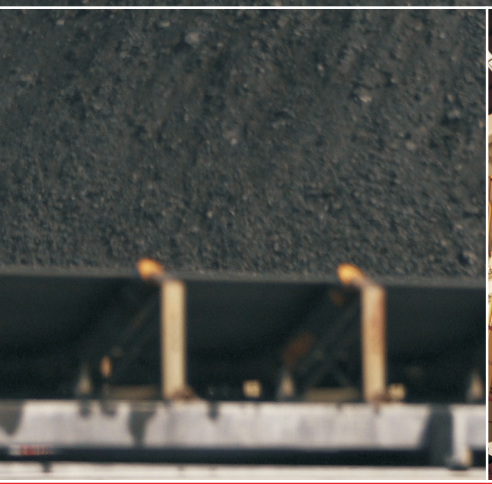
PROPOSED WARKWORTH EXTENSION

Preliminary Environmental Assessment

October 2009



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Abbreviations

ACHMP	Aboriginal Cultural Heritage Management Plan
ANZECC	Australia and New Zealand Environment and Conservation Council
CCC	Community Consultation Committee
CCL	Consolidated Coal Lease
CHWG	Cultural Heritage Working Group
CPP	Coal Preparation Plant
DECCW	NSW Department of Environment, Climate Change and Water
DEWHA	Commonwealth Department of Environment, Water, Heritage and the Arts
DoP	NSW Department of Planning
INI	NSW Department of Investment and Industry
NOW	NSW Office of Water
EA	Environmental Assessment
EARs	Environmental Assessment Requirements
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ha	hectares
HMA	Habitat Management Area
IEA	International Energy Agency
HSEQ	health, safety, environment and quality
km	kilometre
LOM	Life of Mine
m	metre
ML	Mining Lease
Mtoe	million tonnes of oil equivalent
MTW	Mount Thorley Warkworth
NDA	Non Disturbance Area
NES	National Environmental Significance
PEA	Preliminary Environmental Assessment
PFM	Planning Focus Meeting
PPR	Preferred Project Report
ROM	Run of Mine
SSC	Singleton Shire Council
TSC Act	NSW *Threatened Species Conservation Act 1995*
WML	Warkworth Mining Limited

1. Introduction

1.1 Purpose and Content

The purpose of this report is to formally lodge a Project Application in accordance with section 75E of the *Environmental Planning and Assessment Act 1979* [EP&A Act] for the proposed extension of the Warkworth Mine and to brief the NSW Department of Planning [DoP], other relevant government agencies as referred to by the DoP and Singleton Shire Council [SSC] about the Project Application. Specifically the document provides the basis for discussions at the planning focus meeting [PFM] and for the provision of Environmental Assessment Requirements [EARs] by the Director-General of Planning.

The body of the report describes:

- the history of mining in the area and the rationale for the proposed extension;
- the development proposal;
- statutory requirements for project determination;
- proposed consultation with stakeholders;
- an initial assessment of environmental impacts with a rating of their significance; and
- conclusions identifying areas of greatest focus for the Environmental Assessment [EA].

1.2 The Proponent

Warkworth Mining Limited [WML] has been appointed the operator of the Warkworth Mine by the participants in the Warkworth Joint Venture.

Ownership of WML is as follows:

- CNA Warkworth Australasia Pty Limited [26.82%];
- CNA Resources Limited [28.75%];
- Mitsubishi Development Pty Limited [28.90%];
- Nippon Steel Australia Pty Limited [9.53%]; and
- Mitsubishi Materials [Australia] Pty Limited [6.00%].

The proponent for this development is WML.

1.3 Existing Operations

Warkworth Mine is located approximately 15km southwest of Singleton in the Hunter Valley, within the Singleton local government area [see Figure 1]. Warkworth Mine is located close to several other mines, including Mount Thorley, Bulga, Wambo and South Lemington [see Figure 2].

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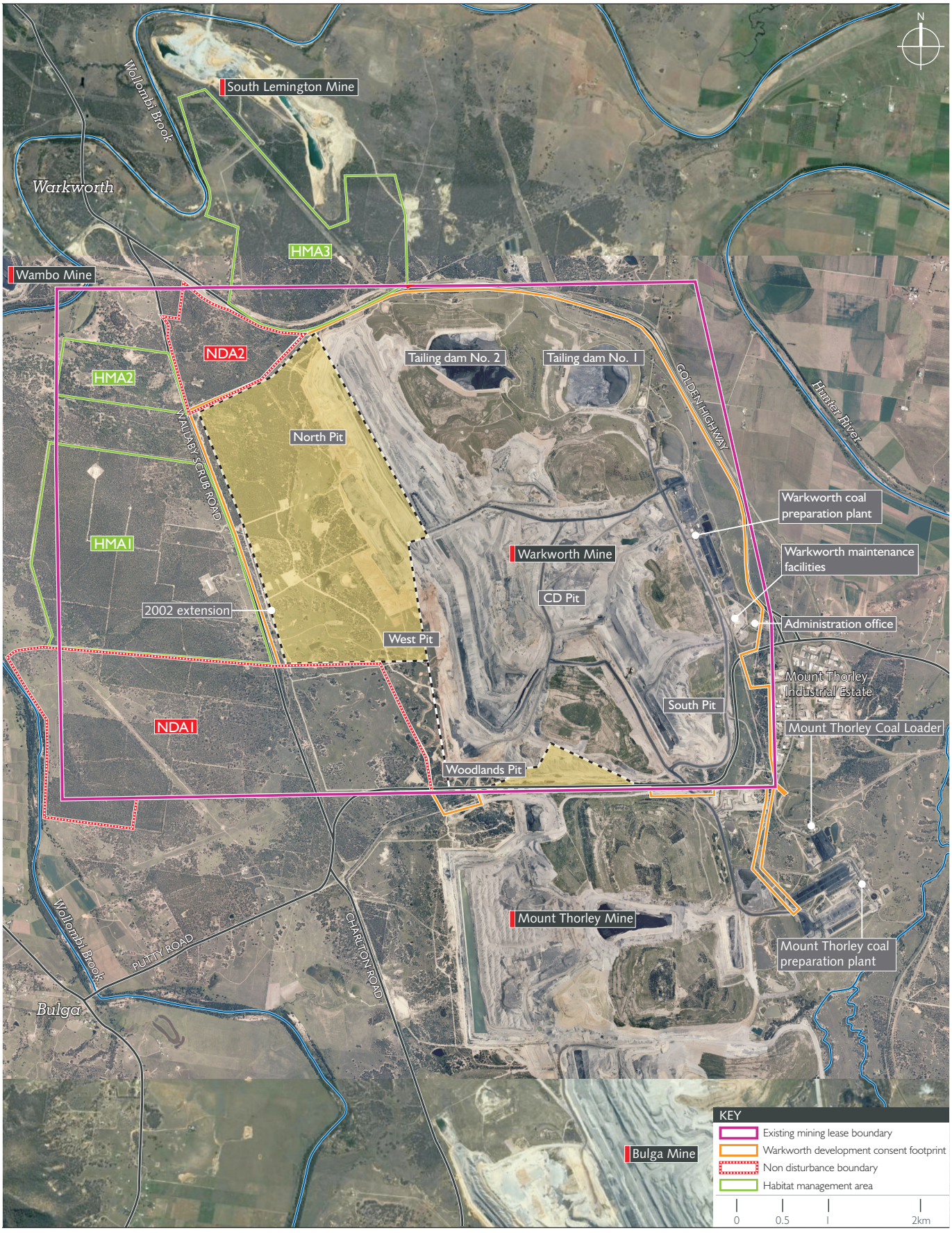
Location Plan

Proposed Warkworth Extension

FIGURE | 1



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Existing Approved Operations

Proposed Warkworth Extension

FIGURE | 2

Coal mining in the Singleton area has a long history, commencing in the 1870s. In the intervening years, the industry has grown substantially with some 23 mines now in operation, supplying steaming and coking coal for the domestic and international markets via the port of Newcastle. Substantial support infrastructure has also been developed, including rail, major port facilities and large power stations including Liddell and Bayswater.

Warkworth and the adjoining Mount Thorley mine were originally developed separately. However, in 2004 the participants in the Warkworth Joint Venture entered into an agreement with the participants in the Mount Thorley Joint Venture to integrate mining operations in both lease areas. The operation is known as Mount Thorley Warkworth [MTW].

The principal effect of this agreement is sharing of infrastructure, including the water and tailings management infrastructure, pittop facilities and coal preparation plants [CPPs]. The agreement enables coal, water, tailings, rejects and overburden to be transferred between the two operations.

Operations at Warkworth Mine commenced in April 1981. Warkworth Mine operates within Consolidated Coal Lease [CCL] 753, Mining Lease [ML] 1412 and ML1590 which cover an area of some 4,200 hectares [ha]. The original consent has been modified substantially. An application for an extension of mining activities [DA 300-9-2002-i] was sought in 2002 and supported by an Environmental Impact Statement [EIS] [ERM Mitchell McCotter 2002]. This application was approved on 20 May 2003 by the then Planning Minister. The main elements, as described in the EIS, are:

- extraction of approximately 160 million tonnes [Mt] of run-of-mine [ROM] coal by open cut mining at a rate of approximately 18 million tonnes per annum [Mtpa];
- extension of two pits [North and West Pits] westwards towards Wallaby Scrub Road, and one pit [Woodlands Pit] southwards towards Putty Road;
- construction of a conveyor to the Mount Thorley Coal Loader;
- construction of two bridges over Putty Road between the two mines to transfer coal, overburden and mining equipment;
- construction of a by-pass adjacent to Putty Road; and
- identification of Green Offsets to address the impacts on biodiversity.

Since this 2003 approval, a further four modifications have been made to the Warkworth consent to provide for:

- construction of a new reject bin and alterations of the rejects conveyor from the CPP to allow for rejects to be directly loaded onto the fleet;
- revision of the land schedule;
- upgrade of the electrical switching yard comprising the replacement of redundant equipment to ensure the ongoing supply of electricity to the operation; and
- installation and operation of up to six gas wells and flaring equipment in areas ahead of mining for the extraction of coal bed methane prior to future mining.

As previously stated, the agreement between the Warkworth and Mount Thorley joint ventures enables coal, water, tailings, rejects and overburden to be transferred between the two operations.

In terms of coal, ROM coal from Warkworth Mine is transported to either the Warkworth CPP or the Mount Thorley CPP for processing. Small quantities of ROM coal may bypass the washing process at the Warkworth CPP depending on customer requirements. Transport of coal to the Mount Thorley CPP is via the existing bridge over Putty Road. The ROM coal from Mount Thorley Mine can also be transported to the Warkworth CPP if required. Coal from the Warkworth CPP may be transported via conveyor to either the Mount Thorley Coal Loader or to the Redbank Power Station. Coal loaded onto trains at the Mount Thorley Coal Loader is transported to Newcastle for export.

In terms of water, MTW has an integrated mine water management system where water is transferred between the two mines to minimise both pumping from the Hunter River and discharges to the Hunter River under the Hunter River Salinity Trading Scheme [HRSTS].

In relation to tailings, the majority of tailings generated from both the Warkworth CPP and Mount Thorley CPPs are currently delivered to tailings storage facilities at Mount Thorley Mine. Tailings are delivered to Mount Thorley's Centre Ramp facility and will be directed to the Abbey Green South facility within the next six months. Following Abbey Green South, staged capacity increases are planned for the Centre Ramp facility before tailings are delivered to the Abbey Green North facility, which is scheduled to remain in service until Year 21. Further details on the interactions between Warkworth Mine and Mount Thorley Mine will be provided in the EA.

The above describes current operations at Warkworth mine and these are shown in Figure 2.

Warkworth Mine operates continuously 24 hours a day, seven days a week.

1.4 Rationale for Proposed Extension

Mine planning for current operations at Warkworth Mine first occurred in the 1980s. At that time global demands for energy and coal prices were considerably lower than at present.

Global energy markets have changed dramatically and often unpredictably over the life of Warkworth Mine. Over the past three decades [1973 to 2006] world energy consumption almost doubled from 4,672 to 8,084 million tonnes of oil equivalent [Mtoe]. Forecasts of energy demand by the International Energy Agency [IEA] show considerable further growth, that is 45% from 2006 to 2030 [IEA, 2008]. This is the IEA's "Reference Scenario" based on "business as usual" and it does not incorporate significant policy shifts due to climate change. However, even if such policy shifts occur, demand for energy will still grow substantially at 34% to 2030. Most of this is due to economic growth in developing countries, with China playing a particularly prominent role: it accounted for 50% of increased world energy demand in the first seven years of this century. All of this will occur despite increasing energy efficiency. For instance, in the decade following the first oil shock of the 1970s the USA and Japan became 25% and 30% respectively more energy efficient [measured as energy consumption per unit of gross domestic product]. As a result of the increased demand for energy globally, the price of coal has risen substantially.

The Life of Mine [LOM] plan undertaken in 2002 showed economic reserves of coal within the approved extension area extending across Wallaby Scrub Road, within the area now known as Habitat Management Area [HMA] 1. As the 2003 approval process progressed, mining within HMA 1 was excluded from the consent application boundary and accordingly the consent life was limited to 18 years, although still acknowledged by the LOM plan and 2002 EIS as economic reserve. At the time, the southern portion of CCL 753 [refer to Figure 2], within the area known as Non Disturbance

Area [NDA] 1, were not shown in the LOM plan as they were not economic to mine based on the long term average price for coal, as estimated in 2002.

In the period since LOM planning was undertaken in 2002, the long term average price for coal has risen by 160%. Margin ranking used to revise the LOM plan for the current long term coal price, as at September 2008, has identified significantly larger areas that are now deemed economic to mine. Based on the new long term average price, it is now economic to mine the majority of CCL753 west of Wallaby Scrub Road including the previously deemed uneconomic areas in the southern portion of CCL753, within NDA1 and extending south to Putty Road which is within the Mount Thorley Mine Coal Lease [CL] known as CL219.

As stated in CCL753 and CL219, the leaseholder is required to extract as large a percentage of the coal within the lease as is practicable. The revised estimates of economic reserves are sufficient to enable mining to Year 2056, but, the current proposal is constrained by the typical consent life of 21 years [to Year 2031, based on a 2011 commencement] adopted by planning authorities.

It is also important to recognise that forecasting world energy demand is difficult and complex as energy consumption is linked closely to changes in global economic conditions. For instance, the growth that occurred in the early part of this century was largely unforseen by the world community, including industry bodies, multi-lateral agencies [International Monetary Fund and World Bank] and national governments. This, in turn, makes the planning of individual facilities, like mines, difficult and prone to variation. However, it is clear that both the demand for and prices of coal will grow. Allied to this, the New South Wales Government is in a strong position to respond to these opportunities as it has recently expanded key aspects of its coal chain infrastructure, such as the port of Newcastle and associated rail lines.

In combination, the above factors have created market opportunities for coal mines in the Hunter Valley. They mean that earlier than anticipated extensions around existing mines, including into some areas previously considered uneconomic, are now viable. In this context a revised mine plan has been prepared for Warkworth Mine that would enable both more efficient and extended operations as explained in the next chapter.

Additionally, it can be seen that a continuation of open cut operations at Warkworth Mine is the only effective and feasible option for extraction of the identified coal resources when considering the characteristics and restrictions of the resource, such as the thickness and depth of the seam as well as the location of the seam itself. Many of the coal seams currently mined by open cut methods are too thin for underground extraction and underground long wall panels can only follow straight boundary reserves and the proposed extension is not rectangular, meaning reduced recovery of resource. Also, for stability reasons, buffers would be needed adjacent to the current open cut mine high wall [100m] and around the new mine boundaries [20m]. In combination, these factors mean that underground mining would only enable extraction of about 19% of the available resource identified for open cut mining within this Project Application.

2. Proposed Development

2.1 Overview

The proposal involves extension of North and West Pits to the west, as well as completion, filling and rehabilitation of other pits. A summary of the proposed Warkworth Mine extension is as follows:

- maintain maximum approved production rates of 18Mtpa of ROM coal;
- maintain approximately 13Mtpa of ROM coal capacity at the Warkworth CPP;
- maintain current tailings disposal system;
- extend the mine life from the current consent life of 2021 to 2031 [assuming project approval is granted in 2010], which is an extension of current approved mining activities of some 11 years while including the existing area and activities approved for mining;
- transfer and disposal of overburden from Warkworth to the Loders Pit at Mount Thorley following completion of coal extraction at Loders Pit;
- replace aging equipment fleet to allow for improved mining efficiencies; and
- upgrade some support infrastructure.

2.2 Extension of Mining

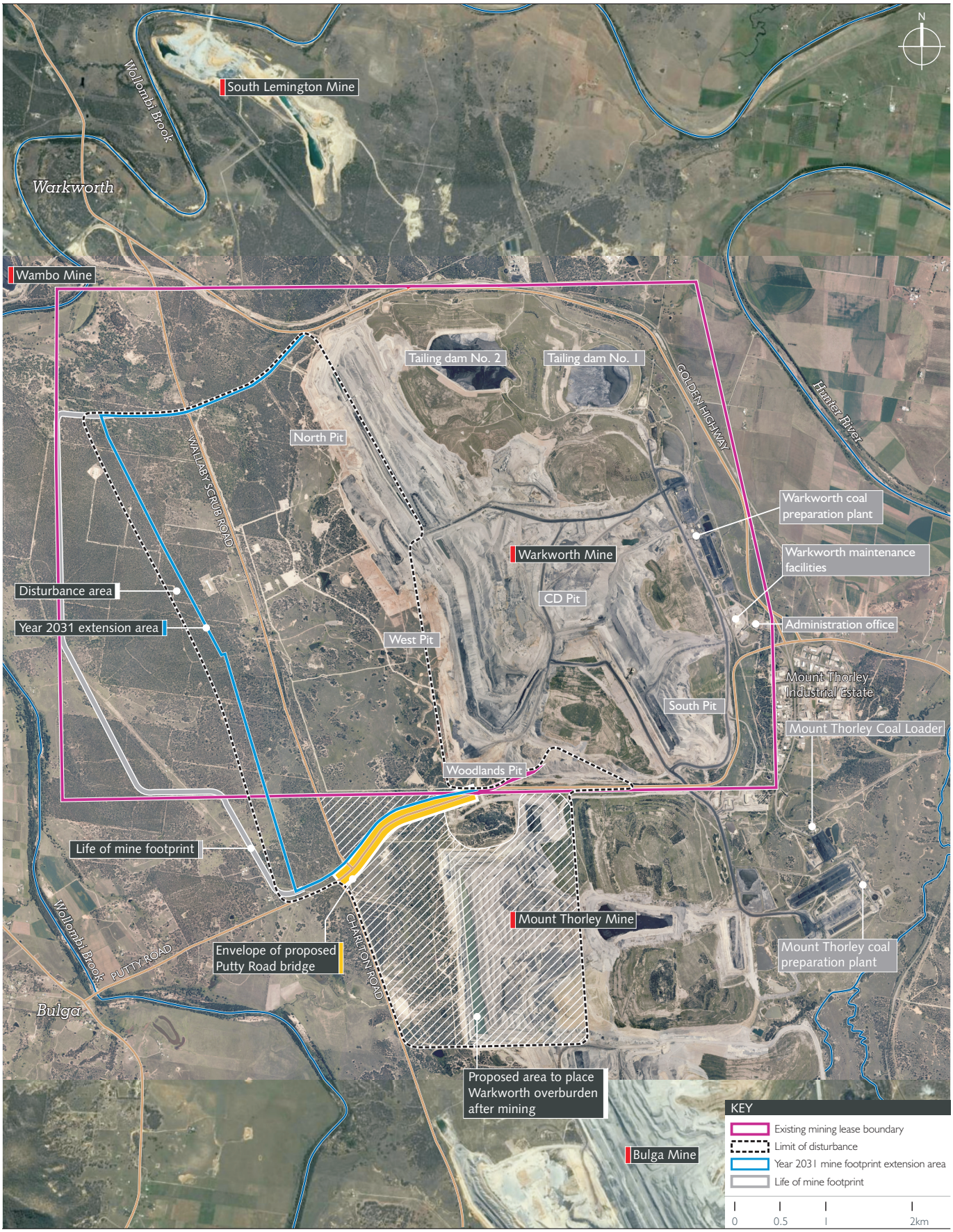
The proposed Warkworth Extension is located within CCL753, and extends south into the Mount Thorley mining tenement CL219 to the northern side of Putty Road [see Figure 3]. A full definition of the Project Application Area, including the real property descriptions, will be provided to the DoP with the Major Projects Application form.

Throughout the life of a 21 year planning approval, mining would continue as a westward advancement of the North and West Pits bounded to the south by Putty Road [refer Figure 3]. Two draglines and supporting mining equipment are currently employed in these pits and would continue to be used, albeit with renewal of fleet as further described below. The two dragline fleets operate along some 4.6km [North and West Pits only] of strike length. Mine operations would reach NDA 1, which was previously considered uneconomic because of high overburden depths. Not advancing into this area would result in a reduction of strike length to some 3km, a reduction in the efficiency of mining equipment and the poor utilisation of economic coal resources. Thus, the intent is to maximise resource recovery as is required under clause 15 of the *State Environmental Planning Policy [Mining, Petroleum Production and Extractive Industries] 2007*.

A third dragline and supporting mining fleet operate in South and CD Pits. By approximately Year 1 [nominally 2011], dragline operations will cease in this area and relocate to Loders Pit, within Mount Thorley Mine. South and CD Pits would then be refilled with overburden and rehabilitated. The shaping of overburden emplacements and their rehabilitation will occur progressively after mining.

In approximately Year 6, mining would extend to be close to Wallaby Scrub Road. Mining in these areas is necessary to provide sufficient strip length to efficiently utilise the two draglines and supporting mining equipment. The North and West pits would be the focus of mining and remain open to Year 21 [to 2031].

Output from the combined MTW operations is expected to produce up to 14Mtpa of saleable [product] coal [approximately 21Mtpa of ROM coal] and remain at this level to approximately Year 8. Current mine planning indicates the combined product tonnes from the operations would drop back to around 10 to 12 Mtpa product beyond approximately Year 8. Mining rates at Warkworth Mine



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Proposed Operations

Proposed Warkworth Extension

FIGURE | 3

would vary to contribute to these outputs from the MTW complex but would not exceed the currently approved maximum of 18Mtpa of ROM coal [approximately 12Mtpa of product coal]. The Project Application seeks to continue mining at a rate of up to 12Mtpa of product coal from Warkworth Mine for the life of the mine to allow flexibility to vary production rates to meet market demand. The EA will assess the worst case potential impacts to provide this operational flexibility.

The proposed extension of Warkworth Mine includes some 1,271ha of lands including 566ha approved for mining in 2003 and an additional 705ha outside of the currently approved Warkworth mining area.

An outline of the current and proposed equipment that would be used at Warkworth Mine is given in Table 1.

Table 1 – Estimated Equipment Fleet

Equipment	Strategy
Draglines	• Warkworth Mine is approved for three draglines • No new draglines are proposed under the proposal • One dragline is likely to relocate to Mount Thorley Mine in approximately Year 1 • Two draglines will be maintained from approximately Year 10
Shovels	• Warkworth Mine currently has approval for two shovels • The integrated operation is expected to operate up to four shovels from Year 1 to assist with increasing pre-stripping operations • The integrated operation is expected to operate two shovels in the long term and would decommission units as workload reduces
Excavators	• Warkworth Mine currently has two excavators and additional hired excavator capacity being commissioned in 2009 • Up to four excavators will be maintained at the integrated mine operation until Year 21
Front End Loaders	• Warkworth Mine currently has three front end loaders • Up to six front end loaders will be operating until approximately Year 4 at the integrated operation and from approximately Year 5, the integrated operation is expected to operate approximately four front end loaders
Trucks	• Warkworth Mine has approval for up to some 65 haul trucks • In approximately 2010 the site will utilise up to 58 haul trucks to assist with pre-stripping operations and would utilise up to approximately 78 haul trucks from approximately Year4
Ancillary Equipment	• Ancillary equipment such as water carts, dozers, graders and drills will be upgraded as part of the proposed fleet strategy • Ancillary fleet numbers will increase initially and then decrease as steady state mining is established

2.3 Support Infrastructure

Warkworth Mine maintains support infrastructure as a separate mine and also shares infrastructure with Mount Thorley Mine.

Mined coal will be processed at the Warkworth CPP and/or the Mount Thorley CPP. The majority of tailings from the CPPs are currently disposed of in tailings storage facilities within Mount Thorley Mine and these are forecast to have sufficient capacity to accommodate all tailings from the

proposed extension. A smaller portion of tailings may be disposed of within the Warkworth Mine Tailings Dam No. 2. Changes to approved tailings disposal methods are not proposed as part of this project application.

As part of a trial program, tailings material from Tailings Dam No 1 is currently being recovered by hydromining. The recovered tailings are processed at Warkworth's Existing Beneficiated Dewatered Tailings (BDT) plant, before delivery as fuel to Redbank Power Station. At the completion of extraction, potential exists for Tailings Dam 1 to be backfilled with fresh "barren" tailings being those without coal.

The workshop at Warkworth Mine may be upgraded to service the new and enlarged fleet. The proposed strategy for upgrading these facilities has not been finalised.

As mentioned in Section 1.4, economic open cut reserves are identified to the west of Wallaby Scrub Road. The westward advancement of open cut mining will therefore affect Wallaby Scrub Road. Wallaby Scrub Road is a rural public local road joining Putty Road and the Golden Highway [or Jerrys Plains Road]. Closure is likely to be required at approximately Year 7 [nominally 2017]. Options for its future are being investigated and include relocation or closure. Any relocation would need to take into consideration appropriate road safety standards in relation to curvature, coal reserves, land owned by the proponent, land not owned by the proponent, ecological communities, habitat connectivity, Aboriginal heritage and noise. The local community and SSC will be consulted regarding these options.

In addition, it is proposed to relocate the western bridge over the Putty Road which was approved as part of Development Consent No. DA 300-9-2002-i. This bridge is proposed to be relocated further to the west of the approved envelope area, as shown in Figure 3. Again, the worst case potential impacts will be assessed as part of the EA to allow operational flexibility.

With all of the above facilities and the mining operations the EA will be based on worst case conditions. This will allow the full implications of impacts to be understood and provide the basis for an approval that will provide operational flexibility given that normal conditions will prevail during most of the mine's operational life.

2.4 Coal Seam Methane Extraction

There is potential for methane that naturally occurs within the coal seams to be extracted in advance of mining. To date, four trial wells have been drilled and surface infrastructure will be installed by the end of 2009. Trial extraction will then occur for a period of 12 months. Thus, at this stage, it is not possible to determine whether there is potential for a viable methane extraction operation and it will not form part of the EA for the mine extension.

2.5 Interactions with Mount Thorley Mine

Since the 2004 agreement to integrate operations at Warkworth and Mount Thorley mines, some joint use of infrastructure and operations has occurred and this will continue under the proposal. Coal will continue to be processed at the two CPPs. As previously stated, tailings from the CPPs will continue to be disposed under current arrangements. The joint water management system will continue and product coal will continue to be transported via the Mount Thorley Coal Loader.

The proposal allows for the continuation of prior consents to transfer and disposal of some of the overburden from the Warkworth extension to Mount Thorley Mine following completion of coal extraction from Loders Pit. The 2003 Warkworth consent included the provision of bridges over the Putty Road to facilitate the transfer of overburden between the two mines. Therefore, disposal of overburden from Warkworth Mine at Mount Thorley Mine will form part of the application for the

Warkworth Mine extension and exist concurrently with the current consent for Mount Thorley Mine. Environmental management integrated across the two operations would be extended and simplified via a unified plan which is likely to form a commitment in the EA.

2.6 Environmental Effects

The proposal will cause a number of physical and other changes that will dictate future environmental impacts. Many of these will be positive, particularly the socio-economic effects of greater and extended employment, plus considerable capital investment, royalties and tax payments to government.

The principal physical changes producing other impacts are as follows:

- west of CCL753 is Bulga village. Warkworth Mine will advance to approximately 900m to the west of the western-most limit under the current consent. The mine will stop within about 2,600m of Wambo Road at Bulga village;
- mining will advance westward through an area of elevated land, Saddleback Ridge, which shields the current operations from areas to the west. Removal of the ridge will increase exposure of the Warkworth Mine to Bulga village and surrounding areas;
- overburden to coal ratios will increase as mining moves down dip. This means greater volumes of overburden will be produced creating a need for higher overburden emplacements;
- mining within the 21 year footprint will occur within the previously approved area [566ha, see Section 5.2] and the proposed extension area [705ha]. The mining will require the clearance of woodland vegetation, with 390ha within the previously approved area and 471ha within the proposed extension area. Of the total woodland to be cleared in the extension area, approximately 141ha occurs in NDA1 [total area 644ha] and 181ha occurs in HMA1 [total area 477ha] with the remainder falling outside the Green Offsets areas. This equates to clearing some 26% of the woodland habitat within the Green Offsets area. The project will be seeking to reassess the offsets required for the 21 year footprint inclusive of the 2003 consent area and to locate these away from areas now deemed as having economic coal reserves;
- the area contains a number of Aboriginal archaeological sites within the mine footprint; and
- the mine will cross Wallaby Scrub Road causing either its relocation or closure.

To understand the implications of these changes an environmental constraints analysis was prepared to provide parameters for mine planning. It included initial assessments of potential impacts including noise, air quality, ground and surface water and visual amenity. In addition, detailed studies of the ecological and cultural characteristics of the Green Offsets area have been undertaken by Cumberland Ecology and Rio Tinto archaeologists respectively.

The mine plan was adjusted where possible to respond to the key constraints and potential impacts will be investigated and reported as part of the EA. An outline of potential impacts is given in Chapter 5 and their potential significance is rated in Chapter 6. The EA will contain the results of the detailed studies and the proposed strategies to mitigate potential impacts.

2.7 Ecological Offsets

The current Green Offsets Strategy was developed for the 2002 proposal to extend Warkworth Mine. This was one of the first offsets for large scale mining at the time and the concept consisted of proactively managing 1,645ha of land to compensate for the mining of approximately 566ha within the 2003 approved mining area. The key components of the Green Offset Strategy are:

- NDAs – open cut mining and agriculture will be precluded from NDAs. The NDAs will be managed to enhance and protect their ecological value;
- HMAs – additional areas of land will be managed until required for mining purposes.

The current proposed extension would mine through areas which are part of the Warkworth Mine 2003 Green Offsets, including HMA1 and NDA1. As explained earlier in Section 1.4, the economics and demand forecasts have now changed such that NDA1 is now also viable to mine.

It is also important to recognise that the two components of the offsets had different functions. The NDAs were for permanent conservation, whereas the HMAs were to be temporary reservations until the land was needed for mining. This Project Application is seeking to establish a new offset strategy for the 21 year mining footprint while clearly recognising that economic coal reserves extend beyond this area, by some further 25 years to 2056 based on the 2009 LOM planning estimates.

2.8 Investment and Employment

The proposal will extend the life of Warkworth Mine by approximately 11 years from 2021 to 2031 [assuming Year 1 is 2011]. Given that much of the plant and equipment is nearing the end of its useful life, with some being 25 years old, considerable replacement and upgrading will be necessary. The 2009 LOM planning indicates that this will involve a very considerable increase in capital expenditure in the order of between $500 million and $600 million. Further, the 2009 LOM planning indicates that the extended mine life will mean greater operational expenditure of some $10 to $12billion over the 21 year life of the project approval and in the order of $1 billion in additional Government royalties.

Much of the additional operational expenditure will support a workforce over a longer period of time. A net increase in employees of up to some 148 full time equivalents on average per year [excluding contractors] is also forecast based on the June 2009 LOM planning. There would also be indirect and induced employment which would increase the number of direct jobs created by the existing mine in the Hunter region. Recent research undertaken by the Hunter Valley Research Foundation demonstrated a multiplier for the mining industry in the order of a 4:1 ratio.

3. Statutory Approvals

3.1 Introduction

The proposed extension of Warkworth Mine will be assessed under the provisions of the New South Wales EP&A Act. A referral will be made under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* [EPBC Act] and if approval is required, the intention would be that the Commonwealth matters are assessed under a bilateral agreement with the State of NSW. This chapter describes the approval process under both pieces of legislation.

3.2 Environmental Planning and Assessment Act 1979

Approval Path

Part 3A of the EP&A Act relates to major development deemed to be significant to the state of New South Wales. Section 75B [1] states that Part 3A applies to:

" … the carrying out of development that is declared under this section to be a project to which this Part applies:

[a] by a State environmental planning policy, or

[b] by order of the Minister published in the Gazette."

State Environmental Planning Policy [Major Projects] 2005 [Major Projects SEPP] defines certain developments that fall under Part 3A; that is, development deemed to be significant to New South Wales. Clause 6 of the Major Development SEPP states:

"[1] Development that, in the opinion of the Minister, is development of a kind:

[a] that is described in Schedule 1 or 2, or

…

is declared to be a project to which Part 3A of the Act applies."

Schedule 1 of the Major Projects SEPP specifies certain classes of developments considered to be major development. In relation to coal mining, its states:

"[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."

Given that the proposed extension is for the purposes of coal mining, will have a capital investment in excess of $30 million and employs more than 100 people, it is classified as a major development and therefore should be considered under Part 3A of the EP&A Act.

Under Part 3A, the Minister for Planning is the consent authority.

Approval Process

There are nine main steps in the Part 3A approval process, starting from the declaration by the Minister that a development is a major project through to the Minister's determination. Each of these steps is described in Table 2 below.

Table 2 – Part 3A Approval Process

Step		Actions
1	Declaration	• The proponent makes a formal request to the Minister for Planning to declare the project as a major project to be assessed under Part 3A • The Minister makes an assessment whether to declare the project
2	Project Application	• A project application is submitted to the DoP, which can be accompanied by a PEA, to obtain terms of reference known as Environmental Assessment Requirements [EARs]
3	Planning focus meeting [PFM]	• Following receipt of the PEA, a PFM is normally held with government agencies to discuss the proposal
4	EARs	• The Director-General of the DoP issues EARs for the proposed development which must be addressed in an EA
5	Prepare draft EA	• A draft EA is prepared by the proponent addressing the EARs issued by the Director-General • During preparation of the draft EA, the proponent is required to consult with relevant stakeholders including the council, government agencies and the community • Once submitted, the Director-General assesses the adequacy of the draft EA against the EARs
6	Public exhibition	• If adequate, the EA is finalised and placed on public exhibition for a period of not less than 30 days
7	Consideration of submissions	• The proponent responds to all submissions made during the public exhibition process • If changes are made to the proposed development to address concerns, the proponent generally prepares a preferred project report [PPR]
8	Assessment report	• The DirectorGeneral provides an assessment report to the Minister with a recommendation whether the proposed development should be approved or refused
9	Determination	• The Minister approves or refuses the application

Other Approvals

It should be noted that there are a number of authorisations or licences under other legislation that do not apply to projects approved under Part 3A, as well as a number of authorisations or licenses under other legislation that cannot be refused if they are necessary for carrying out projects approved under Part 3A. Section 75U of the EP&A Act lists the authorisations or licences under other legislation that do not apply to projects approved under Part 3A, including:

- permits under section 201, 205 or 219 of the *Fisheries Management Act 1994*;
- an approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*;

- a permit under section 87 or a consent under section 90 of the *National Parks and Wildlife Act 1974*;
- an authorisation referred to in section 12 of the *Native Vegetation Act 2003* [or under any Act to be repealed by that Act] to clear native vegetation or State protected land;
- a permit under Part 3A of the *Rivers and Foreshores Improvement Act 1948*;
- a bush fire safety authority under section 100B of the *Rural Fires Act 1997*; and
- a water use approval under section 89, a water management work approval under section 90 or an activity approval under section 91 of the *Water Management Act 2000*.

In addition, Division 8 of Part 6 of the *Heritage Act 1977* does not apply to prevent or interfere with the carrying out of an approved project under Part 3A.

Section 75V of the EP&A Act lists the authorisations or licences under other legislation that cannot be refused if they are necessary for carrying out projects approved under Part 3A, including:

- a ML under the *Mining Act 1992*;
- an environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997*;
- a consent under section 138 of the *Roads Act 1993*; and
- a licence under the *Pipelines Act 1967*.

3.3 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act aims to protect matters deemed to be of National Environmental Significance [NES]. Administered by the Commonwealth Department of Environment, Water, Heritage and the Arts [DEWHA], the EPBC Act lists seven matters of NES, including:

- World Heritage properties;
- places listed on the National Heritage Register;
- Ramsar wetlands of international significance;
- threatened flora and fauna species and ecological communities;
- migratory species;
- Commonwealth marine areas; and
- nuclear actions [including uranium mining].

If an action [or proposal] will, or is likely to, have a significant impact on any of the matters of NES, it is deemed to be a Controlled Action and requires approval from the Commonwealth Environment Minister or the Minister's delegate. To determine whether a proposed action will or is likely to be a Controlled Action, an action may be referred to DEWHA.

Where an action is designated a Controlled Act, DEWHA decides on the approach to be used for assessing the relevant impacts of an action from any of the five different pathways. One of the assessment pathways is by an 'accredited process' whereby a state or territory manages the assessment on behalf of the Commonwealth [often referred to as a bilateral agreement].

On 17 June 2002, the Commonwealth accredited the NSW environmental assessment process under both the EP&A Act and *Threatened Species Conservation Act 1995* [TSC Act]. If the proposed

extension is deemed to be a Controlled Action and approval is required under the EPBC Act, the Commonwealth may elect that the action is assessed under the NSW bilateral agreement coordinated by the DoP.

On completion of the State process, a copy of DoP's assessment report will be forwarded to DEWHA. The Commonwealth Environment Minister must then make a decision on whether to approve the taking of the action within 30 business days of receiving the assessment report.

The Warkworth Mine extension project approvals schedule has been developed in such a way to integrate the Commonwealth approvals process, if required, into the State process under a bilateral agreement. The timing of the EPBC Act referral and Commonwealth Minister's decision is such that if approval was required under the EPBC Act, that the EARs could be developed to incorporate Commonwealth assessment requirements.

4. Stakeholder Engagement

4.1 Introduction

During and after the preparation of the EA, key stakeholders who have an interest in the project will be consulted to identify issues so that they can be considered in the EA and incorporated into ongoing environmental management of the mine.

The aim of stakeholder engagement will be to:

- identify stakeholders who have an interest in the project and ongoing operations at Warkworth Mine;
- provide stakeholders with accurate and timely information on the project;
- identify stakeholders issues and understand how these will be addressed in the EA; and
- identify potential initiatives that WML could incorporate within the proposed extension, to help minimise the impact on the environment and help make a significant contribution to present and future generations.

For WML, stakeholder engagement for the Warkworth Mine extension project will be specific to the project and in addition to the regular and ongoing engagement they have with stakeholders in relation to their operations. WML, through Coal & Allied, maintain offices in the main street of Singleton that provides an avenue for the community to meet with company representatives at any time during business hours.

4.2 Stakeholder Identification

Stakeholders identified for engagement during and after the preparation of the EA include:

- local, State and Commonwealth government agencies;
- neighbours, local and regional community;
- Aboriginal groups;
- MTW Community Consultation Committee [CCC];
- employees;
- neighbouring mines;
- State and Commonwealth members and government ministers;
- industry representative groups; and
- the media.

The above list is not definitive and will be reviewed and updated as the project develops.

4.3 Stakeholder Engagement Activities

The stakeholders previously identified will be engaged through a range of engagement activities as described below.

Table 3 – Stakeholder Engagement Activities

Stakeholder	Engagement Activities
State and Commonwealth government agencies and SSC	• PEA • PFM • Meetings with agencies on specific issues • Newsletters
Neighbours, local and regional community	• Phone calls • Meetings • Newsletters • Community information sessions • Shopfront facilities in Singleton and Muswellbrook
Aboriginal community groups	• Coal & Allied Aboriginal Cultural Heritage Working Group • Phone calls • Meetings • Newsletters • Participation and review of Aboriginal heritage survey assessment • Participation in development of Aboriginal cultural heritage management plan
Mount Thorley Warkworth CCC	• Presentation at CCC meetings • Newsletters • Community information sessions
Employees	• Briefings • Newsletters
Neighbouring mines	• Briefings • Newsletters
State and Commonwealth members and government ministers	• Briefings • Newsletters
Industry representative groups	• Briefings • Newsletters
The media	• Newsletters • Press releases and media responses as required

4.4 Engagement Activities Prior to PFM

Prior to the PFM on 25 August 2009, a number of stakeholders identified above were engaged in relation to the proposed extension. These activities [completed and planned] are described in the table below. Three meetings have been held with the DoP since March 2009 to discuss the development of an in principle mine plan.

Table 4 – Stakeholder Engagement Activities Prior to PFM

Date	Engagement
24 March 2009	• Meeting with DoP
5 May 2009	• Meeting with DoP
24 June 2009	• Meeting with DoP
Prior to 11 August 2009	• Briefing of SSC
Prior to 11 August 2009	• Brief members of CCC
Prior to 11 August 2009	• Brief employees
Prior to 11 August 2009	• Brief community leaders
11 August 2009	• Distribution of PEA to government agencies and SSC
Two weeks commencing 10 August 2009	• Advertisements in local newspaper [Singleton Argus]
18 August 2009	• Meeting with DEWHA
20-22 August 2009	• Community information sessions at Bulga and Warkworth • Information available at Coal & Allied shopfronts during business hours
25 August 2009	• PFM • Update WML component on Coal & Allied website • Media release to announce proposed extension
27 August 2009	• Coal & Allied Aboriginal Cultural Heritage Working Group meeting
September 2009	• Lodge EPBC Referral • Distribution of WML newsletter in Singleton

5. Preliminary Assessment

5.1 Introduction

This chapter provides an initial description of a preliminary assessment of potential environmental impacts as a consequence of the proposed Warkworth Mine extension. Detailed assessments will be reported in the EA.

5.2 Ecology

The proposed extension to Warkworth Mine will extend approximately 900m to the west of the current approval boundary towards Wollombi Brook. In total approximately 1,271ha of land will be disturbed, including approximately 566ha of land approved for mining in the 2003 and 705ha of land outside of this approved disturbance area. Some 46% of proposed extension area is located within the previous Green Offsets package that was required as part of the 2003 approval to extend the Warkworth Mine is encompassed by the proposed extension.

WML is currently preparing a new package to offset the ecological loses caused by the proposed mine extension and will form part of the EA. This offsets package is discussed in further detail below.

The impacts of the proposed mine extension on ecology will be from the staged clearance of woodland vegetation and fauna habitat. The extension area contains five vegetation communities and provides habitat for threatened woodland bird species, and the threatened Squirrel Glider. Commonwealth and State listed threatened species such as Regent Honeyeater, Swift Parrot and Large-eared Pied Bat have been recorded on one occasion only out of numerous surveys of Warkworth MLs.

The following tables [Tables 5 and 6] provide details on the areas of vegetation likely to be disturbed by the proposed extension, including areas to be cleared within the approved 2003 extension area. All areas quoted have been rounded.

Table 5 – Area of Vegetation to be Disturbed within 2003 Extension of Warkworth Mine

Vegetation Community	Area (ha)	Area Cleared Since 2002 (ha)
Central Hunter Grey Box - Ironbark Woodland	206	43
Central Hunter Ironbark - Spotted Gum - Grey Box Forest	1	0
Derived Native Grassland	145	80
Hunter Lowlands Red Gum Forest	3	0
Warkworth Sands Woodland	35	0
Total	**390**	**123**
Total Excluding Grassland	**245**	**43**

Table 6 – Area of Vegetation to be Disturbed within Proposed Extension Area

Vegetation Community	Area (ha)
Central Hunter Grey Box - Ironbark Woodland	374
Central Hunter Ironbark - Spotted Gum - Grey Box Forest	29
Derived Native Grassland	207

Vegetation Community	Area (ha)
Warkworth Sands Woodland	68
Total	**678**
Total Excluding Grassland	**471**

DECCW has prepared principles for the use of biodiversity offsets. Foremost among these is the principle that impacts must be avoided where possible by using prevention and mitigation measures. This principle means that the ecological impacts of proposed developments should be managed as follows:

- Avoid: to the extent possible, developments should be designed to avoid or minimise ecological impacts;
- Mitigate: where certain impacts are unavoidable through design changes, mitigation measures should be introduced to ameliorate the ecological impacts of the proposed development; and
- Compensate: the residual impacts of the project should be compensated for in some way to offset what would otherwise be a net loss of habitat.

It should be noted that underground mining of this resource was investigated and determined as not feasible due to a number of factors, including the fact that seven of the 11 coal seams are too thin for underground mining and that long wall mining panels can only follow straight boundaries and the mining area is not rectangular, meaning curved boundary reserves would be sterilized. Also, for stability reasons, buffers would be needed adjacent to the current open cut mine high wall [100m] and around the new mine boundaries [20m]. The combination of these factors would result in only 19% of the identified resource being able to be extracted. Therefore, the proposed action is an extension of an open cut mine and therefore avoidance of ecological impacts is not feasible given the location, depth and structural characteristics of the minable coal deposit.

A range of mitigation measures have been used on the current mine site, including rehabilitation and these will be used for the current proposal. However, there will remain a sizeable residual impact that will require offsetting under not only DECC requirements but also Rio Tinto's Biodiversity Standard, utilised by WML, that requires projects to attain a net positive impact on biodiversity.

An offsets package for the proposed action is currently under preparation and may consist of a combination of:

- land with similar vegetation and habitats for immediate compensation;
- restoration of offsite areas of degraded vegetation communities to provide further habitat in the future;
- funding contributions to the appropriate government departments for use in conservation programs; and
- vegetation and habitat restoration on previously mined areas.

Furthermore, the vegetation in the area to undergo mining will be rehabilitated to create woodland post mining, resulting in at least an equivalent amount of fauna habitat to be established in the future.

Many endangered ecological communities attain this status simply because of the limited areas that remain in natural settings. When selecting offsets, preference will be given to areas of land that afford like for like or better within the limitations of the extent of the communities that remain within the bioregion. This means that if land becomes available that supports rarer or higher

conservation value entities than those proposed to be cleared, preference may be given to acquiring that land where reasonable and feasible. The determination of like for like or better will be determined in consultation with State and Commonwealth agencies.

5.3 Aboriginal Heritage

The proposed Warkworth Extension has the potential to affect Aboriginal cultural heritage located within the extension development areas. The portion of the extension area located east of Wallaby Scrub Road has been subject to Aboriginal cultural heritage assessment for the 2002 Warkworth Mine Extension EIS [AMBS 2002]. Subsequent to the 2002 EIS assessment, an Aboriginal Cultural Heritage Management Plan was developed and approved under the current development consent for the Warkworth Mine.

The greater portion of the currently proposed Warkworth Mine extension area is located west of Wallaby Scrub Road. This area has been subject to more recent comprehensive Aboriginal cultural heritage survey assessments during 2008 and 2009. These recent surveys involved field teams conducting pedestrian transects across the entire proposed extension area and also adjacent Coal & Allied owned lands. The assessments have identified a number of significant Aboriginal cultural heritage sites that are located within the proposed extension area and in potential off-set areas.

Aboriginal community consultation is conducted through the auspices of the Coal & Allied Upper Hunter Valley Aboriginal Cultural Heritage Working Group [CHWG]. Coal & Allied established the CHWG in 2005 and it is comprised of representatives from Coal & Allied and the Upper Hunter Valley Aboriginal community groups, corporations and individuals. The CHWG was established so that Coal & Allied and the Aboriginal community could develop and implement a new cultural heritage consultation and management process in the Upper Hunter Valley. Coal & Allied consults directly with the Aboriginal community to cooperatively develop, implement and manage cultural heritage management programs, such as those at the Warkworth Mine.

Coal & Allied will prepare an Aboriginal cultural heritage assessment report for the proposed extension area and it will form part of the project EA. The Aboriginal cultural heritage assessment report will provide the basis for discussions between Coal & Allied and the CHWG on a revised Aboriginal Cultural Heritage Management Plan [ACHMP] for Warkworth and the ACHMP will apply to the consolidated Warkworth Mine consent area, that is the current and the proposed extension areas.

5.4 European Heritage

The proposed extension of Warkworth Mine is likely to impact on the eastern end of an airstrip constructed and utilised by the Royal Australian Air Force during World War II. Impacts are only expected near the end of proposed mining [at or near Year 21]. The airstrip may also be impacted if Wallaby Scrub Road is relocated.

Whilst it is not listed as a heritage item under local environmental planning instruments, to assess potential impacts of the proposed extension on the airstrip, a heritage assessment will be undertaken in accordance with requirements of the Heritage Branch of DoP.

5.5 Noise and Vibration

As previously mentioned the proposed extension will advance closer to Bulga, involve removal of the Saddleback Ridge and require higher overburden emplacements due to higher strip ratios. Saddleback Ridge currently provides a physical barrier for residents at Bulga and its surrounds.

This means that equipment, including dump trucks carting overburden, is likely to operate in areas less shielded from residential and other sensitive receptors, although these will operate some distance away. This equipment may create a zone of affectation that would extend towards Bulga and surrounding properties to the south west and west of the proposed extension area.

A detailed noise and vibration assessment will be undertaken in accordance with requirements from DECCW and other regulators. The assessment will be undertaken to assess potential acoustic impacts of the proposed extension, in accordance with relevant guidelines such as DECCW's *Industrial Noise Policy* and the ANZECC blasting guidelines.

During the assessment, on-site field validation of the modelling software will be undertaken to explore the effects of weather conditions on noise propagation in the locality. This validation was undertaken during the noise and vibration assessment conducted in 2002 for the previous extension, and resulted in more accurate modelled noise levels under adverse wind conditions. This field validation is designed to increase the precision of the modelling.

The assessment will also consider appropriate source and receiver mitigation measures. All assessments will be based on updated background noise monitoring to take account of changes to local acoustic conditions arising from recent developments at Wambo, Bulga, Beltana and other mines.

5.6 Air Quality

The proposed extension to Warkworth Mine will require longer haul roads and greater exposed areas which are likely to lead to higher dust emissions. An initial assessment suggests that there will be few directly affected properties due to PM_{10} annual but PM_{10} 24 hour and cumulative impacts could occur. The zone of affectation may overlap with that for noise and vibration.

To assess potential air quality impacts of the proposed extension, a detailed air quality assessment will be undertaken in accordance with requirements from DECCW and other regulators. The assessment will be undertaken in accordance with relevant guidelines and policies such as DECCW's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW.*

As part of the air quality assessment, the model will be calibrated by assessing a historical mine year. This calibration is designed to increase the precision of the modelling.

The air quality assessment will be based on updated and improved meteorological data including that from a second on-site monitoring station, which will assist with data validation. Potential mitigation measures, such as re-orientating major emission sources to reduce wind exposure, increasing the rate of rehabilitation and modifying the mine plan, will be considered as part of the assessment.

5.7 Groundwater

The open cut will extend to within 800m to 1,650m of Wollombi Brook. The alluvial sediments adjoining the Wollombi Brook contain groundwater that is used for stock watering and irrigation, and potentially potable purposes. It is conceivable that removal of coal seams and other strata in the vicinity could reduce groundwater pressure and, if the alluvial and deeper aquifers are linked, cause loss of water from the former.

The characteristics of the alluvial [surficial] aquifer are well understood as there are a large number [138] of bores in and around it. However, most extend only into or just through the alluvium and it will be necessary to establish and monitor a number of deeper bores to understand groundwater linkages between the various aquifers. These bores are now installed and will be monitored to provide a sound basis for the detailed groundwater assessment. Previous studies undertaken in this area stated that low permeability residual clays underlying the sands act as a low permeability barrier that result in the formation of an ephemeral perched aquifer forming after rainfall. The water levels present in the deeper Permian coal measures is significantly deeper than the perched aquifer, with the depth to water in bores located in close proximity to the Wollombi Brook measures at about 36m below ground level. This information suggests that a direct hydraulic connection between Wollombi Brook, and the proposed mine pits, through the alluvial sediments is not present. The groundwater investigation for the EA will confirm if this is the case and also accurately define the boundaries of the alluvium in areas near the mine.

To assess potential impacts of the proposed extension on groundwater, a groundwater assessment will be undertaken in accordance with requirements from the NSW Office of Water [NOW] and other regulators. The assessment will address the potential for any groundwater impacts resulting from the proposed extension, including modelling the cumulative groundwater impacts with existing industry or approved mining projects [including groundwater impacts on each identified privately owned bore within the predicted drawdown from the project]. The assessment will be based on a modelling exercise utilising the MODFLOW SURFACT simulation package to identify predicted groundwater inflows at representative years, identify the predicted cones of depression and determine potential impacts to the various groundwater users.

5.8 Surface Water

Due to the integrated operation and sharing of infrastructure with Mount Thorley Mine, a surface water assessment of the Warkworth Mine extension will also include the operations at Mount Thorley Mine to enable a water balance for the operations at MTW. Initial assessments of water inputs and outputs for MTW, including Warkworth Mine, have been made, and they show a potential small increase in surplus water being generated by the proposed extension. Options for use of this, such as dust suppression and enhanced rehabilitation, along with capacity to provide greater storage on-site will all be investigated.

Additionally, the surface water study will examine flood levels along Wollombi Brook to determine if any extra protection is needed. While the 1% Annual Exceedance Probability [AEP] levels are known, less frequent events and higher rainfall intensities will be considered.

5.9 Visual Amenity

The proposed mine extension is not likely to be visible from most areas to the north, south and east. However, as a result of the proposed removal of Saddleback Ridge and the progressive movement of the overburden emplacement westwards, some elements of the mine are likely to be visible to elevated parts of Bulga where current views are mostly of varied topography consisting of rural lands, woodlands and open cut mining. Riparian vegetation along Wollombi Brook currently provides screening for receptors at near ground level.

To assess potential visual impacts of the proposed extension, a detailed visual assessment will be undertaken. The assessment will illustrate and assess changes to the landscape through the use of photomontages to identify impact areas and provide a basis for developing mitigation measures. Mitigation measures may include foreground planting and screening at receivers, visual barriers between source and receivers [eg along roads] or, modification of mine associated landforms.

5.10 Traffic and Transportation

The proposed activities at Warkworth Mine will require the closure or relocation of Wallaby Scrub Road. As stated in Chapter 2, closure is likely to be required at approximately Year 7 [nominally 2017]. An increase in employees and contractors associated with the extension may also result in an increase in traffic.

To assess potential traffic impacts of the proposed extension, a traffic and transportation assessment will be undertaken. The assessment will consider the impacts of the closure and/or relocation of Wallaby Scrub Road and likely impacts of increased employees and contractors accessing the site by local roads. Feedback from engagement with the local community and SSC in relation to Wallaby Scrub Road closure/relocation will be considered and a recommendation made in the EA.

5.11 Soils and Land Capability

A soils and land capability impact assessment will be undertaken to assess the potential impact on soils and land capability. An assessment of representative soil profiles and soils and capability/suitability units will be made. Proposed disturbance areas will be assessed in accordance with guidelines from DPI and DoP. In particular, soil layers at each profile site within these areas will be assessed according to a procedure devised by Elliot & Veness [1981] for the recognition of suitable topdressing materials.

Topsoil management and mitigation measures specific to the project site will be developed and included in the assessment report.

Pre and post mining land capability and agricultural suitability classes will be established in accordance with DWE and DPI guidelines. Given the outcomes of the post mining land capability and agricultural suitability assessments, suitable post mining land-uses will be assessed and proposed with recommendations.

5.12 Socio-Economics

The extension project has the potential for positive and negative impacts. Positive impacts include extension and expansion of employment, with ongoing support of local commercial and community activities providing social stability. Conversely, certain residences in and around Bulga village may be unavoidably affected by dust, noise and vibration and some may require acquisition by the proponent upon request. If this were the case, this would be towards the end of the life of the mine when the extension moves closer to Bulga. Properties purchased by the proponent following acquisition requests where levels exceed statutory criteria may be tenanted and this may have some influence on local social networks.

On balance the net social effects are likely to be positive. The number of households that may benefit from additional job opportunities and related economic stimulus is likely to be in the order of five times greater than those potentially affected by dust, noise and vibration based on preliminary assessments.

To assess potential social and economic impacts of the proposed extension, a detailed social and economic assessment will be undertaken. The study will consider the results of other technical assessments [such as the air quality, noise and vibration and visual assessments] and the results of stakeholder engagement.

The social and economic study will document numbers of households affected positively and the resultant implications for related organisations and activities. Negatively affected households will also be identified.

Traditional socio-economic assessments of the cost-benefit of a project in an EA typically use the 'threshold value analysis' method. Under this method, the net production benefits provide a threshold value that environmental impacts would need to exceed to make the costs of mining exceed the benefits. Whether or not environmental impacts are likely to exceed net production benefits is left to the decision-maker.

Estimation of the economic cost of environmental impacts in a cost-benefit analysis requires application of non-market valuation methods. As part of the assessment, the innovative 'choice modelling' method will be used to identify surrogate monetary values for the key environmental attributes likely to be impacted by the proposed extension. It will be used to determine how much the community values mining impacts on key environmental attributes such as native vegetation, Aboriginal heritage, social dislocation etc. Choice modelling involves developing and implementing a community questionnaire that contains a number of choice sets. Each choice set contains a number of mine impact scenarios, each with varying levels of impact on a fixed set of environmental attributes. By observing and modelling how people change their preferred option in response to the changes in the levels of the attributes, it is possible to determine how they trade-off between the attributes. When one of the attributes being traded off is a monetary amount, it is possible to infer peoples' willingness to pay [value] to obtain varying amounts of each of the environmental attributes.

The outcome of choice modelling studies is a set of value estimates for the differing levels of impact on each environmental attribute. This data can then be used to more accurately inform decision-makers of the economic benefits and costs of the project.

In addition to the above, input-output analysis is typically used to examine the economic stimulus of a project to the regional or State economy rather than costs and benefits, and is considered a useful adjunct to benefit cost analysis and a link to social impact analysis. The Hunter Valley Research Foundation has completed a study for Coal & Allied referred to as the Hunter Valley Community Baseline in February 2008. The intent of the study was to provide a thorough analysis of the social and economic context that supports Coal & Allied's operations in the Hunter Region including Upper Hunter, Muswellbrook, Singleton, Cessnock and Maitland local government areas. The study utilised a number of research methodologies including:

- information audit;
- socio-economic profile;
- community survey; and
- input-output analysis.

The results of this study will be drawn upon in the EA, providing a baseline for assessment. In addition, the input-output analysis will be revised to take into account the Warkworth Mine Extension.

6. Preliminary Environmental Risk Assessment

The primary purpose of this report is to identify and determine the significance of potential environmental impacts associated with the proposed extension of Warkworth Mine. Potential impacts have been identified in the preceding sections based on preliminary assessments but they will not be of equal significance, varying in terms of both their likelihood and effects.

To provide a sound basis for informed scoping of the EA, the preliminary environmental risks of the project have been rated according to their significance, using two variables, namely:

- the potential severity or consequences of the impact assuming the proposed safeguards, design or management measures are applied; and
- the likelihood that the proposed safeguard, management or design measure will fail or be ineffective.

In each case, impacts have been rated using Rio Tinto's *HSEQ Qualitative Risk Assessment (Level 2)* procedure, as given below.

Severity or consequences of impact:

- Minor: Near-source confined and promptly reversible impact on-site with little or no off-site impact expected;
- Medium: Near-source confined and short-term reversible impact on-site with little promptly reversible off-site impact;
- Serious: Near-source confined and medium-term recovery impact on-site with near-source confined and short-term reversible off-site impact;
- Major: Impact that is unconfined and requiring long-term recovery, leaving residual damage on-site with near-source confined and medium-term recovery of off-site impacts; and
- Catastrophic: Impact that is widespread-unconfined and requiring long-term recovery, leaving major residual damage on-site with off-site impact that is unconfined and requiring long-term recovery and leaving residual damage.

Likelihood of consequence:

- Rare: Event that is very unlikely to occur during the lifetime of the project;
- Unlikely: Event that is unlikely to occur during the lifetime of a project;
- Possible: Event that may occur during the lifetime of the project;
- Likely: Event that may occur frequently during the lifetime of the project; and
- Almost Certain: Recurring event during the lifetime of the project.

Table 7 below shows the risk matrix used to identify environmental risks to determine priorities for the EA. In each case a score of 1 to 5 is given for the consequence and likelihood of an event occurring and the scores are added to determine environmental risk. There are four classes of environmental risk utilised in this preliminary assessment, with these being:

- Low: Risks that are below the risk acceptance threshold and do not require active management. Certain risks could require additional monitoring.
- Moderate: Risks that lie on the risk acceptance threshold and require active monitoring. The implementation of additional measures could be used to reduce the risk further.

- High: Risks that exceed the risk acceptance threshold and require proactive management. Includes risks for which proactive actions have been taken, but further risk reduction is impracticable.

- Critical: Risks that significantly exceed the risk acceptance threshold and need urgent and immediate attention.

Table 7 – Preliminary Environmental Risk Matrix

Likelihood of Impact	Consequence of Impact: 1 Minor	2 Medium	3 Serious	4 Major	5 Catastrophic
5 Almost Certain	6 [Moderate]	7 [High]	8 [Critical]	9 [Critical]	10 [Critical]
4 Likely	5 [Moderate]	6 [High]	7 [High]	8 [Critical]	9 [Critical]
3 Possible	4 [Low]	5 [Moderate]	6 [High]	7 [Critical]	8 [Critical]
2 Unlikely	3 [Low]	4 [Low]	5 [Moderate]	6 [High]	7 [Critical]
1 Rare	2 [Low]	3 [Low]	4 [Moderate]	5 [High]	6 [High]

The results are given in Table 8 below.

It is important to note that the ratings given in the table are based on an understanding of existing operations and environmental interactions of Warkworth Mine and a preliminary assessment of likely impacts associated with the proposed extension. As such, individual scores should not be seen as quantitative, they are only a guide to relative significance with the purpose to sort and prioritise studies of focus for the EA.

Table 8 – Preliminary Environmental Risk Rating

Issue	Consequence	Likelihood	Priority
Ecology			
Impact upon threatened flora and vegetation communities	3	4	7 [High]
Impact on threatened fauna	3	3	6 [High]
Impact on habitat for native species	3	3	6 [High]
Cumulative ecological impacts	3	4	7 [High]
Aboriginal Heritage			
Impact on Aboriginal artefacts	3	4	7 [High]
Impact on cultural heritage	3	4	7 [High]
European Heritage			
Impact on European heritage	1	2	3 [Low]

Issue	Consequence	Likelihood	Priority
Noise and Vibration			
Noise impacts on residential receptors	3	3	6 [High]
Vibration impacts on buildings and structures	1	2	3 [Low]
Cumulative noise impacts	3	2	5 [Moderate]
Air Quality			
Air quality impacts on residential receptors	3	3	6 [High]
Cumulative air quality impacts	3	2	5 [Moderate]
Groundwater			
Impact on hard rock aquifers	3	2	5 [Moderate]
Impacts on the Hunter alluvium	1	2	3 [Low]
Surface Water			
Impacts on Hunter River – water draw	1	1	2 [Low]
Impact on local hydrological flows	1	2	3 [Low]
Impacts on Hunter River – water discharge	1	1	2 [Low]
Visual			
Impact on surrounding receptors	3	2	5 [Moderate]
Impact on nature of surrounding area	3	2	5 [Moderate]
Traffic and Transportation			
Changes to local traffic networks	2	3	5 [Moderate]
Increases in traffic volumes	1	1	2 [Low]
Soils			
Erosion	1	2	3 [Low]
Social and Economic Impacts			
Amenity impacts on residents	3	3	6 [High]
Social impacts [community disruption]	2	3	5 [Moderate]

The results of the preliminary risk assessment show that the relative environmental risks vary between the typical aspects that are subject of an EA.

The preliminary risk assessment has identified an order of study significance for the EA as follows:

- highest significance: ecology and Aboriginal cultural heritage;
- high significance: noise, air quality and visual amenity; and
- medium significance: social, traffic and transportation and potentially groundwater.

The above does not mean that other aspects, such as surface water and soils, are not important. Rather, the assessment suggests that these aspects can be effectively managed whereas the more significant study elements will require particular attention in the EA.

7. Conclusions

Since the 2002 proposal to extend Warkworth Mine, world energy demand has grown significantly causing increased coal prices. This has had two effects: previously uneconomic deposits are now viable and greater coal output can be supported.

Accordingly, economic coal reserves have now been identified at Warkworth Mine by WML as part of the June 2009 LOM planning process. These economic coal reserves cover additional areas to those identified in 2002 due to higher long term average prices for coal.

Plans for extension of Warkworth Mine have been developed in this context. It is probable that the extension would also improve efficiency enabling a substantial upgrading of plant and equipment, and extending and increasing employment.

The new mine plan primarily involves extension westwards across Wallaby Scrub Road and towards Wollombi Brook and bound by Putty Road to the south, with progressive filling and rehabilitation of pits to the east. Upgrading of some support facilities, workshop and offices, would also occur.

The extension has the potential for positive and negative impacts. Positive impacts would include: extended and increased employment, substantial capital investment, and significantly greater royalties and tax payments. Also, much of the current mined area would be rehabilitated.

The project would also have some potential negative impacts:

- loss of locally significant ecological and cultural resources. This would not be permanent in all cases because of post mining rehabilitation and the new off-sets would more than compensate for temporary local losses; and
- local noise, visual, air quality and related amenity impacts caused both directly and cumulatively.

The EA will focus on these aspects to ensure their magnitude is accurately determined and that proposed strategies will be effective. Other potential impacts will also require careful investigation but it is probable that they can be managed effectively using established safeguards.