining in the western areas cannot be undertaken due to a lack of appropriate ventilation this would reduce the number of NRE mining and surface employees in the Illawarra from approximately 2013 onwards, because coal production and processing volumes would drop significantly due to the completion of mining at in the Nebo and Elouera domains.

If NRE are unable to undertake any operations in the western areas this may also lead to the early closure of the mine, which would significantly decrease employment created by NRE in the Illawarra.

It is envisaged that once mining operations in the Nebo and Elouera domains are completed, mining in the western areas will commence. If this does not occur as a result of the proposed development not proceeding, this would result in a loss of employment to the region.

4.4.3 Customer Requirements

NRE would be unable to meet their customer requirements from 2013 onwards if they cannot access all the financially viable coal reserves within the mining lease areas or extract coal in an efficient manner from the western areas. This may result in customers sourcing coal from other Australian states or another country.

5 Regulatory Framework

This section outlines the current regulatory framework within which NRE operate and the relevant Acts and policies which apply to the project.

5.1 Planning Approach

Section 1.4 of this PEA identifies that the proposed development has the characteristics of a Major Project. Consequently on receipt of this PEA and the accompanying application, the Minister will be requested to confirm the development is a 'Major Project' under *SEPP (Major Development) 2005* and issue the DGRs. The EA will be prepared and lodged following receipt of the DGRs and the Minister will assume the responsibility of the consent authority.

5.2 Federal Guidance & Controls

The EA will assess relevant Federal legal controls as follows:

- **Environment Protection & Biodiversity Conservation Act 1999** – the EA appraise whether the proposal will have any significant impact on a location or species listed under this Act.
- **Greenhouse Gas Emissions** – the Federal Government provides requirements and guidance on GHG emissions through a variety of legislation and regulations. **Section 9** of this PEA provides further detail on this topic. The EA will address these policies and obligations under the relevant legislation.

5.3 State & Strategic Planning Controls

The EA will assess relevant state planning controls and strategic planning guidance. This will include a review of the following polices:

- **Environmental Planning & Assessment Act 1979** – the proposed development is applicable for determination under Part 3A of this Act. This PEA and the subsequent EA will be prepared in accordance with this legislation.
- **Environmental Planning & Assessment Regulation 2000** – the EA will demonstrate that this Part 3A application is in accordance with the requirements of this regulation.
- **Mining Act 1992** – underground coal mining is subject to approvals and titles granted under the *Mining Act 1992*. These titles provide the control mechanism for government by stipulating tenure, operating and environmental conditions. The EA will demonstrate how the proposed development is in accordance with activities permitted by the *Mining Act 1992*. A separate application will also be made under this Act to obtain a mining lease for the proposed development.
- **Protection of the Environment Operation Act 1997** – existing site Environment Protection Licenses (EPL) may need to be varied to incorporate the works in this application. The EA will review this requirement. It is not anticipated that the proposed development will require the creation of a new EPL.
- **Threatened Species Conservation Act 1995 and National Parks & Wildlife Act 1974** – the EA will include assessments of the development areas by a specialist environmental and cultural heritage consultant.
- **Water Act 1912 and Water Management Act 2000** – the EA will include an assessment of the proposal under these Acts. It is not anticipated that any permits will be required to be obtained under these Acts.

- **Sydney Water Catchment Act 1998** – as the proposed shaft site is located within the Metropolitan Special Area the EA will assess the potential environmental impacts with due consideration to the requirements of this Act.
- **Sydney Water Catchment Management Regulation 2008** – covers all of the SCA's area of operations and SCA to exercise certain powers under the POEO Act in relation to pollution sources that impact on water quality in catchment areas. The EA will assess the potential impacts of the proposal against the requirements of the POEO Act.
- **State Environmental Planning Policy (Major Development) 2005** – this SEPP guides the type of developments to which Part 3A of the EP&A Act is applicable. The EA will include confirmation of this SEPPs applicability to the proposed development.
- **State Environmental Planning Policy (Mining, Petroleum, Production & Extractive Industries) 2007** – the EA will review this SEPP and assess the proposed development against the applicable policies.
- **Drinking Water Catchments Regional Environmental Plan No.1** – the EA will include an assessment of the Neutral or Beneficial Effect (NoBE) of the project on water quality as required by this REP. The assessment will also demonstrate that the proposed development will incorporate any current recommended practices and performance standards endorsed or published by the SCA.
- **Illawarra Regional Environmental Plan No. 1** – the EA will review policies in this Plan and assess the development against relevant controls and directions.
- **Illawarra Regional Strategy 2006 (31)** – the EA will review policies in this Plan and assess the development against relevant controls and directions.

5.4 Local Planning Controls

The entire development as proposed in this Part 3A application is located within the Wollongong City Council (WCC) Local Government Area (LGA). The Wollongong Local Environment Plan (WLEP) 2009 applies to the majority of the Wollongong LGA. A portion of the project area is also subject to the Wollongong (West Dapto) LEP 2010. Both of these LEPs have been prepared under the new standard template for NSW and are intended to be amalgamated. As such they are discussed together in this report.

Figure 5 identifies the land use zoning within the project area including the proposed Wongawilli No.2 Ventilation Shaft Site, Wongawilli Pit Top and surrounding areas. Although the suitability of the proposed development within these zonings are considered below, there is no requirement for the development to be undertaken in accordance with these zonings due to the anticipated classification of the development as a Major Project under the Major Development SEPP.

5.4.1 Wollongong Local Environment Plan 2009 and Wollongong (West Dapto) LEP 2010

The proposed Wongawilli No.2 Ventilation Shaft is zoned E2 under the WLEP 2009, however is located within the Metropolitan Special Area, which is owned and managed by the SCA. The remainder of the development, including the powerlines from the NRE Wongawilli Colliery Pit Top to the shaft site, water pipeline from Lake Avon and upgrades to the access roads may interact with the following zonings from the WLEP 2009 and W (West Dapto) LEP 2010:

Table 5.1 – Project Area Zoning (WLEP 2009)

Locality	Zone	Zone Name	Land Owner/ Manager	Mining permissible under WLEP 2009
Shaft Site	E2	Environmental Conservation	SCA	No
NRE Wongawilli Colliery Pit Top	RU1	Primary Production	NRE/ WCC	Yes
Rail Corridor	SP2R	Infrastructure (Road and Rail)	ARTC	No
Lake Avon	SP2	Infrastructure	SCA	No
Land directly to the west of the pit top	E1	National Parks and Nature Reserves	NPWS	No

The EA will include an assessment of the proposed development against the relevant policies. Notwithstanding, it is noted that the proposed development is classified as a Major Project under the Major Development SEPP and as such mining is permissible regardless of the zonings.

5.4.2 Wollongong Development Control Plan 2009

The Wollongong Development Control Plan (DCP) 2009 relates to the entire project area, including the area covered by the W (West Dapto) LEP 2010.

The DCP is not directly applicable to the proposed development as it is being determined under Part 3A of the EP&A Act. However, the EA will identify the parts of the DCP that have relevance to the project and identify how the works comply with the requirements, or what suitable alternatives approaches are to be taken.

6 Consultation

This section describes the consultation which has been undertaken by NRE and that which is proposed.

6.1 Agencies

NRE has consulted with DoP during the early stages of the Part 3A application. A project description has been provided to DoP and DoP have advised of the relevant stakeholders to be consulted regarding the proposed development. NRE propose to contact these agency stakeholders and report all comments to DoP to expedite the determination of this application.

NRE has contacted the SCA in relation to the proposed development, and has provided them a project description. NRE will continue to liaise closely with the SCA as the project progresses.

NRE will liaise with government agencies and other stakeholders as required throughout the project, to discuss and confirm requirements, source information and to discuss outcomes of environmental assessments. Consultation with the following stakeholders is anticipated to occur during the preparation of the EA for the Wongawilli No.2 Ventilation Shaft Project:

- Government Ministers
- Department of Planning (DoP)
- Sydney Catchment Authority (SCA)
- Department of Environment, Climate Change & Water (DECCW)
- National Parks and Wildlife Service (NPWS)
- Wollongong City Council (WCC)
- Department of Industry & Investment NSW (I&I)
- NSW Roads & Traffic Authority (RTA)
- Australian Rail Track Corporation (ARTC).

6.2 Community

NRE Wongawilli Colliery is in ongoing consultation with the local community through quarterly community meetings and regular community newsletters. NRE has introduced the community to the planned expansion of mining activities at the NRE Wongawilli Colliery into the western areas through these meetings.

NRE intend to undertake project specific consultation regarding the Wongawilli No.2 Ventilation Shaft Project at their regular quarterly community meetings from early 2011. Additional information regarding the No.2 Ventilation Shaft Project will be provided to the community, as required. Community consultation will continue throughout the application process.

No communities have been identified as being directly affected by the construction and operation of the Wongawilli No.2 Ventilation Shaft itself due to its location within the Metropolitan Special Area and the significant distance to residential areas. Community consultation will therefore be limited to general discussions about the project and targeted consultation with small groups who may be affected by potential secondary impacts from the proposal.

The EA will further describe all consultation with the community and identify concerns raised throughout the Part 3A application process.

7 Preliminary Risk Assessment

This section provides a preliminary assessment of the potential environmental risks associated with the project.

7.1 Introduction

The basis for identification of potential environmental risks and/or impacts is an appreciation of the site location and an understanding of the project, including the process proposed and technology utilised to construct the ventilation shaft and associated infrastructure. This understanding is achieved through background research on similar projects, site visits and liaison with stakeholders and NRE project experts. This preliminary risk assessment provides direction and context for the identification of potential environmental impacts from the proposed development and the anticipated required potential impact assessments required to be undertaken in the future EA.

This preliminary risk assessment is based on an index formed from the perceived likelihood of an occurrence and the subsequent consequence of that occurrence, using the process outlined in the Australian Standard AS/NZS 4360:2004 *Risk Management*.

Both likelihood and consequence are measured on a scale of 1 to 5 (with 1 corresponding to improbable/negligible and 5 corresponding to frequent/catastrophic). A subsequent index is developed and all identified risks classified as belonging to either 'Low', 'Moderate' or 'High' risk categories (refer **Table 7.1**). This is a conservative index, emphasising the number of Moderate and High risks identified.

Table 7.1 – Environmental Risk Assessment Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Improbable	Low	Low	Low	Moderate	Moderate
Remote	Low	Low	Low	Moderate	High
Occasional	Low	Moderate	Moderate	High	High
Probable	Moderate	Moderate	Moderate	High	High
Frequent	Moderate	High	High	High	High

7.2 Risk Categories

The following potential environmental impacts were assessed in accordance with the aforementioned methodology and the results are presented in **Table 7.2**.

- Biodiversity
- Visual
- Traffic
- Noise and vibration
- Greenhouse Gas (GHG) emissions
- Water resources
- Aboriginal and European cultural heritage
- Air quality
- Sediment and erosion control
- Surface water management

- Bushfire
- Utilities
- Waste management.

Each of these factors is then allocated a risk category, and this is used to determine the Key Environmental Impacts (refer **Section 8**) and the Secondary Environmental Impacts (refer **Section 9**) associated with the proposal.

Table 7.2 – Preliminary Environmental Risk Assessment

Environmental Impact	Process/Activity	Potential Impacts from Proposed Development	Risk
Biodiversity	<p>Removal of trees and habitat to allow facilitate construction works.</p> <p>Excavation works during construction.</p>	<p>Reduction in habitat quality and quantity from removal of trees, shrubs and other habitat features such as logs and leaf litter.</p> <p>Decline in the diversity and abundance of fauna species utilising the site for habitat and foraging.</p> <p>Injury to fauna due to increased traffic along fire trails and access roads during the construction phase.</p> <p>Introduction of weed species to the site and along fire trails from construction vehicles.</p> <p>Impacts to fauna from night lighting.</p> <p>Refer Section 8 for further information.</p>	<p>MODERATE/HIGH</p> <p>The proposed shaft site is located within the Metropolitan Special Area, which is a protected area that has been subject to minimal past disturbance.</p> <p>The possible presence of threatened species will require consideration in the EA and management if they are found to be present or potentially impacted by the proposed development.</p> <p>Potential impacts will be mitigated through the progressive rehabilitation of disturbed areas during operational phase. Offset measures may be considered in EA if deemed to be required.</p>
Visual	<p>Construction activities including height of drill rig headframe.</p> <p>Construction traffic.</p> <p>Lighting requirements for night time construction.</p> <p>Operational infrastructure.</p>	<p>Construction equipment, such as the drill rig headframe may be visible from some public vantage points.</p> <p>Transient impacts from heavy vehicle movements thought Mt Kembla and Wongawilli.</p> <p>Utility infrastructure (such as overhead powerlines) may be visible from some public vantage points.</p> <p>Alteration of visual character of a small portion of the Metropolitan Special Area.</p> <p>Refer Section 9 for further information.</p>	<p>LOW</p> <p>The proposed development is located in an area where there is no public access. There are also no known public vantage points which have direct or unobstructed views to the site.</p> <p>Some aspects of the proposed development, such as construction traffic and powerlines, will pass though areas where there is public access and the visual impact of these aspects will need to be considered in the EA and mitigated if required.</p>
Traffic	<p>Construction traffic.</p> <p>Operational and maintenance traffic (mainly light vehicles).</p>	<p>Short duration noise impacts and small amounts of dust may be generated by construction vehicles.</p> <p>Construction/improvement of access roads (if required) may also generate noise and/or dust emissions.</p>	<p>LOW/MODERATE</p> <p>Potential impacts from construction traffic will be minimised due to relatively short duration of construction phase.</p> <p>All traffic will be managed to minimise its impact on the surrounding areas.</p>

		<p>Attrition of SCA fire trails due to increased heavy vehicle use.</p> <p>Traffic delays on local roads due to increased heavy vehicle traffic during construction.</p> <p>Interaction between construction traffic and trains at the two rail crossings on the access road.</p> <p>Refer Section 9 for further information.</p>	<p>Construction traffic will be carefully managed in accordance with a Traffic Management Plan (TMP) to be prepared prior to the commencement of works.</p> <p>Appropriate approvals will be sought from ARTC to manage the potential interactions between project traffic and trains using the Moss Vale to Unanderra Rail Line.</p>
Noise and vibration	<p>Machinery and plant associated with construction activities.</p> <p>Operation of the extraction fans.</p>	<p>Noise and vibration associated with construction (i.e. blasting) and operation of the proposed development may impact surrounding receivers.</p> <p>Reduction in public amenity during operational activities.</p> <p>Refer Section 9 for further information.</p>	<p>LOW</p> <p>The shaft site is located in a remote area, where public access is prohibited. There is minimal risk of noise impacts occurring as the proposed ventilation shaft is located a significant distance from local townships, with the nearest residential receiver being approximately 5 km away.</p> <p>All feasible and reasonable measures will be undertaken to minimise noise emissions during the construction and operation of the No.2 Ventilation Shaft Project and any construction impacts will be temporary in nature.</p>
GHG emissions	<p>GHG emissions generated from vehicles and machinery used during the construction and operational phases.</p> <p>Operation of fans.</p>	<p>Contribution to local, state, national and global GHG emissions.</p> <p>Refer Section 9 for further information.</p>	<p>LOW</p> <p>Minor contributions to existing GHG emissions are expected from vehicles and equipment used in the construction and operation of the Wongawilli No.2 Ventilation Shaft and electricity used during the operational phase.</p> <p>GHG emissions from the mining of the western areas are not attributable to the Wongawilli No.2 Ventilation Shaft Project as they do not directly result from the construction or operation of the shaft. It is anticipated that they will be accounted for as part of future applications to mine these areas.</p>
Water resources	<p>Supply of ~1 ML of water from Lake Avon to the shaft site for construction and fire fighting purposes.</p> <p>Minor water use during the operational phase.</p>	<p>Loss of storage from Lake Avon.</p> <p>Cross-contamination of groundwater during shaft excavation.</p> <p>Refer Section 9 for further information.</p>	<p>LOW</p> <p>The amount of water required by the project is minimal in comparison to the volumes of stored water in Lake Avon.</p> <p>Water for the project is intended to be sourced under SCA licences.</p> <p>The lining and sealing of the shaft will prevent the cross contamination of groundwater after the construction phase.</p>

Aboriginal and European cultural heritage	Excavation works (including shaft construction) and clearing during construction, including site establishment and access road upgrades (if required).	Damage to aboriginal or non-aboriginal cultural heritage site, area or item. Reduction to heritage value of the site/s if present. Refer Section 8 for further information.	MODERATE/HIGH Aboriginal archaeological sites may be present in the locality and may potentially be affected by excavation works. Survey for archaeological sites will be undertaken by a specialist consultant and the results provided in the EA. During works NRE will avoid these sites, where possible, or mitigate potential impacts as dictated by the specialist heritage consultant. The major European historical features of the area are the Avon Dam wall and the Moss Vale to Unanderra Railway. Both are located several km from the proposed ventilation shaft site, however the access road will interact with the rail line. Any identified impacts will be assessed further in the EA.
Air quality	Dust and particulate matter produced from construction activities. Odour and particulate matter emitted in Mine Ventilation Air (MVA).	Short term respiratory problems for employees as a result of reduced air quality during construction. Dust settlement in or on Lake Avon increases suspended solid content and turbidity. Operational odour impacting employees involved in maintenance roles. Refer Section 9 for further information.	LOW Potential dust impacts from the construction activities will be temporary in nature and mitigation and management measures will be implemented to reduce possible impacts. The location of the proposed site is such that residential receivers are unlikely to be significantly impacted by particulate matter or odour emitted from the vent shaft in MVA due to the large distances between them and the site. It is further anticipated that dust would settle out of the MVA prior to reaching Lake Avon.
Surface water management	Creating of impervious or hardstand areas. Emplacement of shaft spoil on site.	Increased runoff from impervious areas. Contaminants from the emplaced shaft spoil entering local waterways. Refer Section 8 for further information.	MODERATE Given the proximity of the shaft site to Lake Avon, a surface-water management system will be implemented for all areas of surface disturbance as part of key objectives for proposed development. This will include clean water diversion drains and sedimentation ponds. NRE will be required to demonstrate that water management on the site achieves compliance with the SCA's Neutral or Beneficial Effect (NoBE) requirements for water quality.
Sediment and erosion control	Exposure of soils during construction of proposed development. Vegetation clearance	Uncontrolled surface water and sediment laden runoff moving offsite due to steep topography. Increased sediment generation from cleared vegetation and vehicle access tracks.	MODERATE Soil and water management controls, including surface stabilisation techniques will be implemented where necessary, to minimise the impacts associated with high-intensity rainfall.

	<p>causing soil instability and exposure at the shaft site and along access roads and utility easements.</p> <p>Increased runoff from developed areas.</p>	<p>Turbid runoff entering Lake Avon, altering aquatic environment and affecting drinking water quality.</p> <p>Refer Section 8 for further information.</p>	<p>Sediment and erosion controls will be implemented for all parts of the proposed development in accordance with the requirements of the “Blue Book” (Landcom, 2004).</p>
Bushfire	<p>On site ignition of fire due to construction or operation of ventilation shaft (e.g. hot works).</p> <p>Occurrence of a bushfire off site having effect on infrastructure or shaft operation.</p>	<p>Damage to project infrastructure from bushfire in surrounding areas.</p> <p>Damage to the surrounding environment from a bushfire started at the shaft site, or from other aspects of the development (such as high voltage switchyard).</p> <p>Refer Section 8 for further information.</p>	<p>MODERATE</p> <p>The proposed development is on land mapped as bushfire prone by WCC and is surrounding by significant native bushland.</p> <p>Appropriate mitigation measures (i.e. APZ) will be determined in the EA and these will be implemented at the site.</p> <p>Safe work methods for hot works and other high risk activities will be employed to minimise the risk of bushfire ignition on site.</p>
Waste management	<p>Generation of waste from construction and operation activities.</p> <p>Shaft spoil from excavated shaft.</p>	<p>Waste not being contained and disposed of in an appropriate fashion, resulting in the presence of waste on SCA landholdings within the project area and potential flow on environmental impacts.</p> <p>Improper containment of shaft spoil in emplacement area leading to adverse environmental impacts.</p> <p>Refer Section 9 for further information.</p>	<p>LOW</p> <p>There will be minimal waste generated from the project and appropriate measures will ensure sustainable disposal of waste produced from the project.</p> <p>Shaft spoil will be emplaced on site for future use in shaft rehabilitation. This minimises waste generation from the site and also minimises truck movements.</p> <p>The emplacement area will be serviced by the appropriate sediment and erosion controls, and will be progressively rehabilitated to minimise potential environmental impacts.</p>

8 Key Environmental Impacts

This section identifies key environmental impacts that will be assessed in further detail in the EA.

The EA will detail and assess the strategic implications of any potential impact from the proposed development that is considered significant. It is considered at this stage that the appropriate mitigation and management measures can be determined and adopted as required to reduce any of the potentially significant impacts associated with the proposed development.

8.1 Biodiversity

The project area is primarily located in the Metropolitan Special Area within a large expanse of intact vegetation that is part of Sydney's water catchment. As such, the majority of the vegetation surrounding the shaft site and proposed utility supply routes consists of native vegetation in good condition. There has been some pre-existing disturbance at the proposed shaft site to facilitate the construction of an access to an exploration borehole.

The distribution of vegetation in the locality of the subject site (i.e. 10 km radius) was mapped by NPWS (2003). Two vegetation communities occurring in the locality, being the Southern Highlands Shale Woodlands and Shale Sandstone Transition Forest are also listed as Endangered Ecological Communities (EECs) on the TSC Act and/or EPBC Act.

Niche Environment and Heritage (Niche) (2010) also undertook vegetation mapping of the NRE Wongawilli Colliery Pit Top and determined that there are two EECs present on the site; being Illawarra Lowlands Grassy Woodland and Illawarra Subtropical Rainforest.

Upland Swamps are also known as important and sensitive features and are a major factor in maintaining water quality for the catchment area. There are several known swamps in the locality of the shaft site including Stockyard Swamp. This swamp is located ~7 km south of the proposed shaft site and is listed as an EEC (Temperate Highland Peat Swamps on Sandstone) under the EPBC Act.

There are 20 known species of endangered flora and 54 known species of endangered fauna in the locality of the shaft site (including the area of the proposed utility supply routes). Niche (2010) also report three threatened fauna species and one threatened flora species as being present of having suitable habitat at the NRE Wongawilli Colliery Pit Top.

Given the large intact expanse of native vegetation occurring in the project area, fauna habitats within the area are likely to be in good condition and provide habitat resources for a wide range of animal species. The habitats likely to occur in the locality include woodland, open forest and heath. Finer scale habitat features including rock outcrops, tree hollows, hollow logs, creeks and drainage lines also occur.

NRE will engage a specialist biodiversity consultant to identify areas of significant flora and/or fauna habitat or species and assess the potential impacts from the proposed within the general work areas prior to the submission of the EA.

The EA will report the method of assessment used and the results of this assessment. The likely impacts of the vegetation clearing will be determine and suitable environmental mitigation or offset measures will be proposed if required.

8.2 Aboriginal and European Cultural Heritage

The proposed Wongawilli No.2 Ventilation Shaft Site is situated on the Woronora Plateau, around the tributaries that form the upper reaches of Lake Avon. The area is characterised by a sandstone plateau incised by drainage lines, forming steep sided valleys with exposed sandstone formations. An AHIMS search undertaken on 7 October 2010 determined that the steep sided valleys contain abundant Aboriginal archaeological sites, including sandstone shelters with rock art and occupation material and axe grinding grooves.

The major European historical features of the area are the Avon Dam wall and the Moss Vale to Unanderra Rail Line.

Aside from general minor development for mining exploration and water catchment management infrastructure such as fire roads, survey points and rain gauges, the area has seen no development and disturbance.

The most comprehensive and systematic archaeological survey work carried out in the area has been undertaken by Caryll Sefton and the Illawarra Prehistory Group (IPG). The IPG has located and recorded Aboriginal archaeological sites in the region over the last 30 years and are responsible for much of the information located in the AHIMS database. Reporting from the IPG and the AHIMS site cards provide more detailed information on sites in the area. The following conclusions can be drawn from those sites cards and reports:

- Sandstone shelter sites are the most common form of evidence within the region.
- Open artefact scatters are uncommon throughout the region.
- More than 70% of shelter sites recorded on AHIMS contain some sort of rock art, chiefly black pigment (usually charcoal) drawings/paintings, but also hand stencils and paintings using red ochre or white clay.
- More than 45% of shelter sites contain artefacts or potential archaeological deposits.
- Rock engravings do not occur in the southern part of the Woronora Plateau, around Lake Avon.
- Grinding grooves are less common than shelter art sites, however do occur on sandstone outcrops and surfaces usually associated with watercourses or swamps.
- Stone arrangements are rare but may occur on sandstone outcrops associated with ridge tops or saddles.
- Scarred Trees are rare, but do occur within the region.

The most likely type of Aboriginal archaeological sites to be present in the vicinity of works associated with the Wongawilli No. 2 Ventilation Shaft Project are:

- Aboriginal rock art and occupation sites, located in sandstone shelters.
- Grinding groove sites, located on sandstone platforms and usually associated with water.

An AHIMS search undertaken on 7 October 2010 returned 47 records of Aboriginal archaeological sites within a 10 km by 5 km rectangle coving the proposed shaft site, associated infrastructure and utility supply routes. The majority of sites, as is typical for the area, are sandstone shelters with art and/or deposit. Axe grinding grooves are also well represented.

Searches of local and state heritage registers show that although the Wingecarribee and Wollongong LGAs contain a significant number of heritage items, no registered European heritage items (apart from the Moss Vale to Unanderra Rail Line) occur in close proximity to the proposed works.

The EA will review any previous heritage studies undertaken in the area along with local, state and federal heritage registers to identify known heritage areas or items. Field surveys will be undertaken, attempting to locate all previously recorded archaeological sites which may be affected by the

proposed works and all areas that have the potential to contain rock art or occupation shelters will be inspected. Consultation with local Aboriginal groups will also provide information on areas of heritage significance.

NRE will engage a specialist cultural heritage and Aboriginal archaeology consultant to assess the potential impacts of the proposed development on heritage features. The EA will provide full details on heritage/archaeology assessments, the potential for impacts of the proposed development and any mitigation and management measures if necessary. If appropriate, relevant heritage mitigation and management measures will be included in the Statement of Commitments.

NRE will attempt to avoid any Aboriginal archaeological sites or artefacts in a development area. If this is not possible, the EA will review other options and take into account guidance from the archaeologist and local Aboriginal groups to seek a solution that satisfies all relevant parties.

8.3 Surface Water Management

The site is located within the Lake Avon catchment, which forms part of the Metropolitan Special Area and Sydney's drinking water catchment. Due to the location of the shaft site within this sensitive area, particular attention will be required to be given to the management of surface water on the site, primarily during the construction phase, to ensure that there are no adverse effects from the proposed development on water quality in the catchment.

There are several potential sources for surface water contamination discharging from the site during both the construction and operational phases of the project. These consist of:

- Increased sediment generated from disturbed areas cleared of grasses and weeds for the construction of the ventilation shaft, switchyard and other surface infrastructure.
- Possible diesel spillages or leakage of drilling and machinery fluids from the equipment associated with the ventilation shaft drilling operation.

The EA will include a soil and water management assessment which will identify appropriate mitigation measures to manage these potential impacts. The assessment will investigate a range of surface water management measures applicable to both the construction and operational phases of the project. Such measures will take into account the local soil types, the near-surface and subsurface lithology, topography and geomorphology of the receiving waters.

Mitigation measures are likely to include the provision of clean water diversion drains around the site, and the provision of sedimentation ponds to manage dirty water discharge from the construction areas. All mitigation measures will be subject to detailed engineering design and assessed to ensure that the project achieves compliance with the SCA's Neutral or Beneficial Effect (NoBE) requirement for water quality as dictated in Part 5 Clause 27 of the *Drinking Water Catchments SEPP*.

The EA will provide a full assessment of the potential surface water impacts and the mitigation and management measures required to minimise these potential impacts.

8.4 Sediment and Erosion Control

The construction works for this project have the potential to cause erosion and sediment laden runoff. The EA will assess the potential erosion impacts from the works and describe proposed control measures.

It is anticipated that best practice sediment and erosion controls, as specified in the "Blue Book" (Landcom 2004) will be implemented at all works areas as a matter of course. If necessary, relevant mitigation measures will be included in the Construction and Environmental Management Plan.

The areas that will accommodate the proposed development may alter the volume of surface water runoff by creating hardstand areas in places where water infiltration previously occurred. The EA will assess alterations to surface water runoff and propose best practice sediment and erosion control measures where necessary.

8.5 Bushfire

The proposed Wongawilli No.2 Ventilation Shaft Site is located within the Metropolitan Special Area and as such it is surrounded by large areas of established vegetation. The shaft site and surrounds have also been classified as bushfire prone land by Wollongong City Council (WCC).

The bushfire risk associated with the project is comprised of risk from the proposed development to the surrounding vegetation and visa versa. There is a risk that a fire started at the Wongawilli No.2 Ventilation Shaft Site could spread to surrounding areas and impact the environment. However, the shaft site and utility supply infrastructure are also at risk of being damaged by a bushfire started elsewhere in the catchment area.

The proposed works at the shaft site will require the clearing of vegetation to facilitate the construction of the required facilities. This provides the opportunity for an Asset Protection Zone (APZ) to be incorporated into the design of the shaft site, providing a buffer between the existing vegetation and the proposed development. This will result in a significant reduction in any bushfire threat.

The EA will undertake an assessment of the bushfire risk for the proposed development. The EA will detail appropriate mitigation and management measures (such as the APZ) if required in the design or layout of the proposed development. If appropriate, relevant bushfire mitigation and management measures will be included in the Statement of Commitments.

9 Secondary Environmental Impacts

This section identifies secondary environmental impacts that the EA will assess.

The EA will detail and assess the strategic implications of any potential impact from the proposed development that is considered significant. It is considered at this stage that the appropriate mitigation and management measures can be determined and adopted as required to reduce any of the potentially significant impacts associated with the proposed development.

9.1 Greenhouse Gas Emissions

The GHG emissions associated with the construction and operation of the proposed development are expected to be fairly minor. Potential emission sources include construction equipment and vehicles, use of fuel and electricity usage for the operation of the fans.

Although the GHG emissions associated with the mining of the western areas will be emitted to the atmosphere via the MVA released from the Wongawilli No. 2 Ventilation Shaft, these emissions will be accounted for in any application for future mining activities. They will therefore not be considered further in the EA for the Wongawilli No.2 Ventilation Shaft Project as they are not produced as a direct result of the construction and operation of the ventilation shaft.

The EA will include GHG emission calculations for the proposed development. Preparation of these will use methodology and emissions factors outlined in the *National Greenhouse Accounts (NGA) Factors* (2009) and best industry practice.

All methodologies are underpinned by frameworks outlined in documents produced by the United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC) with due regard to the Kyoto Protocol.

Consistent with the protocols of IPCC and UNFCCC, the GHG assessment for the proposed development will include three emission types. These are Scope 1, Scope 2, and Scope 3 emissions. A description of each is below:

- **Scope 1** – includes direct emissions from sources within the boundary of an organisation such as fuel combustion and manufacturing processes.
- **Scope 2** – includes indirect emissions from the consumption of purchased electricity, steam or heat produced by another organisation. Scope 2 emissions result from the combustion of fuel to generate electricity, steam or heat and do not include emissions associated with the production of fuel. Scopes 1 and 2 are careful to ensure that two or more organisations do not report the same emissions in the same scope.
- **Scope 3** – includes all other indirect emissions that are a consequence of an organisation's activities but are not from sources owned or controlled by the organisation. Examples of Scope 3 emissions include indirect emissions associated with the extraction/ production of fuels used on site, fuel extraction and line loss associated with the consumed electricity, transport of product outside the organisation, and emissions associated with end use of that product.

The EA will categorise activities associated with the proposed development within these three scopes to allow correct calculations and reporting of GHG emissions associated with this project. The EA will provide calculation methodologies in addition to results.

9.2 Water Resources

During the construction phase approximately 1 ML of water is anticipated to be required for activities such as concrete preparation, dust suppression, to service the site amenities and for fire fighting purposes. During the operational phase water use at the shaft site is anticipated to be limited to that required for site amenities, maintenance/cleaning of the fans and underground fire fighting purposes.

It is proposed that water for the site be sourced from Lake Avon at one of two possible locations as shown in **Figure 2**. Infrastructure required to be constructed to facilitate the provision of water to the shaft site will include a pump house on the edge of the lake which will feed water to the site via an overland pipeline.

It is anticipated that the ~300,000 L capacity water tank located on the shaft site will provide a continual gravity driven water supply to the new workings as a backup in the event that the underground power is affected and fire fighting water is required underground. Thus the tank will be maintained at full capacity via a float valve or other similar system.

Permission to source this water is proposed to be obtained from the SCA, who have a licence to extract water from Lake Avon under the *Water Act 1912*. NRE will liaise with the SCA to ensure that this approach is acceptable and that the relevant SCA requirements are considered.

It is noted that Lake Avon is located within the area covered by the draft *Water Sharing Plan for Greater Metropolitan Region unregulated river water sources* (DECCW, 2009). Lake Avon is located within the Upper Nepean River Tributaries Headwaters Management Zone under the plan, which is yet to come into force. As NRE propose to obtain water as a customer of the SCA, it will be the responsibility of the SCA to ensure that the requirements of the Water Sharing Plan are met once the plan comes into force. This will include compliance with the requirements of the *Water Management Act 2000*.

There is also a possibility of cross contamination of groundwater sources occurring during construction of the ventilation shaft, however this risk is will be minimised by the chosen construction method. The risk of groundwater interaction will be minimised as the shaft will not be full of water during its construction and will be progressively lined. Once the construction of the shaft is complete, the shaft will be completely lined and grouted. This will ensure that the shaft does not interfere with either shallow or regional aquifers during its operational phase.

Further details regarding the water supply to the Wongawilli No.2 Ventilation Shaft Site and potential groundwater interaction will be provided in the EA.

9.3 Noise and Vibration

The following aspects of the proposed development have the potential to generate noise and/or vibration impacts:

- Construction activities (including operation of machinery, shaft drilling and blasting, traffic noise).
- Operation of extraction fans.

These sources may have the potential to cause 'offensive noise' as defined by the POEO Act, if they are located in close proximity to sensitive receivers.

The proposed Wongawilli No.2 Ventilation Shaft Site is located ~5 km from the nearest residential receiver and within a heavily vegetated part of the Metropolitan Special Area, where there is limited public access. Minor works will also be undertaken around the NRE Wongawilli Colliery Pit Top.

Buffer distances required for a range of commonly used construction equipment to avoid human discomfort is in the order of tens of meters rather than kilometres (Renzo Tonin, 2001). Similarly known distances required to comply with blasting vibration and over pressure limits are in the range of several hundred meters to kilometres. Due to the distance between the shaft site and potential receivers, it is not anticipated that there will be any adverse noise or vibration impacts from the proposed development. Any potential impacts from the construction phase will also be temporary in nature.

The EA will include a full assessment of any likely noise and vibration impacts which may be associated with the proposed development and any mitigation measures will also be proposed if deemed to be required.

9.4 Air Quality

The construction and operation of the proposed development may have the following air quality impacts:

- Dust and fumes from the construction activities.
- Coal and stone dust emitted to the atmosphere via the MVA.
- Odour from operation of the ventilation shaft.

Any potential air quality impacts which may occur during the construction phase will be relatively short lived and are expected to be easily controlled through commonly applied dust management measures, such as the use of a water cart.

There is a possibility that dust created during construction activities or emitted in the MVA from the operational shaft could settle in or on Lake Avon leading to increase turbidity and suspended solid content. Construction phase mitigation measures should minimise this impact and it is anticipated that particles emitted from the ventilation shaft would settle out prior to reaching the lake.

Emissions from diesel-powered plant and equipment used on site and vehicle movements to site are typically minor for projects of this scale and will be too widely dispersed to give rise to significant off site concentrations.

This combined with the distance of the site from urban areas means there are unlikely to be any air quality impacts from the construction phase. Notwithstanding, appropriate mitigation measures will be included in the Construction and Environmental Management Plan as required.

Recent assessments and subsequent monitoring undertaken for similar ventilation shafts, servicing both the Bulli and Wongawilli seams of the Southern Coalfield, have shown that the levels of dust and odour produced by upcast ventilation shafts are minor and have no adverse environmental effects aside from nuisance impacts to human receivers (PEA Holmes 2010; Holmes Air Sciences, 2008, Holmes Air Sciences 2000).

Due to the location of the shaft site being a significant distance the nearest receiver and in a publicly inaccessible area it is not anticipated that there will be any adverse air quality impacts from the proposed development on human receivers.

It is therefore considered that air quality will be a secondary environmental impact associated with the proposal. The EA will contain further details on the possible air quality impacts and the proposed mitigation measures to minimise dust and odour generation where at all possible.

9.5 Visual

The proposed Wongawilli No.2 Ventilation Shaft Site is located in dense bushland in the Metropolitan Special Area. There are no known public vantage points to the site and public access to the area is prohibited. It is therefore not anticipated that the development of the shaft site will have a significant impact on visual amenity.

The majority of the infrastructure at the site will be less than 6 m height, with exceptions being the headframe to be used during the construction phase. This feature may be visible a significant distance from the site along the SCA managed fire trails, however as stated above access to these areas by the general public is prohibited, and these impacts would only be temporary (~18 months) during the construction phase.

The proposed water supply pipeline from Lake Avon will be located at ground level and is therefore not expected to create a visual impact. The powerlines from the shaft site to the NRE Wongawilli Colliery Pit Top may have some visual impact but will mainly only be visible within the Metropolitan Special Area which is not accessible to the public.

If the powerlines are unable to be underbored from pit top to the top of the escarpment this portion of the powerline may have to be comprised of overhead lines. The lines and associated poles may be visible from some public vantage points, however it is anticipated that the dense vegetation in this location would limit any visual impact.

The construction and operation of additional power supply infrastructure at the NRE Wongawilli Colliery Pit Top will be in the context of the existing operations and as such is not anticipated to have a significant visual impact.

A full assessment of the visual impact of the proposed development will be undertaken in the EA.

9.6 Traffic

The proposed development will require transportation of construction materials and employees along local roads through Mt Kembla, Wongawilli and surrounding areas during the construction phase. The Wongawilli No.2 Ventilation Shaft will not be staffed during the operational phase, however a small workforce, such as maintenance staff, may be required to access the site.

Heavy vehicle impacts during the construction phase will predominately relate to the delivery of infrastructure, such as the drill rig, concrete and mobile equipment for site establishment and spoil management. Employee access to the site will also create some light vehicle traffic.

There will be no offsite truck movements associated with the movement of spoil generated from the shaft sinking as this material is proposed to be retained on site for possible reuse as shaft filling material during rehabilitation.

There is existing access to the ventilation shaft site along SCA managed fire trails, which intersect with the local road network at Cordeaux Road to the south west of the township of Mt Kembla. There is minimal traffic on this section of Cordeaux Road, and as such it is not anticipated that the works will affect intersection performance.

The existing access to the shaft site crosses the Moss Vale to Unanderra Rail Line on two occasions. As such the interaction between project traffic (especially heavy vehicles) and train movements will require management. NRE will liaise with ARTC to determine to their requirements in this regard and obtain any necessary approvals.

The EA will include an assessment of potential traffic impacts and detail any necessary mitigation and management measures. NRE will also ensure the Traffic Management Plan (TMP) is prepared by a suitably qualified consultant or contractor prior to the commencement of works. The TMP will include

the details of relevant routes, traffic control signage for the project and detail the required management of vehicle movements through Mt Kembla, Wongawilli Village etc. and at the rail crossings.

9.7 Waste Management

It is anticipated that that the proposed development will generate minimal waste, as the processes are mostly self-contained. Waste streams will fall into two categories, construction and operational. Typical waste streams are anticipated to include:

- Sewage from construction and operational personnel. Site amenities will be provided on site for construction staff and retained during the operational phase if required.
- General waste (e.g. food and drink containers) from the workforce carrying out the construction works and delivery of equipment (packaging).
- General construction related waste such as concrete, steel, timber, electrical cabling etc.
- Spoil from the excavation of the shaft.

Waste from onsite amenities will be disposed of in an appropriate manner offsite. There will be no on site treatment or disposal of sewerage due to the location of the shaft site within the Metropolitan Special Area.

Spoil waste from the ventilation shaft and borehole drilling will be emplaced in the shaft spoil emplacement for future use in shaft filling and rehabilitation works.

10 Construction Management

This section reviews matters relating to construction of the proposed development.

The project requires a significant amount of construction and it is anticipated that the construction phase of the proposed development will take ~18 months to complete.

NRE will ensure all works progress in a safe manner whilst also using best practice measures to minimise environmental impacts. Project specific environmental controls will be developed by NRE for the project to ensure that the relevant requirements are met. Project specific Occupational Health and Safety (OH&S) documentation will also be prepared to ensure the safety of contractors and other staff on the site.

10.1 Construction and Environmental Management Plan

NRE, or any contractor appointed to undertake the construction works, will prepare Health and Safety and Environmental documentation that includes details of the environmental controls for the worksite. Compliance with the following requirements will be a minimum:

- All staff will be briefed on environmental controls prior to the commencement of work. All personnel will be required to attend a site induction that will cover the OH&S and environmental issues on each work site.
- Mitigation measures for control of erosion and sedimentation in accord with the soil and construction handbook (Landcom 2004) and will be regularly and adequately maintained.
- Plant and equipment will be inspected on arrival to site and prior to use to ensure it complies with its safety specifications.
- Daily inspection of plant and equipment will be undertaken to ensure it remains safe for use.

10.2 Construction Safety

All work carried out for NRE construction activities must be covered by relevant safety legislation and procedures. Contractors will be required to complete a risk assessment in relation to activities involved in the construction of the project. Once approved by NRE, the risk assessment will form part of the controls that determine all safety management aspects of the development.

Workplace safety is of the highest importance to NRE and relevant measures are in place to increase safety. These include:

- Site induction including safety awareness and hazard specific training
- Mandatory wearing of the following Personal Protective Equipment (PPE):
 - Steel toe-capped footwear
 - Hard hat
 - High visibility vest or coat
 - Hand protection
 - Eye protection
 - Hearing protection (wherever applicable).

In addition to compliance with site safety regulations, protective equipment and attendance at site induction Contractors will be responsible for the safety of their employees and sub-contractor employees.

10.3 Equipment Inspection

All motorised plant in use during construction will be subject to a site introduction process that may include inspection by the Mine Electrical and Mechanical Engineers. The construction work will meet NSW WorkCover safety guidelines until such time that mine lease areas are declared. From that time onwards, mine regulations will be enforced. As such, all coal mine safety equipment will conform with relevant regulations and requirements. Equipment that does not meet relevant standards will be removed from site.

10.4 Pollution Control Measures

Appropriate best practice measures will be implemented and regularly inspected and maintained to ensure control of stormwater and sediment laden runoff during construction. Such measures will be detailed in soil and water management plans, where required, and include silt fencing and clean water diversion drains for example.

The Construction and Environmental Management Plan will detail all such protection measures and compliance with these during construction will be mandatory.

11 Conclusion

This section concludes this Preliminary Environmental Assessment.

This PEA informs the DoP of development proposed as part of the Wongawilli No.2 Ventilation Shaft Project which is subject to this application under Part 3A of the EP&A Act.

The aim of the Wongawilli No.2 Ventilation Shaft Project is to support the planned future underground mining activities in the western areas of NRE Wongawilli Colliery. The proposed development is required to provide an adequate and reliable source of fresh air to the mine's underground workings, through the implementation of a new upcast ventilation shaft and associated surface infrastructure. As the western areas are a new mining domain, separated and isolated from the colliery's existing operations, a new ventilation system is the only way to ventilate this new mining area.

The proposed location for the ventilation shaft site is within the SCA managed Metropolitan Special Area approximately 5 km from the NRE Wongawilli Colliery Pit Top. This location was determined to be the preferred location for a range of reasons including the geometry and proximity of the underground workings, known geology in the area, and existing surface features.

The works proposed to be undertaken as part of the Wongawilli No.2 Ventilation Shaft Project described in this application are the construction and operation of the following:

- Upcast ventilation shaft
- Extraction fans and housing
- Electrical switchyard (on or near to the shaft site)
- Electrical switch house
- 33 kV power connection from the NRE Wongawilli Colliery Pit Top to the new switchyard
- 11 kV power supply from switchyard to switch house
- Upgrades to power supply infrastructure at the NRE Wongawilli Pit Top (including new HV substation and switchyard)
- Surface to in-seam service boreholes (for the provision of power and water to the underground workings)
- Water supply pipeline from Avon Dam
- Pump house
- Water tank
- Site amenities.

This PEA determines that approval of this application will allow NRE to adequately and safely ventilate the planned mining domains in the western areas of the NRE Wongawilli Colliery. NRE is seeking approval of the works described in this PEA in order to facilitate sustainable and safe mining practices in the western areas.

If the proposed development described in this PEA does not proceed, this would preclude mining of the proposed western areas upon the exhaustion of the reserves in the current Elouera and Nebo domains. Subsequently affecting the long term viability of the colliery's operations. Should this occur it would have flow on effects on job security, Government royalties and the local, state and national economy.

Expectations are that mitigation and management measures will appropriately reduce the more significant impacts such that any potential environmental impacts of the proposed development will be minimal.

The EA will identify potential impacts from the proposed development and undertake further assessment in the following areas:

- Biodiversity
- Aboriginal and European cultural heritage
- Surface water management
- Sediment and erosion control
- Bushfire
- GHG emissions
- Water resources
- Noise and vibration
- Air quality
- Visual
- Traffic
- Waste management.

The construction of the Wongawilli No.2 Ventilation Shaft is required to commence in late 2011 to ensure that it is operational in time to meet the ventilation requirements of the western drive and then service the development and mining of the western areas should this application be approved.

Approval for the proposed Wongawilli No.2 Ventilation Shaft therefore needs to be gained prior to the proposed submission of the application to undertake mining in the western areas due to the long lead times required for the construction of a ventilation shaft (~18 months).

As such, NRE would like to request that this application be considered and assessed independently of future applications to undertake mining in the western areas. NRE understands that undertaking the first workings, and gaining approval to construct the Wongawilli No.2 Ventilation Shaft does not guarantee the subsequent approval of mining in the western areas.

The development proposed in this application is shown to meet the definition of a Major Project in Part 5(1)(a) of Schedule 1 of the SEPP (Major Development) 2005. Following review of this PEA the Director General of DoP is respectfully requested to issue his requirements for the assessment of this project.

References

This section cites the resource material that assists in the production of this PEA.

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