PROPOSED ALTERATIONS TO THE WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE

STATEMENT OF ENVIRONMENTAL EFFECTS

JUNE 2004

WAMBO COAL PTY LIMITED

ResourceStrategies

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13 August 2004

Minister for Infrastructure and Planning
Department of Infrastructure, Planning and Natural Resources
GPO Box 3927
SYDNEY NSW 2001

Dear Minister

Proposed Alterations to the Wambo Development Project Rail and Train Loading Infrastructure
Development Application No. 177-8-2004-i

Wambo Coal Pty Limited (WCPL) requests the Minister agree to the amendment of Development Application No. 177-8-2004-i under clause 55 of the Environmental Planning and Assessment Regulation 2000.

Since the completion of the enclosed Statement of Environmental Effects (SEE) (*Proposed Alterations to the Wambo Development Project Rail and Train Loading Infrastructure* – WCPL, June 2004), WCPL has undertaken further detailed design of the rail infrastructure. As a result of this design work WCPL proposes to further alter the alignment of portions of the loop from that described in the enclosed SEE. As described below, this alteration will remove the need to re-align Wallaby Scrub Road and reduce the number of rail underpass intersections with Wallaby Scrub Road from two to one.

Figure A (attached to this letter) illustrates the alteration to the rail loop alignment when compared to that shown in Figure 3 of the enclosed SEE.

Rail Loop Alignment

The enclosed SEE describes (Section 2) and illustrates (Figure 3) the rail loop. It is proposed to alter this alignment to that shown on Figure A. The revised rail loop alignment would result in approximately the same length of rail loop; however, both lines on the loop would pass through the same underpass of Wallaby Scrub Road (Figure A). The Train Loading Area has also been expanded (Figure A).

Wallaby Scrub Road

With the proposed changes to the rail loop alignment, it is no longer necessary to re-align Wallaby Scrub Road (as indicated in SEE Figure 3). WCPL proposes, however, to upgrade the intersection of Wallaby Scrub Road with the Golden Highway at the location shown on Figure A in accordance with the Roads and Traffic Authority and AUSTROADS design standards.

Environmental Implications

Presented below is an assessment of the change in the environmental effects of the development as a result of the proposed amendment of Development Application No. 177-8-2004-i. The change in environmental effects is addressed for each of the environmental issues considered in the SEE.

Land Resources

The proposed minor realignment of the rail loop would not change the potential topographic and landscape effects from that described in the SEE. However, avoiding the need to re-align a 450 m section of Wallaby Scrub Road would result in a reduction to potential impacts on land resources. The nature of the development and associated construction works would remain unchanged.

Visual

The SEE assesses the potential visual impacts of Development Application No. 177-8-2004-i from the viewpoints listed below. From each of these view points the change in potential visual impact as a result of the proposed amendments to Development Application No. 177-8-2004-i would be as follows:

- Golden Highway East of Warkworth (looking north) – no change to potential visual impact as it is not proposed to amend portions of Development Application No. 177-8-2004-i in this view-scape.

- Golden Highway East of Warkworth (looking south) – minor reduction in potential visual impacts when compared to Development Application No. 177-8-2004 due to the decreased length of rail loop immediately adjacent to the highway.

- St Philips Church - no change to potential visual impact as it is not proposed to amend portions of Development Application No. 177-8-2004-i in this view-scape.

- Henderson Residence - no change to potential visual impact as it is not proposed to amend portions of Development Application No. 177-8-2004-i in this view-scape.

- Wallaby Scrub Road - minor reduction in potential visual impacts when compared to Development Application No. 177-8-2004 due to avoiding the need to realign a 450 m section of Wallaby Scrub Road. A further minor decrease in potential visual impacts would result from building only one rail underpass rather than two.

- Hawkes Property – the nature of the potential visual impacts along the northern boundary of the Hawkes property would remain unchanged from that assessed for Development Application No. 177-8-2004-i however the frequency of partially visible (i.e. through gaps in vegetation) train movements would increase along the eastern sections of the northern boundary of the property. This is due to the fact that the loop rail lines carrying the outbound and inbound coal trains would converge at this point (refer Figure A) where as they were separated by approximately 200m to 300m in Development Application No. 177-8-2004-i (refer SEE Figure 3). The visibility of trains would also be marginally increased due to portions of the inbound line being on a low embankment. The Hawkes dwelling is located more than 500m from the rail alignment.

Potential night lighting impacts associated with train movements on the rail infrastructure are expected to remain generally unchanged.

Acoustics

The proposed amendment to Development Application No. 177-8-2004-i would not change the potential noise impacts assessed in the SEE as noise emissions from the rail loop and coal handling infrastructure would remain unchanged and their general location is within the limits of that previously assessed.

Rail Transport Vibration and Blasting Vibration and Overpressure

Potential impacts associated with rail transport vibration and blasting vibration and overpressure are unchanged from that assessed in the SEE as the source of these emissions (coal trains movements and rail construction activities) and the distance between the rail line and nearby sensitive receptors would not be decreased as a result of the proposed amendment to Development Application No. 177-8-2004-i.

Air Quality

The proposed amendment to Development Application No. 177-8-2004-i would not result in any significant changes (increases or decreases) in the air quality effects described in the SEE as the nature, source and general location of air quality emissions would remain unchanged as a result of the proposed amendment to Development Application No. 177-8-2004-i. However, there would be a slight reduction in construction air quality emissions due to the reduction in the disturbance area resulting from avoiding the need to realign a 450 m section of Wallaby Scrub Road.

Surface Water Resources

The proposed amendment to Development Application No. 177-8-2004-i would result in a slight reduction in the potential for erosion and sedimentation related impacts due to the reduction in the disturbance area resulting from avoiding the need to realign a 450 m section of Wallaby Scrub Road.

Flora and Terrestrial Fauna

The proposed amendment to Development Application No. 177-8-2004-i would reduce the disturbance of remnant vegetation due to not realigning a 450 m section of Wallaby Scrub Road. Consequently, potential flora and fauna impacts would be marginally reduced.

Community Infrastructure

The proposed amendment to Development Application No. 177-8-2004-i would not result in a significant change (increase or decrease) to the community infrastructure effects described in the SEE as the capital expenditure and employment would not change significantly.

Aboriginal Heritage

The proposed amendment to Development Application No. 177-8-2004-i would not change the potential Aboriginal Heritage impacts from those described in the SEE.

Non-Aboriginal Heritage

The proposed amendment to Development Application No. 177-8-2004-i would not change the potential Non-Aboriginal Heritage impacts from those described in the SEE.

Road Transport

The proposed amendment to Development Application No. 177-8-2004-i would potentially result in a minor reduction in construction related disruptions to traffic flows on Wallaby Scrub Road due to dispensing with the need for the road realignment and the second underpass.

Hazard and Risk

The proposed amendment to Development Application No. 177-8-2004-i would result in no change to the potential hazards and risks of the development as the scale and nature is generally unchanged.

Environmental Management and Mitigation Measures

The environmental management and mitigation measures presented in the SEE would remain unchanged as a result of the proposed amendment to Development Application No. 177-8-2004-i.

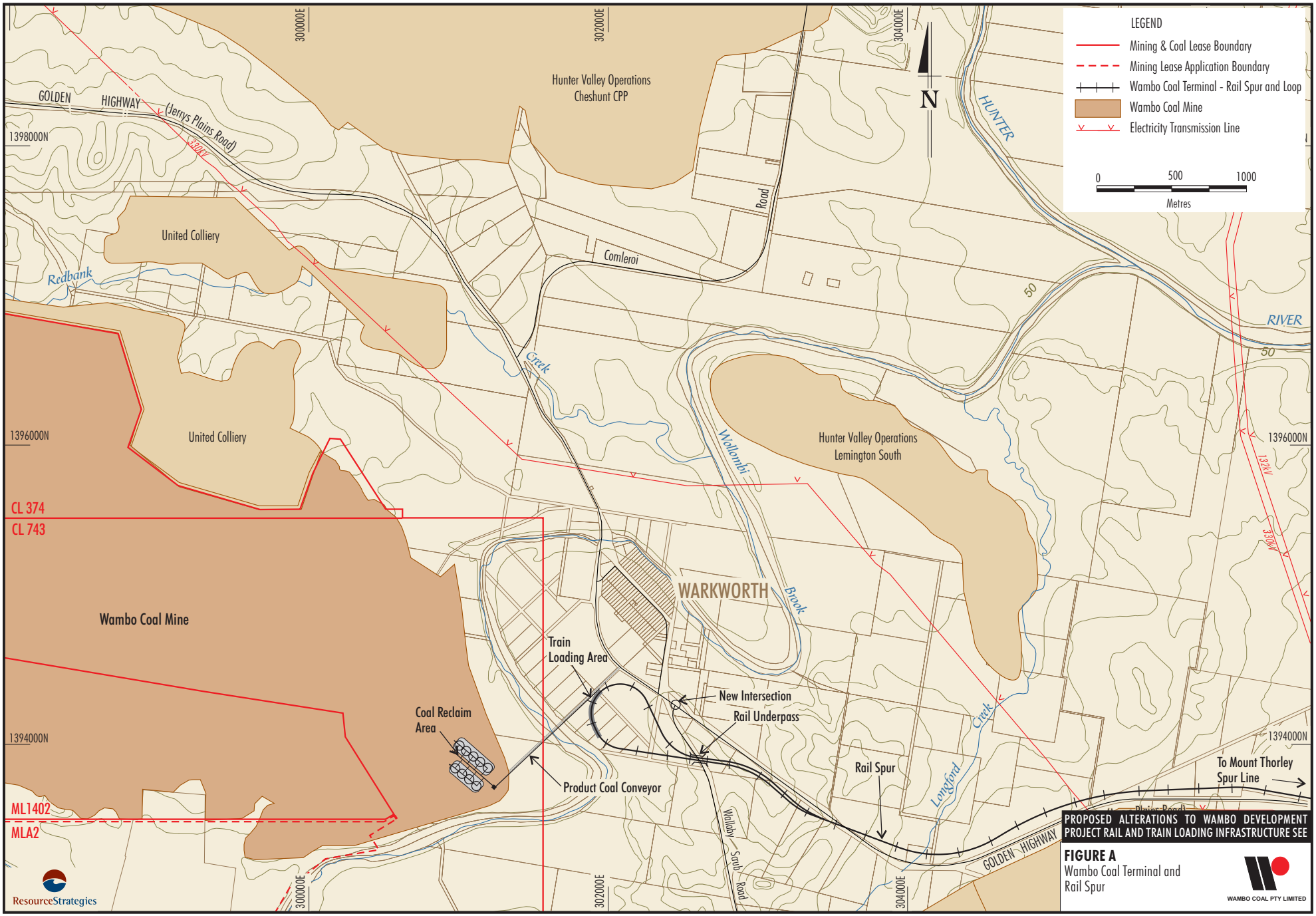
Conclusion

Based on the above it is considered that the proposed amendment to Development Application No. 177-8-2004-i would not significantly change the scale or nature of the development and the associated environmental effects would not significantly change.

Yours sincerely

PETER DOYLE
Project Manager

cc. David Kitto



PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

FIGURE A
Wambo Coal Terminal and Rail Spur

WAMBO COAL PTY LIMITED

PROPOSED ALTERATIONS TO THE WAMBO DEVELOPMENT PROJECT
RAIL AND TRAIN LOADING INFRASTRUCTURE
STATEMENT OF ENVIRONMENTAL EFFECTS

Wambo Coal Pty Limited

JUNE 2004
Project No. WAM-04-04
Document No. SEE-01-E

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EXECUTIVE OVERVIEW

In July 2003, WCPL submitted two Development Applications (DA1 and DA2) for the Wambo Development Project accompanied by the Wambo Development Project Environmental Impact Statement (EIS). DA2 has been granted development consent by the NSW Minister for Planning and Infrastructure (the Minister). DA1 comprises the continued open cut and underground mining operations at the Wambo Coal Mine. DA2 (the Approved Project) comprises:

- construction and operation of a rail spur, rail loop, coal reclaim area, product coal conveyor and train load-out bin to enable the transport of product coal by rail to market;
- construction of a rail spur underpass beneath the Golden Highway;
- realignment of the intersection between Wallaby Scrub Road and the Golden Highway; and
- transportation of product coal to the market via nominal 8,600 tonne (t) capacity trains 24 hours per day, seven days per week.

As an outcome of the detailed design and land access constraints, WCPL proposes the following alterations to the Approved Project:

- alter the alignment of the rail loop and connect onto the Jerrys Plains Rail Line at a point that removes the requirement to build the 2.5 km rail spur;
- alter the alignment of the rail loop so as to remove the need for the rail spur underpass beneath the Golden Highway within the DA2 area; and
- construct two rail underpasses where the realigned Wallaby Scrub Road and the altered rail loop intersect.

This Statement of Environmental Effects provides a comparative assessment of the nature and scale of the Altered Project in comparison to the Approved Project and assesses the associated potential impacts.

The assessment indicates the key environmental implications of the alterations to be:

- A significant reduction in the area of land disturbance associated with rail construction (reducing from approximately 7 hectares to 4.4 hectares) and a 1.4 km decrease in the length of rail.
- No change to the overall potential operational noise emissions of the development.
- Minor reduction in the potential air quality impacts of the development during construction due to the decreased area of land disturbance.
- No change to potential air quality impacts of the development during operation.
- Reduction in potential visual impacts on the Henderson residence and the St Philips Church due to the rail alignment remaining on the southern side of the Golden Highway.
- Potential increase in the visual exposure of the Hawkes residence to the southern limb of the rail loop, although this section of the loop would be in a cutting and tree screening (existing and/or additional plantings) would be utilised.
- Reduced potential for disruptions to traffic flows on the Golden Highway due to the removal of the need for the construction of a rail underpass beneath the Golden Highway. Disruptions to traffic flows on Wallaby Scrub Road would be minimised by constructing the two rail underpasses prior to the commissioning of the realigned section of road.

- Reduced potential for erosion and sedimentation related impacts on Wollombi Brook due to the decreased area of land disturbance and removal of the rail spur from the Wollombi Brook flood plain north of the Golden Highway.

On the basis of the assessment it can be concluded that the proposed alterations to the Wambo rail loop alignment would not significantly increase the environmental impacts of the total development compared with the approved development.

1 INTRODUCTION

Wambo Coal Mine is owned by Wambo Coal Pty Limited (WCPL), which is a wholly owned subsidiary of Hunter Coal Pty Ltd. Wambo Coal Mine is located approximately 80 kilometres (km) north-west of Newcastle and 15 km west of Singleton in New South Wales (NSW) (Figure 1).

In July 2003, WCPL submitted two Development Applications (DA1 and DA2) to the NSW Minister for Planning and Infrastructure (the Minister) for the Wambo Development Project accompanied by the Wambo Development Project Environmental Impact Statement (the EIS). The two development application areas are shown on Figure 2.

DA1 (DA 305-7-2003-i) and DA2 (DA 306-7-2003-i) have been granted development consent by the Minister. DA1 comprises the continued open cut and underground mining operations at the Wambo Coal Mine. DA2 comprises (Figure 3):

- construction and operation of a rail spur, rail loop, coal reclaim area, product coal conveyor and train load-out bin to enable the transport of product coal by rail to market;
- construction of a rail spur underpass beneath the Golden Highway;
- realignment of the intersection between Wallaby Scrub Road and the Golden Highway; and
- transportation of product coal to the market via nominal 8,600 tonne (t) capacity trains 24 hours per day, seven days per week.

DA2 is herein referred to as “the Approved Project”.

This Statement of Environmental Effects (SEE) has been prepared in accordance with Section 79C of the *Environmental Protection and Assessment Act 1979* in support of a development application for alterations to the Approved Project. This SEE assesses the environmental impacts of the Altered Project and presents relevant environmental mitigation and management measures.

1.1 REPORT STRUCTURE

The SEE is structured as follows:

Section 1: Provides background information and statutory considerations relevant to the development application for the alterations to the Approved Project.

Section 2: Presents a description of the Approved Project and the proposed alterations (Altered Project).

Section 3: Characterises the existing environment and draws on the extensive information presented in the corresponding section of the EIS.

Section 4: Presents the potential environmental effects of the Altered Project and associated mitigation measures.

Section 5: Details rehabilitation initiatives for the Altered Project.

Section 6: Outlines environmental management and monitoring programmes to be adopted.

Appendices A to C and Attachments 1 and 2, also provide supporting information as follows:

Appendix A: Noise Assessment of the Altered Project
Appendix B: Air Quality Assessment of the Altered Project
Appendix C: Preliminary Hazard Analysis
Attachments 1 and 2: Land Ownership

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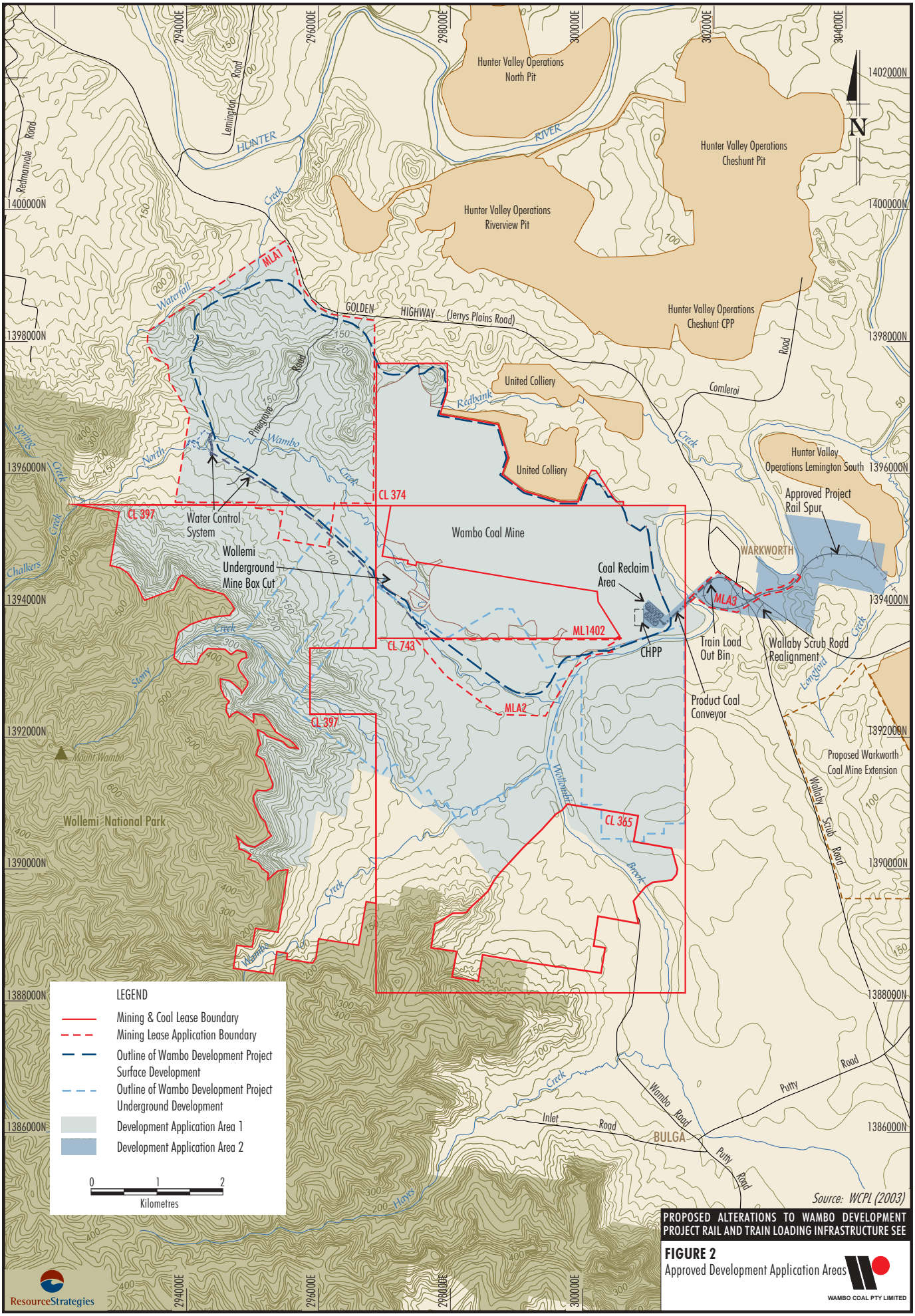

PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

FIGURE 2
Approved Development Application Areas

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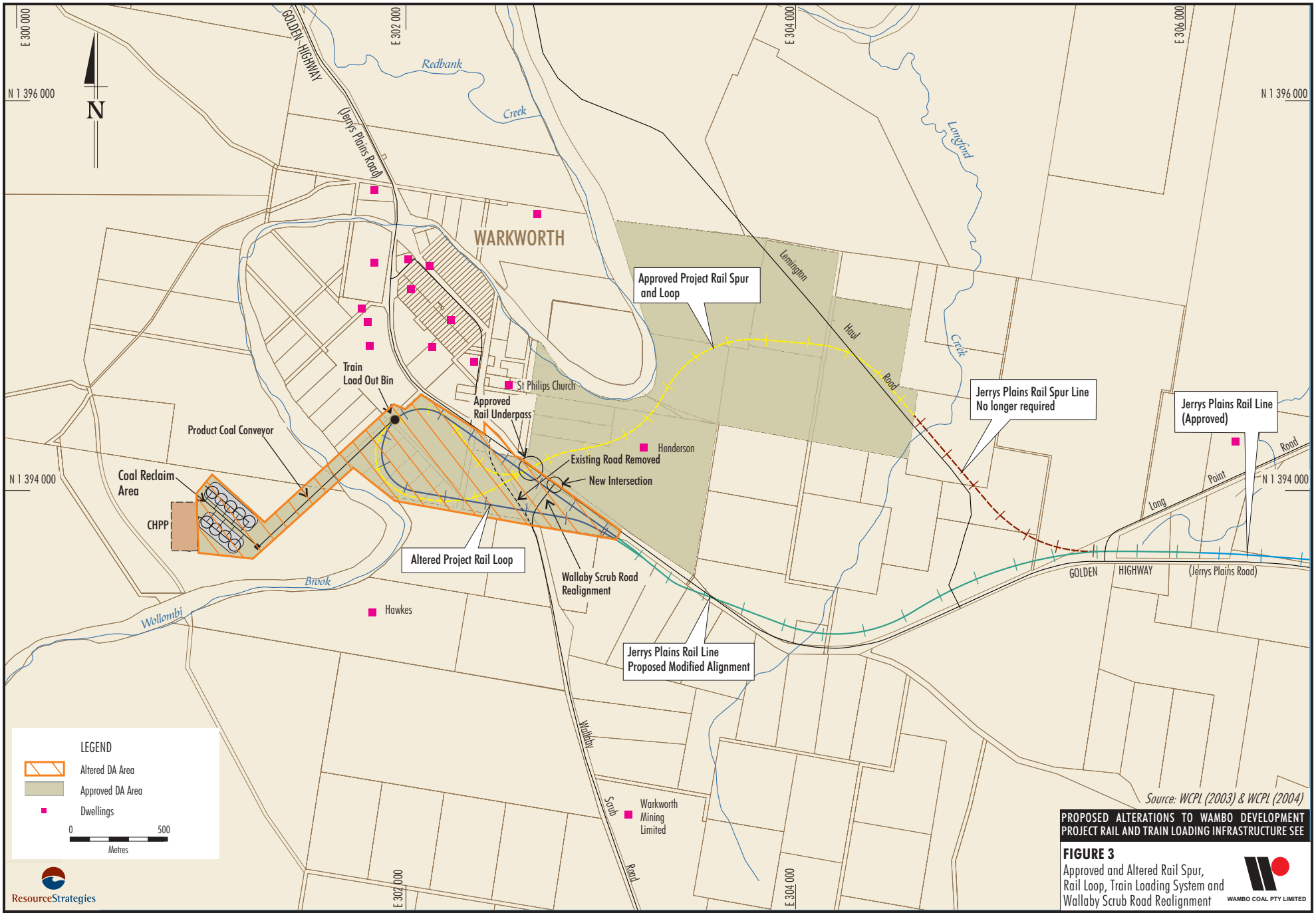


WAM-04-04 SEE_004B

1.2 PURPOSE OF PROPOSED ALTERATIONS

In consideration of land access constraints and as an outcome of the detailed design process, WCPL proposes the following alterations to the Approved Project (Figure 3):

- alter the alignment of the rail loop and connect onto the Jerrys Plains Rail Line at a point that removes the requirement to build the 2.5 km rail spur;
- alter the alignment of the rail loop so as to remove the need for the rail spur underpass beneath the Golden Highway within the Approved Project area; and
- construct two rail underpasses where the realigned Wallaby Scrub Road and the altered rail loop intersect.

Relevant land tenure is shown on Figure 4 and Attachments 1a and 1b. A comparison of the Altered Project and the Approved Project is presented in Section 2.

1.3 LEGISLATIVE REQUIREMENTS

Environmental Assessment and Approval Process

The *Environmental Planning and Assessment Act, 1979* (EP&A Act) provides for planning instruments based on the zoning of land according to its suitability for given uses. The most common planning instrument is the local environmental plan (LEP), which is prepared by a local council for all or part of a local government area.

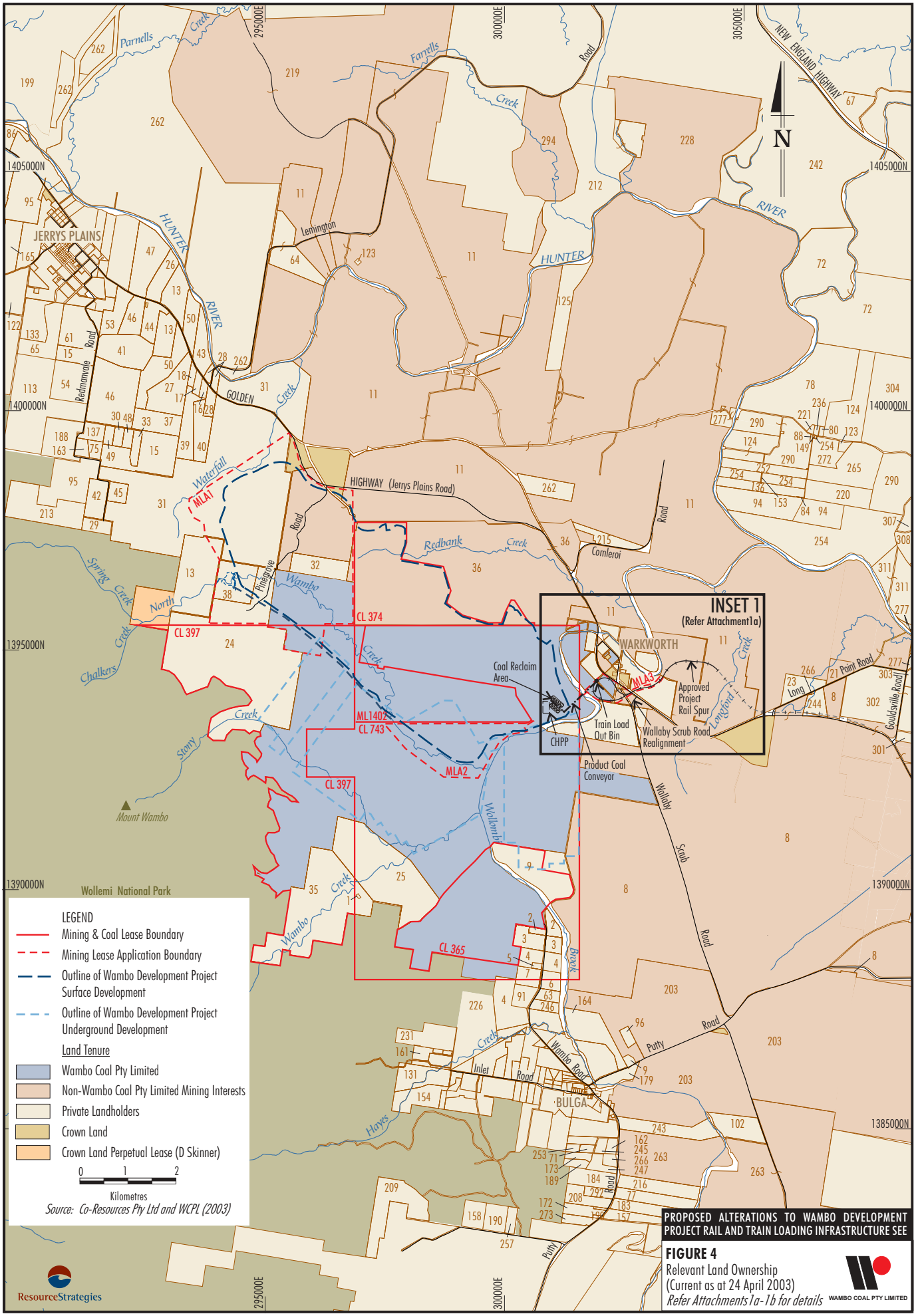
The Altered Project is located entirely within the local government area of Singleton. Under the Singleton LEP 1996, the land comprising the Altered Project is zoned 1(a) General Rural.

Development of the Altered Project is permissible within this zone with development consent from the consent authority.

A declaration made by the Minister for Urban Affairs and Planning on 29 June 2001, under section 76A(7) of the EP&A Act, identifies classes of development that are considered to be State Significant Development. Schedule 1 of the declaration includes:

> *"All coal mining-related development associated with development approvals previously given by the Minister on or from 4 June, 1987."*

The Altered Project is therefore State Significant Development.


INSET 1
(Refer Attachment1a)
WARKWORTH
Coal Reclaim Area
Approved Project Rail Spur
Train Load Out Bin
Wallaby Scrub Road Realignment
CHPP
Product Coal Conveyor
HIGHWAY (Jerrys Plains Road)
JERRYS PLAINS
BULGA
Comleroi
Mount Wambo
Wollemi National Park
CL 374
CL 397
CL 743
ML1402
MLA1
MLA2
MLA3
CL 365
LEGEND
Mining & Coal Lease Boundary
Mining Lease Application Boundary
Outline of Wambo Development Project Surface Development
Outline of Wambo Development Project Underground Development
Land Tenure
Wambo Coal Pty Limited
Non-Wambo Coal Pty Limited Mining Interests
Private Landholders
Crown Land
Crown Land Perpetual Lease (D Skinner)
0 1 2
Kilometres
Source: Co-Resources Pty Ltd and WCPL (2003)
ResourceStrategies
PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE
FIGURE 4
Relevant Land Ownership
(Current as at 24 April 2003)
Refer Attachments1a-1b for details
WAMBO COAL PTY LIMITED
WAM-04-04 SEE_006A

Under Part 1 of Schedule 3 of the *Environmental Planning and Assessment Regulation, 2000* (EP&A Regulation), the Altered Project is classified as designated development under the category of "*coal works*" (meaning that under Part 4 of the EP&A Act, an environmental impact statement is required to be submitted along with a development application for these types of development) as it will handle in excess of 500 t of coal per day.

It would generally be the case that the Altered Project would fall within the category of designated development. However, item 1 of Part 2 of Schedule 3 of the EP&A Regulation relevantly provides:

> "*Development involving alterations or additions to development (whether existing or approved) is not designated development if, in the opinion of the consent authority, the alterations or additions do not significantly increase the environmental impacts of the total development (that is the development together with the additions or alterations) compared with the existing or approved development*."

In order to determine whether the Altered Project falls within Part 2 of Schedule 3 of the EP&A Regulation, WCPL carried out an assessment of the factors which must be taken into consideration by the consent authority in making this decision. The outcome of this assessment was that the Altered Project should not significantly increase the environmental impact of the total development compared with the existing development. As a consequence, the development application for the Altered Project is accompanied by this SEE (rather than an EIS).

State Environmental Planning Policy 33

State Environmental Planning Policy (SEPP) 33 (Hazardous and Offensive Development) requires the consent authority in considering a development application for a potentially hazardous or potentially offensive industry to take into account certain factors including current guidelines or circulars published by DIPNR, consultations with public authorities and a "*preliminary hazard analysis*".

The Approved Project comprised a "*development for the purposes of a potentially hazardous industry*" under SEPP 33. Accordingly, the EIS included a preliminary hazard analysis. The preliminary hazard analysis has been revised for the Altered Project and is included in this SEE as Appendix C.

Integrated Approval Requirements

Division 5 of the EP&A Act makes provision for a combined approval process, where a party seeks development consent as well as one or more approvals listed in that Division. Development to which Division 5 applies is known as "*integrated development*".

Table 1-4 of the EIS presents the likely integrated DAs required for the Approved Project, reproduced here as Table 1 for the Altered Project.

Table 1
Likely Integrated Development Approvals – Altered Project

Act	***Provision***	***Requirement***
Heritage Act, 1977	*s.58 (Heritage Council)*	*In relation to an item listed on the State Heritage Register, approval is required in respect of the doing or carrying out of an act, matter or thing referred to in s.57(1) of the Act.*
Mine Subsidence Compensation Act, 1961	*s.15*	*Approval is required to alter or erect improvements within a mine subsidence district.*
National Parks and Wildlife Act, 1974	*s.90*	*In the case that Aboriginal objects will be destroyed, defaced or damaged as a result of Project activities a consent under section 90 of this Act will be required.*
Protection of the Environment Operations Act, 1997	*ss.43(a), 43(b), 47, 48 and 55*	*An Environment Protection Licence (EPL) is required for the undertaking of scheduled development works and/or scheduled activities under this Act.*
Rivers and Foreshores Improvement Act, 1948	*Part 3A*	*A permit is required under section 22B of the Act to excavate or remove material from protected land or do anything that obstructs or detrimentally affects the flow of protected waters.*
Roads Act, 1993	*s.138* *(RTA – Golden Highway)* *(SSC – gazetted roads including Wallaby Scrub Road)*	*Under section 138 of the Act, consent is required to:* *(a) erect a structure or carry out a work in, on or over a public road, or* *(b) dig up or disturb the surface of a public road, or* *(c) remove or interfere with a structure, work or tree on a public road, or* *(d) pump water into a public road from any land adjoining the road, or* *(e) connect a road (whether public or private) to a classified road.*

Source: WCPL (2003)

The above list of potential integrated development approvals required for the Altered Project has not changed from that required for the Approved Project.

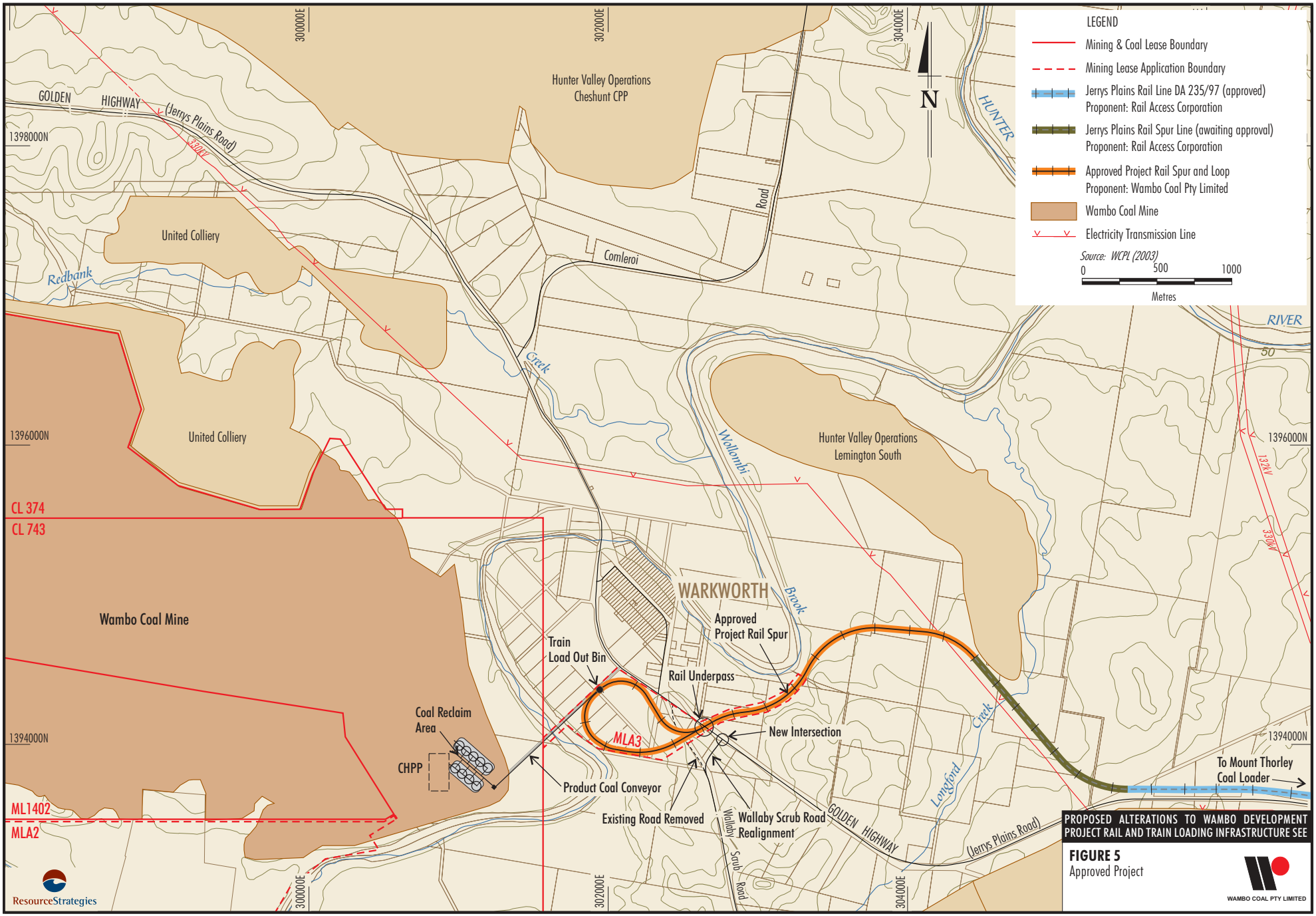
2 PROJECT DESCRIPTION

This section provides a description of the Approved and Altered Projects. Table 2 provides a summary snapshot comparison of the Approved and Altered Projects.

Table 2
Comparison of Approved and Altered Projects

Project Feature	Approved Project	Altered Project
General Development	Construction and operation of rail infrastructure to facilitate the rail transport of product coal from the coal reclaim area at the Wambo Coal Mine to market. Construction of a coal reclaim area, product coal conveyor, train load-out bin, rail loop and rail spur.	As per the Approved Project, however, the rail spur is not required.
Land Described by DA	As shown on Figure 3.	As shown on Figure 3, removal of some land parcels and inclusion of a portion located adjacent to the Golden Highway.
Project Life	Twenty-one year period approved in the development consent. Dependent on the future development of coal reserves, the train loading and rail infrastructure would be required beyond this period.	As per the Approved Project.
Construction Hours	Construction activities limited to between 7 am to 6 pm, on Monday to Saturday, and 8 am to 6 pm on Sundays and Public Holidays.	As per the Approved Project.
Construction Workforce	Up to 100 employees over an eighteen month construction period.	As per the Approved Project.
Operating Hours	Trains would operate up to 24 hours per day, seven days per week.	As per the Approved Project.
Rail Alignment	As shown on Figure 5: • Travels west and then south-west from the Jerrys Plains Rail Spur Line (awaiting approval). • Passes within 100 m and 300 m of the Henderson dwelling and St. Philips Anglican Church, respectively. • Crosses the Golden Highway and forms a loop south of Warkworth and east of Wollombi Brook.	Altered as shown on Figure 6: • Travels west from a proposed realignment of the Jerrys Plains Rail Line. • Forms a rail loop south of Warkworth and east of Wollombi Brook.
Roadworks	• Realignment of Wallaby Scrub Road to meet the Golden Highway approximately 400 m south-east of the existing intersection. • Construction of a rail spur underpass beneath the Golden Highway.	• Realignment of Wallaby Scrub Road as per Approved Project. • Construction of two split level crossings to allow rail to pass under Wallaby Scrub Road. • Rail spur underpass beneath the Golden Highway not required.
Road closures	Closure of High Road, Watt Street and Parmeter Street at Warkworth.	As per the Approved Project.
Train Loading System	• Overland product coal conveyor delivering coal from product coal reclaim area to a 400 t train load-out bin above rail loop. • Nine (9) underground reclaim points, each with a transfer conveyor to feed coal onto the main reclaim conveyor.	As per the Approved Project.
Trains	Product coal loaded onto nominal 8,600 t capacity trains.	As per the Approved Project.

Source: WCPL (2004)

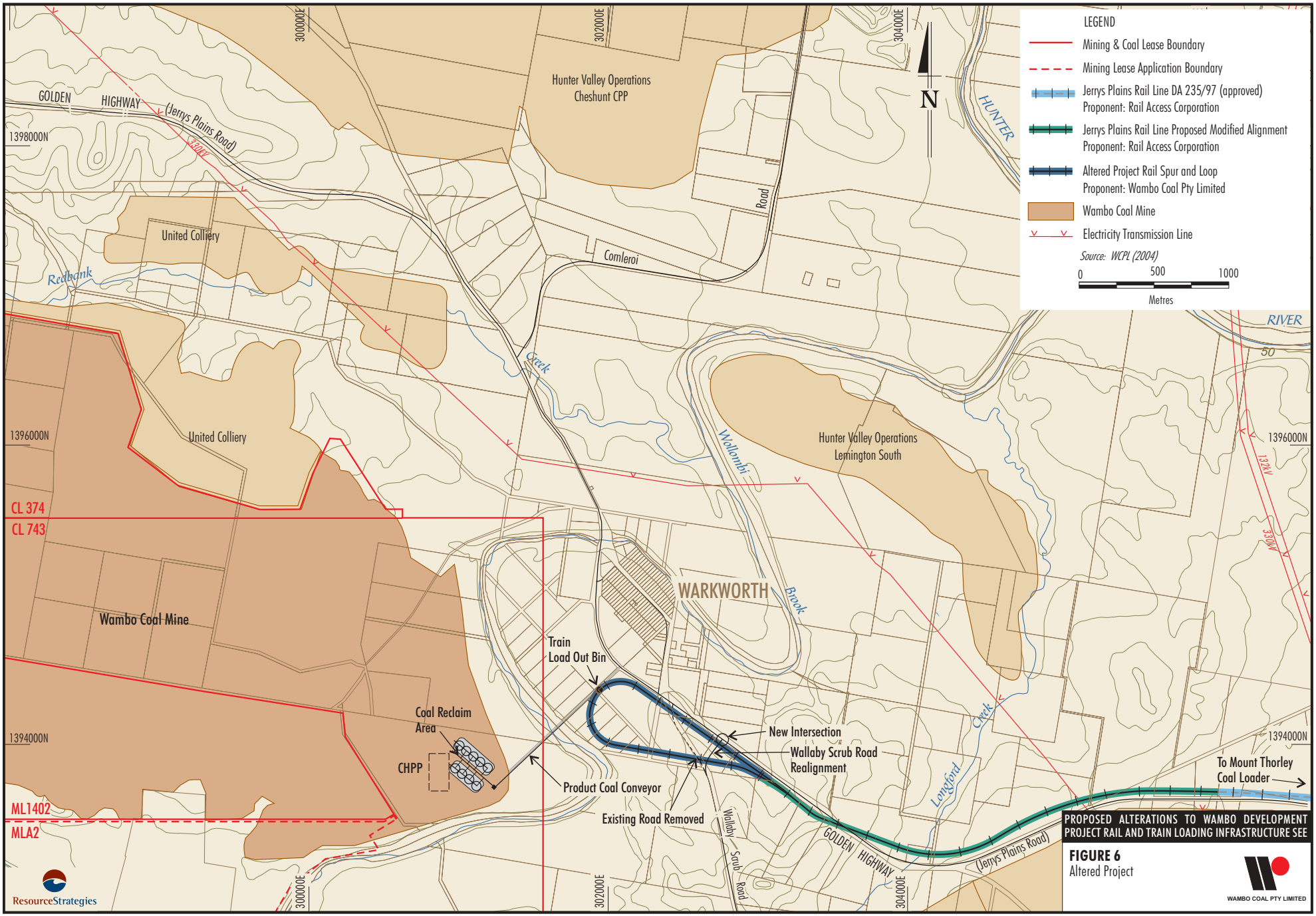


PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

FIGURE 5
Approved Project

WAMBO COAL PTY LIMITED

WAM-04-04 SEE_003A



WAM-04-04 SEE_005B

The following sub-sections describe the Altered Project in comparison to the Approved Project.

2.1 RAIL SPUR LINE AND RAIL LOOP

APPROVED PROJECT

The following section of text is extracted from the EIS (Section 2.4.2) and describes the alignment of the rail spur and rail loop of the Approved Project. Figure 5 of this SEE shows the Approved Project.

> *The Project would include the construction of a rail loop on the eastern side of Wollombi Brook and a rail spur. As described in Section 1.2.2* [of the EIS] *the Project rail spur would join the Jerrys Plains Rail Spur Line that is the subject of a separate DA lodged in 1999. The Jerrys Plains Rail Spur Line would connect onto the Jerrys Plains Rail Line which was granted development consent in July 1998. The Jerrys Plains Rail Line would join the State rail network near the MTCL* [Mount Thorley Coal Leader]*.*
>
> *The Project rail spur would facilitate the rail transport of product coal to the Port of Newcastle and would remove in the order of 160,000 existing Wambo Coal Mine truck movements per annum from the Golden Highway. The Project rail spur would also be available for the transport of coal from surrounding mines (e.g. Hunter Valley Operations and United Colliery) which (either currently or in the recent past) transport coal by road to the MTCL.*
>
> *The location of the Project rail spur and loop is shown on …….* [Figure 5 of this SEE]*.*
>
> *The rail spur would pass under the Golden Highway via a grade separated crossing (i.e. the rail spur would be placed in a cutting below the level of the existing road surface).*
>
> *The rail underpass would comprise a 7 m deep cutting with a single span, pre-cast concrete deck for the new Golden Highway road surface. Design and construction of the underpass would be undertaken in accordance with relevant RTA and SSC guidelines. Wallaby Scrub Road would be realigned to meet the Golden Highway approximately 400 m south-east of the existing intersection….* [Figure 5 of this SEE].

ALTERED PROJECT

Figure 6 shows the proposed realignment of the rail loop for the Altered Project. The reduced scale of the Altered Project when compared to the Approved Project is shown on Figure 3.

The Altered Project would connect directly to the Jerrys Plains Rail Line, eliminating the need for construction of a section of the Jerrys Plains Rail Spur Line and the rail spur underpass beneath the Golden Highway (Figure 3).

The realigned rail loop would pass under the realigned Wallaby Scrub Road via two grade separated crossings

Blasting may be required during construction of the rail loop. It is anticipated that Ammonium Nitrate Fuel Oil (ANFO) and/or Torvex would be used for blasts, if required. Blasting is discussed in Section 4.3.3.

No changes to the operation of the rail loop or the location of the rail load-out bin on the loop are proposed for the Altered Project.

2.2 REALIGNMENT OF WALLABY SCRUB ROAD AND GOLDEN HIGHWAY INTERSECTION

APPROVED PROJECT

The following section of text is directly extracted from the EIS (Section 2.4.4) and describes the realignment of Wallaby Scrub Road and Golden Highway intersection of the Approved Project.

> *"The construction of the Project rail spur and rail loop would require the realignment of a section of Wallaby Scrub Road and its intersection with the Golden Highway….* [Figure 5 of this SEE]. *The realigned section would be approximately 450 m in length. The new intersection would comprise a rural T-junction with auxiliary right and left turn lanes in accordance with the RTA's Road Design Guide. The redundant section of Wallaby Scrub Road would be rehabilitated in consultation with the SSC.*
>
> *Realignment of the Wallaby Scrub Road and Golden Highway intersection would occur during construction of the rail spur and rail loop which is planned for Year 1."*

ALTERED PROJECT

Wallaby Scrub Road would be realigned as described above for the Approved Project (Figure 6).

Two split level crossings of Wallaby Scrub Road are proposed for the Altered Project. The rail loop would pass under the realigned Wallaby Scrub Road via grade separated crossings (ie. the rail loop would be placed in cuttings below the level of the new road surface). The crossings would be designed in accordance with AUSTROADS bridge design standards and to the satisfaction of the Roads and Traffic Authority (RTA) and Singleton Shire Council (SSC). Disruptions to traffic flows on Wallaby Scrub Road would be minimised by constructing the two rail underpasses prior to the commissioning of the realigned section of road.

As outlined in the EIS, Wallaby Scrub Road would be realigned to create a T-junction with the Golden Highway (Figure 6). The precise details and location of the intersection would be determined following detailed design and in consultation with the RTA and SSC and would be in accordance with the RTA's Road Design Guide.

2.3 TRAIN LOADING SYSTEM

APPROVED PROJECT

The following section of text is directly extracted from the EIS (Section 2.4.3) and describes the train loading system of the Approved Project.

> *"Overland product coal conveyors would deliver coal from the CHPP product coal reclaim area to a 400 t train load-out bin to be constructed above the rail loop ….* [Figure 5 of this SEE].
>
> *Nine underground reclaim points, each with a transfer conveyor to feed coal onto the main reclaim conveyor, would be required to service the product coal stockpile area. Each reclaim point would have a feed capacity of up to 4,500 tph. The reclaim system would be able to blend coal from the different reclaim points to achieve the required coal quality. The train loading system would have the capacity to accommodate potential future use by other coal mines.*
>
> *The main reclaim conveyor would transfer the reclaimed coal to a transfer station and then onto the product coal conveyor to the train load-out bin ….* [Figure 5 of this SEE].

The product coal conveyor and support structure would run adjacent to the Wambo Access Road and cross Wollombi Brook over the existing bridge …. [Figure 5 of this SEE].

The train loading system would be designed to load trains at a rate of 4,500 tph. Each train would therefore take approximately two hours to load."

ALTERED PROJECT

No changes to the train loading system are proposed for the Altered Project.

2.4 COAL TRANSPORT

APPROVED PROJECT

The following section of text is directly extracted from the EIS (Section 2.8) and describes the train loading system of the Approved Project.

"Product coal from the Wambo Coal Mine is currently transferred from the CHPP to the MTCL by a combination of 37 t capacity B-Double trucks and single trailer 28 t capacity trucks at a rate of up to 3 [million tonnes per annum] *(Mtpa) … . This practice would continue until Project rail and train loading infrastructure is commissioned.*

Thereafter, product coal would be loaded onto typical Hunter Valley nominal 8,600 t trains 24 hours a day, seven days per week, using the Project train loading system for transport to market. An average of four trains would be loaded each day. The maximum number of trains loaded per day would be six, based on a two hour loading period and two hour clearance and arrival of a new train on the rail spur. This would correspond to a maximum of 12 train movements in any one day (i.e. six arrivals and six departures). …. Where possible, train movements would be minimised on Friday evenings and Sunday mornings to ameliorate the potential impact of rail traffic noise emissions at St. Philips Anglican Church."

ALTERED PROJECT

No changes to coal transportation are proposed for the Altered Project.

3 OVERVIEW OF THE EXISTING ENVIRONMENT

A description of the existing environment relevant to the Altered Project is provided below based on extracts from Section 3 of the EIS.

3.1 LAND RESOURCES

3.1.1 Landforms and Landuse

Landforms of the Upper Hunter region are characterised by gently sloping flood plains associated with the Hunter River and the undulating foothills, ridges and escarpments of the Mount Royal Range and Great Dividing Range. Local elevations range from approximately 60 m AHD (Australian Height Datum) at Wollombi Brook to approximately 650 m AHD at Mount Wambo within the Wollemi National Park to the west (Figure 7).

Land use in the vicinity of the Altered Project is characterised by a combination of coal mining operations, agricultural land uses and rural residential development at Warkworth. WCPL controlled lands that are not subject to Wambo Coal Mine operations are utilised for the agistment of stock (primarily cattle).

3.1.2 Meteorology

Regional climatic data were collected from Bureau of Meteorology (BOM) weather stations at the Jerrys Plains Post Office, the Scone Soil Conservation Service (SCS) and Singleton Army Base (Table 3).

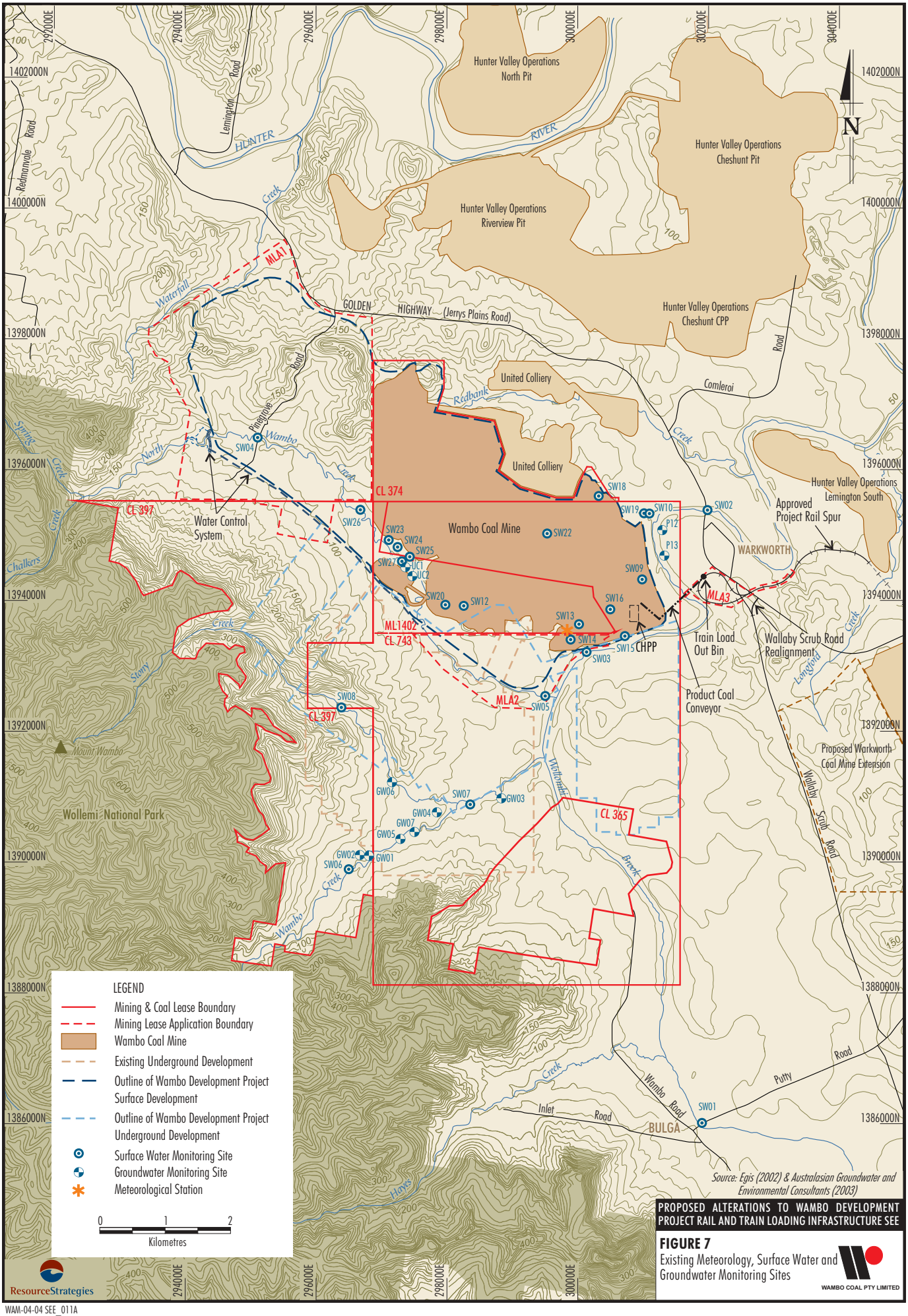
Table 3
Bureau of Meteorology Station Locations and Recording Period

Bureau of Meteorology Station	Station Number	Location	Elevation (m)	Period of Record
Jerrys Plains Post Office	061086	10 km north-west of the Wambo Coal Mine Latitude: -32.4983°S Longitude: 150.9083°E	90.0	1884-2001
Singleton Army Base	061275	15 km east of the Wambo Coal Mine Latitude: -32.6133°S Longitude: 151.1717°E	73.1	1969-1990
Scone SCS	061089	53 km north of the Wambo Coal Mine Latitude: -32.0632°S Longitude: 150.9272°E	216.0	1950-2002

Source: Bureau of Meteorology (2002)

A meteorological station which continuously records wind speed and direction, temperature, relative humidity, net solar radiation, rainfall, evaporation and atmospheric pressure was installed at the Wambo Coal Mine in March 1998 (Figure 7).

Meteorological data collected from various regional stations and the Wambo Coal Mine is summarised in Table 4.



Source: Egis (2002) & Australasian Groundwater and Environmental Consultants (2003)

PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

FIGURE 7

Existing Meteorology, Surface Water and Groundwater Monitoring Sites

ResourceStrategies

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Table 4
Meteorological Data Summary

Month	Relative Humidity Monthly Average (% mean)						Average Daily Air Temperature (°C)						Average Rainfall (mm)			Average Evaporation (mm)
	Jerrys Plains		Singleton Army Base[3]		Wambo Coal Mine[4]		Jerrys Plains[5]		Singleton Army Base[3]		Wambo Coal Mine[4]		Jerrys Plains[6]	Singleton Army Base[7]	Wambo Coal Mine[4]	Scone[8]
	9am[1]	3pm[2]	9am	3pm	9am	3pm	Max.	Min.	Max.	Min.	Max.	Min.				
January	67	47	72	49	54	38	31.7	17.1	30.6	17.7	33.0	16.5	78.9	94.3	55.0	218.7
February	72	50	77	52	72	54	30.9	17.0	29.5	17.9	28.6	17.1	70.0	88.9	108.7	173.6
March	71	50	74	51	73	50	29.0	15.0	28.2	16.1	26.9	15.0	58.6	72.7	119.7	156.5
April	71	47	75	49	77	50	25.3	10.8	24.9	12.6	25.0	12.6	45.3	58.4	51.2	106.3
May	77	52	80	56	79	54	21.2	7.3	21.0	9.5	19.6	9.1	41.6	59.7	41.3	67.4
June	79	54	81	56	80	52	17.9	5.2	17.8	6.8	18.0	6.5	46.2	37.9	11.5	48.2
July	78	50	77	52	76	47	17.3	3.7	17.0	5.2	17.0	5.0	44.7	29.4	29.6	56.5
August	72	45	71	42	67	42	19.4	4.4	19.2	6.3	18.5	5.5	36.5	37.1	16.3	85.6
September	65	43	64	42	62	37	22.8	6.9	22.2	8.8	23.6	7.2	41.8	45.3	22.5	115.7
October	60	44	61	42	54	36	26.2	10.2	25.5	11.8	25.0	9.4	51.9	69.1	55.4	154.8
November	59	41	66	43	65	52	29.3	13.1	27.5	14.2	26.4	12.6	57.9	67.9	48.5	181.9
December	60	42	63	40	59	42	31.4	15.7	30.4	16.7	28.6	12.9	66.8	63.0	42.7	225.4
Annual Average	**69**	**47**	**72**	**48**	**66**	**45**	**25.2**	**10.5**	**24.3**	**11.6**	**24.2**	**10.8**	-	-	-	-
												Annual Total	**640.2**	**723.7**	**602.2**	**1590.6**

Source: Bureau of Meteorology (2002); WCPL (2002)

1 For the period 1940 – 2002
2 For the period 1957 – 2002
3 For the period 1970 – 1990
4 For the period 1998 – 2002
5 For the period 1907 – 2002
6 For the period 1884 – 2002
7 For the period 1969 – 1990
8 For the period 1965 – 2002

Wind roses for the Wambo Coal Mine meteorological station indicate that relatively strong winds from the west-northwest are dominant during winter and spring, while winds from the south-east are more common during summer and autumn. Moderate south-easterly winds are common during the evening and night-time throughout spring, summer and autumn.

3.1.3 Geology

The Altered Project is situated within the Hunter Coalfield subdivision of the Sydney Basin, which forms the southern part of the Sydney-Gunnedah-Bowen Basin. The coal bearing rocks of the Sydney Basin are Permian in age (i.e. approximately 225 to 270 million years old) and are typically associated with low-lying gentle topography. The overlying rocks of Triassic age (i.e. approximately 180 to 225 million years old) cover large parts of the Sydney Basin and tend to form prominent escarpments where they outcrop. Local geology is illustrated on Figure 8.

3.1.4 Soils, Rural Land Capability and Agricultural Suitability

A soils, rural land capability and agricultural suitability assessment was conducted for the Wambo Development Project. The assessment utilised information from previous soil surveys, DLWC and NSW Agriculture mapping, aerial photography and field surveys.

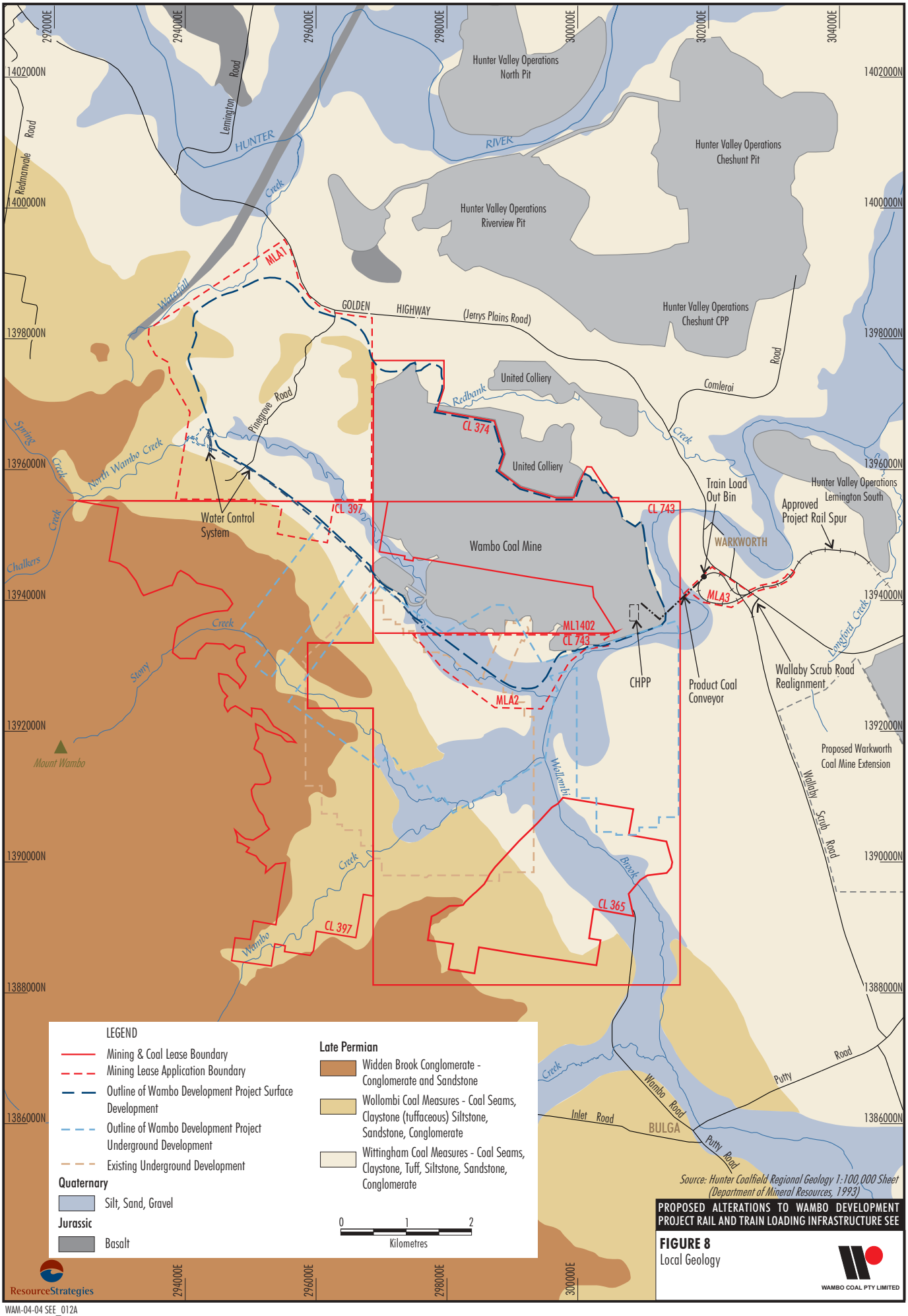
Soil landscapes were classified and mapped in accordance with descriptions in the Soil Landscapes of the Singleton 1:250,000 Sheet (Kovac and Lawrie, 1991), data from previous investigations (Environsciences Pty Ltd, 1991; HLA Environsciences Pty Ltd, 1998; and Wambo Mining Corporation, 2000) and field surveys undertaken for the Wambo Development Project EIS. Major soil types identified include alluvial soils along major drainage lines, siliceous sands to the east of Wollombi Brook, yellow podzolics and yellow solodic intergrades adjacent to the alluvials on lower slopes and undulating plains.

A rural land capability assessment was conducted in accordance with the standard NSW eight class system (Cunningham *et al.*, undated) which assesses biophysical soil properties and categorises land according to limitations such as erosion hazard, climate and slope. Five of the eight classes were identified as being traversed by the Approved Project (see Table 5 below). Of these, Class I land would not be traversed by the Altered Project.

Table 5
Rural Land Capability Classes in the Vicinity of the Project

Class	Description (Cunningham *et al.*, undated)
Class I	• *"Land capable of being regularly cultivated with no special soil conservation works or practices necessary."*
Class II	• *"Land capable of being regularly cultivated with soil conservation practices such as strip cropping, conservation tillage and adequate crop rotations."*
Class IV	• *"Land not capable of being regularly cultivated but suitable for grazing with occasional cultivation with soil conservation practices such as pasture improvement, stock control, application of fertiliser and minimal cultivation for the establishment or re-establishment of permanent pasture."*
Class V	• *"Land not capable of being regularly cultivated but suitable for grazing with occasional cultivation and structural soil conservation works such as absorption banks, diversion banks and contour ripping, together with the practices as in Class IV."*
Class VI	• *"Land not capable of being regularly cultivated but suitable for grazing with soil conservation practices including limitation of stock, broadcasting of seed and fertiliser, prevention of fire and destruction of vermin. This class may require some structural works."*

After: WCPL (2003)



Source: Hunter Coalfield Regional Geology 1:100,000 Sheet (Department of Mineral Resources, 1993)

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FIGURE 8
Local Geology

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An agricultural suitability assessment was conducted in accordance with the five class system (Riddler, 1996), which classifies land according to its potential agricultural productivity. Class 3 and 4 agricultural lands were identified within the Approved and Altered Project areas. Table 6 summarises these classes.

Table 6
Agricultural Suitability Classes in the Project Area

Class	Description (Cunningham *et al.*, undated)
Class 3	• *"Grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with pasture. The overall production level is moderate because of edaphic or environmental constraints. Erosion hazard, soil structural breakdown and other factors including climate may limit the capacity for cultivation, and soil conservation or drainage works may be required."*
Class 4	• *"Land suitable for grazing but not for cultivation. Agriculture is based on native pastures or improved pastures established using minimum tillage techniques. Production may be seasonally high but the overall production level is low as a result of major environmental constraints."*

After: WCPL (2003)

3.1.5 Visual Character

Since the commencement of European settlement, the Upper Hunter region has been altered by clearing for agriculture resulting in the creation of a visual character that contrasts extensive agriculture on the valley floor with the rugged, forested terrain of the Barrington Tops and Wollemi National Parks that bound the valley (Department of Mineral Resources [DMR], 1999). This visual character has been further modified over the past thirty years by coal mining and the development of power generation infrastructure, including the Bayswater and Liddell power stations (*ibid.*).

The local visual landscape is dominated by the rugged escarpments of the Wollemi National Park and the forested landforms that rise behind the escarpments to above 600 m AHD, peaking at Mount Wambo (approximately 650 m AHD). The peaks and ridges of the Wollemi National Park are visible from locations in the vicinity of the Altered Project, except where obscured at close range by local topography or vegetation. Other features of the local visual landscape include:

- remnant vegetation and isolated landforms;
- riparian vegetation and flood plain features of Wollombi Brook;
- coal mining operations including the existing Wambo Coal Mine, various Hunter Valley Operations' open cut mines (Coal & Allied), Warkworth Coal Mine and United Colliery;
- power supply infrastructure associated with the Redbank power station;
- agricultural land, including cropping, dairy and beef production; and
- residential areas including Warkworth.

A description of the local visual landscape is presented below, focussing on views available from potentially sensitive visual locations such as roads, Warkworth and rural dwellings.

Roadside vegetation dominates the landscape on both sides of the Golden Highway as it passes through Warkworth. Intermittent views of adjacent grazing land and the riparian vegetation covering the banks of Wollombi Brook are available on the Golden Highway east of Warkworth.

The majority of Wallaby Scrub Road has significant screening vegetation that dominates views to the east and west. Reduced vegetation toward the northern end of Wallaby Scrub Road enables views of the Wambo Coal Mine above grazing land in the foreground.

The visual landscape for dwellings in Warkworth includes significant stands of remnant vegetation, cleared grazing land and riparian vegetation covering the banks of Wollombi Brook. Views of the Wambo Coal Mine are generally limited due to the presence of intervening vegetation. Reduced vegetative cover to the east enables views of grazing land and vegetation on the banks of Wollombi Brook.

Distant views from dwellings along Wallaby Scrub Road are generally impeded by vegetation and topography.

The night-time visual landscape in the Upper Hunter region has been altered by the large number of coal mining operations. Night-lighting from mining operations produces a glow at night that is particularly visible during overcast conditions. The glow produced by night-lighting at the Wambo Coal Mine is visible at nearby dwellings and along transport routes, while direct views of mobile machinery lights and operational lighting are available from some elevated positions.

3.1.6 Bushfire Regime

The Altered Project is located in the Central Valley Fire District area within the Singleton District (Egis, 2002a). The fire season for this area is predominantly from September to December although it may extend until May depending on weather conditions and fuel loads. The Altered Project also falls under the Muswellbrook, Scone and Singleton Bush Fire Management Committee's Bush Fire Risk Management Plan (Bush Fire Management Committee, 2000) developed by the National Parks and Wildlife Service (NPWS) (now the DEC) and relevant fire authorities.

The vegetation of the Wollemi National Park and remnant vegetation to the east of Wollombi Brook presents an increased bushfire risk to mining operations and pastoral activities due to the higher level of vegetative cover and fuel load present in these areas.

3.2 ACOUSTICS

An assessment of the existing noise environment has been undertaken by Richard Heggie Associates (2003).

Recorded and assessed noise levels are expressed in A-weighted decibels (dBA). The dBA system simulates the response of the human ear, which is more sensitive to high frequency sounds and de-emphasises lower frequency sounds. Table 7 provides information on common noise sources in dBA for comparative reference.

Hearing "nuisance" for most people begins at noise levels of about 70 dBA, while sustained noise levels of 85 dBA (ie. eight hours) can cause hearing damage.

Measured and predicted noise levels are expressed as the equivalent continuous sound pressure level (L_{Aeq}), which is a constant sound level that is equal in energy to the fluctuating levels recorded during the sampling period.

Table 7
Relative Scale of Various Noise Sources

Noise Level (dBA)	Relative Loudness	Common Indoor Noise Levels	Common Outdoor Noise Levels
110 – 130	Extremely noisy	Rock band	Jet flyover at 1,000 m
100	Very noisy	Inside subway train	Petrol engine lawn mower at 1 m
90	Very noisy	Food blender at 1 m	Diesel truck at 15 m
80	Loud	Garbage disposal at 1 m Shouting at 1 m	Urban daytime noise
70	Loud	Vacuum cleaner at 3 m Normal speech 1 m	Commercial area heavy traffic at 100 m
60	Moderate to quiet	Large business office	-
50	Moderate to quiet	Dishwasher next room Wind in trees	Quiet urban daytime
40	Quiet to very quiet	Small theatre, large conference room (background) Library	Quiet urban night-time
30	Quiet to very quiet	Bedroom at night Concert hall (background)	Quiet rural night-time
20	Almost silent	Broadcast and recording studio	-
0-10	Silent	Threshold of hearing	-

Source: Modified from US Dept. Interior, Robinson Project EA (1994) and Richard Heggie Associates (1995)

3.2.1 Background Noise Monitoring

Background noise surveys were conducted during the period December 2000 to April 2001 to characterise and quantify the acoustic environment in the area surrounding the Wambo Coal Mine (Egis, 2001a). This included the positioning of unattended noise loggers at representative locations in Warkworth.

Ambient noise surveys to further characterise and quantify the existing acoustic environment in the vicinity of the Altered Project were conducted in December 2002. These surveys were conducted while normal day and night shift operations were in progress at Wambo Coal Mine. Operator-attended daytime, evening and night-time surveys were also conducted (December 2002) to supplement the unattended logger measurements and to assist in identifying the character and duration of ambient noise sources.

Noise emissions from the Wambo Coal Mine were detected in Warkworth. No significant industrial noise (excluding road traffic noise) from other coal mines was detected during the surveys.

Rating Background Level

Noise data from the 2001 and 2002 surveys was then processed in accordance with the requirements of the NSW Industrial Noise Policy (INP) (Environment Protection Authority [EPA] [now the Department of Environment and Conservation], 2000) to determine background noise levels for acoustic assessment (Table 8).

Table 8
Noise Environment for Assessment Purposes

General Locality	Land Owner	Rating Background Level (dBA)		
		7.00 am to 6.00 pm	6.00 pm to 10.00 pm	10.00 pm to 7.00 am
Warkworth (INP Suburban)	19A, 19B Kelly	35	33	33
	51 Hawkes	33	31	31
	56 Hayes	34	32	31
	Residential	34	32	31

After: WCPL (2003)

The rating background level (RBL) is a calculated median background level representing each assessment period (day/evening/night) over the whole monitoring period.

3.2.2 Cumulative Impacts of Other Mines on Local Noise Levels

While background noise monitoring did not identify any other industrial noise during the period of attended noise monitoring, a number of existing mining developments in the area have the potential to affect the local noise environment under adverse weather conditions, including proposed expansions of the Warkworth Coal Mine and the United Colliery.

The INP requires that cumulative industrial noise (i.e. non-road traffic noise) should not exceed specified $L_{Aeq(period)}$ amenity levels that are appropriate for a particular locality and land use. The INP acceptable and maximum noise amenity criteria for the main areas surrounding the Altered Project are summarised in Table 9.

Table 9
Specific Cumulative Noise Assessment Criteria

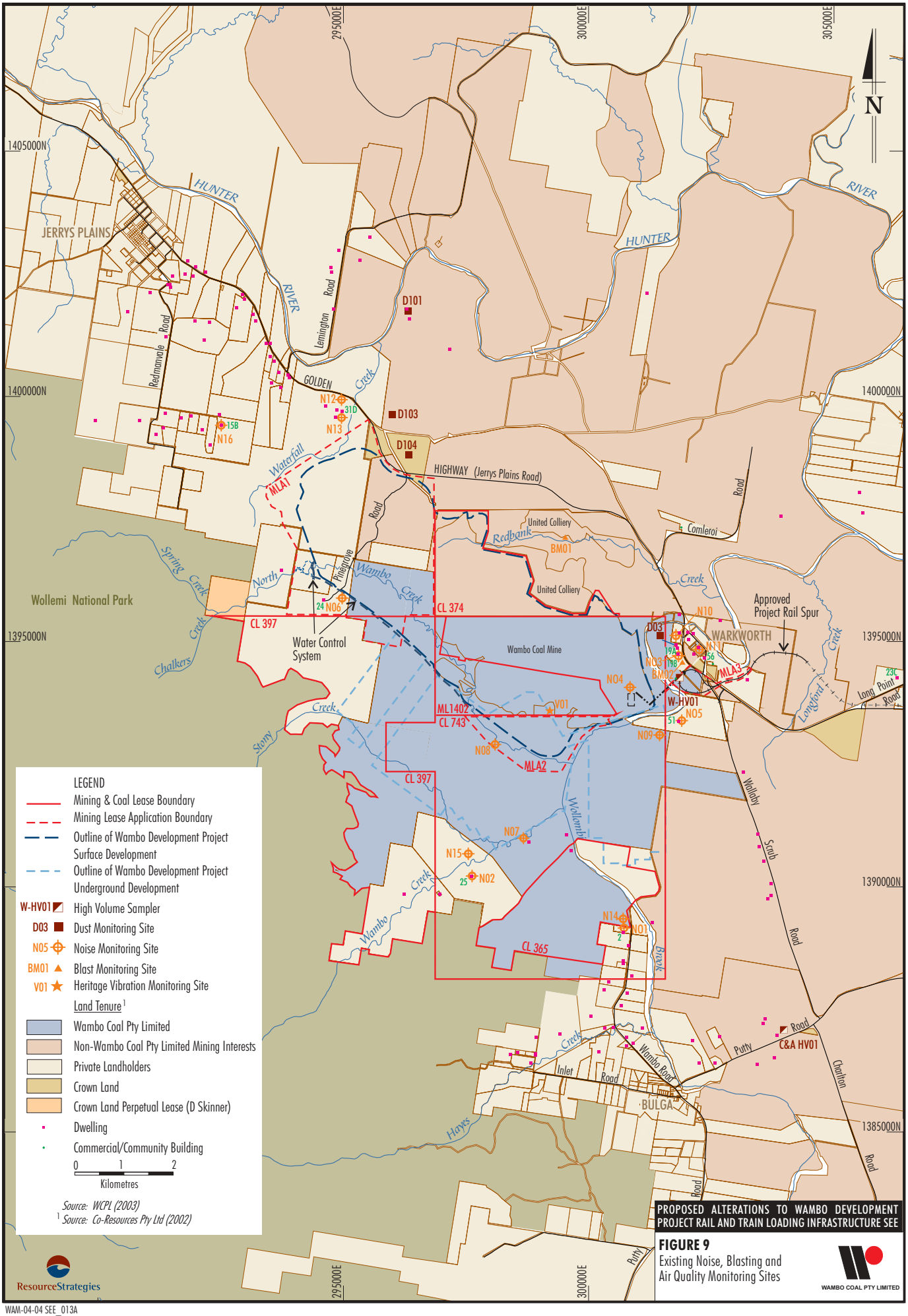
Land Use	General Locality	Acceptable $L_{Aeq(period)}$ Amenity Levels (dBA)			Maximum $L_{Aeq(period)}$ Amenity Levels (dBA)		
		Day	Evening	Night	Day	Evening	Night
Suburban* Residential	Warkworth	55	45	40	60	50	45

After: WCPL (2003)
Note : Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours and Night-time 2200 hours to 0700 hours
* Defined in the INP as an area affected by road traffic noise

3.3 AIR QUALITY

An assessment of air quality in the vicinity of the Altered Project has been undertaken by Holmes Air Sciences (2003).

The following section provides an overview of background dust deposition and total suspended particulates (TSP), including concentrations of particulate matter less than ten microns in size (PM_{10}).



PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

FIGURE 9
Existing Noise, Blasting and Air Quality Monitoring Sites

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3.3.1 Dust Deposition

The Department of Environment and Conservation (DEC) has established amenity criteria for dust deposition that seek to limit the maximum increase in dust deposition from a new development to 2 grams per square meter per month (g/m^2/month) and total dust deposition from all sources to 4 g/m^2/month.

The current Wambo Coal Mine dust monitoring network includes 13 gauges located in the vicinity of the Wambo Coal Mine.

Data from dust monitoring site D03 at Warkworth (Figure 9) was examined to ascertain background levels for assessment purposes. Wambo Coal Mine operations during this period included underground mining at the Wollemi Underground Mine and open cut mining operations which recommenced in August 2001.

When contaminated samples are discounted from the data set, the annual mean dust deposition rates at site D03 was approximately 2 g/m^2/month for the years 2001 and 2002, which is below the DEC goal of 4 g/m^2/month.

3.3.2 Suspended Particulates

The DEC has established an amenity based criterion of 90 micrograms per cubic metre ($\mu g/m^3$) for maximum annual average TSP concentrations. The DEC has also established 24-hour average and annual average PM_{10} goals of 50 $\mu g/m^3$ and 30 $\mu g/m^3$ respectively that should be generally met within the region. Further, the National Environment Protection Measure (NEPM) 24-hour standard of 50 $\mu g/m^3$ has been interpreted as a PM_{10} goal that should generally be met for the region.

Total Suspended Particulates

Monitoring of ambient TSP levels using a high volume sampler has been undertaken every sixth day since December 1998 and is ongoing at site W-HV01 (Figure 9). As this monitor is located close to the existing Wambo Access Road, the results are not considered indicative of the general background air quality.

Recorded TSP concentrations (24-hour average) at W-HV01 for the period 2000-2002 ranged from 2.5 $\mu g/m^3$ to 247 $\mu g/m^3$. The highest two measurements were recorded in late November/early December 2002 and are considered to have been affected by the bushfire present in the Hunter Valley in November and December 2002. Excluding data affected by the 2002 bushfires, the annual average TSP concentration for the 2000-2002 period was 58.4 $\mu g/m^3$.

Particulate Matter Less than Ten Microns in Size

Long-term inferred and measured average PM_{10} concentrations at monitoring site W-HV01 were between 18.1 $\mu g/m^3$and 29.9 $\mu g/m^3$ for the period December 1999 to January 2003, while higher values were recorded during the bushfires. Conservative estimates of PM_{10} concentrations in the Warkworth area under normal conditions (ie. without bushfires) are in the order of 22 $\mu g/m^3$

3.4 SURFACE WATER RESOURCES

While the EIS discusses a number of streams in the Wambo area, the following discussion focuses on Wollombi Brook as the Altered Project is located immediately adjacent to the Brook.

Regional Hydrology

The Altered Project is located within the catchment of the Hunter River, which drains some 22,000 km^2 of central-eastern NSW to the Pacific Ocean at Newcastle.

The Hunter River is one of six river basins that have been regulated by the NSW government through the construction of large water storages. The Hunter River has a mean annual flow at Singleton in the order of 651,000 Mega Liters per annum (ML/annum).

Local Hydrology

At a local level the Altered Project is situated adjacent to Wollombi Brook, south-west of its confluence with the Hunter River. Wollombi Brook drains an area of approximately 1,950 square kilometres (km^2) and joins the Hunter River some 5 km to the north-east. The Wollombi Brook sub-catchment is bound by the Myall Range to the south-east, Doyles Range to the west, the Hunter Range to the south-west and Broken Back Range to the north-east (Hunter Catchment Management Trust [HCMT], 2003).

Other streams in the local vicinity, including Wambo, Stony, North Wambo, Redbank and Waterfall Creeks, are shown on Figure 7.

Surface Water Quality

Surface water quality monitoring has been undertaken in the vicinity of the Wambo Coal Mine since 1994. The water quality monitoring programme measures total suspended solids (TSS), total dissolved solids (TDS), pH and electrical conductivity (EC).

Water quality is currently measured on a monthly basis at sites along Wollombi Brook and Wambo, North Wambo and Stony Creeks. The locations of relevant water quality monitoring sites are shown on Figure 7.

Wollombi Brook

Sampling results at sites SW01, SW02 and SW03 on Wollombi Brook (located both upstream and downstream of the Wambo Coal Mine) indicate a mean EC ranging from 865 to 1,437 microsiemens per centimetre (µS/cm). Maximum EC results at all sites were in excess of the Australian and New Zealand Environment and Conservation Council (ANZECC) (2000) guideline range for the protection of aquatic ecosystems (125 to 2,200 µS/cm), while Site SW01 also exceeded the guideline range for livestock watering (>6,000 µS/cm). Measured pH levels are generally within the ANZECC guidelines.

3.5 FLORA

Vegetation in the Hunter Valley has been significantly altered in floristics and structure since the arrival of Europeans in the early 1800's, primarily due to the clearing of vegetation for agriculture, mining, forestry and settlement (Peake, 2000; DMR, 1999). Nevertheless, a diverse array of vegetation types occur in the Upper Hunter region including dry rainforest, semi-evergreen vine thicket, riverine gallery forests, flood plain woodlands, upland ironbark and acacia forest, spotted gum forest and extensive box and ironbark woodlands (HCMT, 2002). Remnant vegetation occurring on the valley floor is generally more degraded and fragmented than that occurring on the slopes and foothills (DMR, 1999).

The condition of native vegetation in the vicinity of the Altered Project varies, with the most disturbed areas generally occurring along watercourses and on flat and undulating areas which have been cleared for grazing. Remaining areas of remnant vegetation have been semi-cleared, subjected to historical or current stock grazing and contain open areas with regeneration of various ages.

3.5.1 Flora Survey

A flora survey and assessment was conducted for the Wambo Development Project (including the Altered Project area) by Orchid Research in spring and summer 2002. Areas of remnant vegetation were systematically surveyed using quadrats and spot sampling sites to compile a comprehensive species list and to detect threatened species which may have been present.

Remnant vegetation is dominated by eucalypt forests and woodlands, however thin strips of River She-oak (*Casuarina cunninghamiana*) occur along Wollombi Brook and sand dune heathy woodlands are also present.

Table 10 and Figure 10 provide a summary of the three vegetation communities recognised in the vicinity of the Altered Project.

Table 10
Vegetation Communities Recognised in the Vicinity of the Altered Project

Community Number	Scientific Names	Common Names
1	*Casuarina cunninghamiana/Angophora floribunda*	River Oak/Rough-barked Apple
5	*B. integrifolia/A. floribunda/E. blakelyi*	Coast Banksia/Rough-barked Apple/Blakely's Red Gum
6	*E. crebra/E. moluccana/Allocasuarina luehmannii/ M. decora*	Narrow-leaved Ironbark/Grey Box/Bulloak/Honeymyrtle

After: WCPL (2003)

Threatened Flora Species and Ecological Communities

No plant species listed as threatened under the *Threatened Species Conservation Act, 1995* (TSC Act) or Commonwealth *Environmental Protection and Biodiversity Conservation Act, 1999* (EPBC Act) were recorded in the vicinity of the Project. However, the Warkworth Sands Woodland was recorded.

The Warkworth Sands Woodland was listed as an endangered ecological community in the TSC Act in December 2002. Mapping of the occurrence of the Warkworth Sands Woodland was undertaken as part of the flora assessment and the results of this mapping are shown on Figure 10. Warkworth Sands Woodland identified in the vicinity of Warkworth and the Altered Project rail loop is heavily invaded by weeds, fragmented and in poor condition. Conversely, the Warkworth Sands Woodland identified to the south, between Wollombi Brook and Wallaby Scrub Road (Figure 10) is in good condition.

VEGETATION COMMUNITIES

Riverine Communities (Alluvial Soils)

1. *Casuarina cunninghamiana/Angophora floribunda*
2. *Eucalyptus camaldulensis*
3. *E. melliodora/E. blakelyi/A. floribunda*

Colluvial Soil Communities

4. *E. tereticornis/Melaleuca decora*

Aeolian Soil Communities (Warkworth Sands Woodland)

5. *Banksia integrifolia/A. floribunda/E. blakelyi*

Soils Derived from Sandstone, Shale, Conglomerate

6. *E. crebra/E. moluccana/Allocasuarina luehmannii/M. decora*
7. *A. floribunda/E. crebra/E. moluccana/A. luehmannii*
8. *E. moluccana/E. crebra/Allocasuarina verticillata*
9. *Corymbia maculata/E. crebra/E. moluccana/A. luehmannii/M. decora*
10. *E. dawsonii/E. crebra/A. luehmannii/M. decora*
11. *E. punctata/E. crebra/A. luehmannii/M. decora*
12. *E. blakelyi/A. floribunda/E. crebra*
13. *E. acmenoides/A. floribunda*
14. *Geijera salicifolia/Notelaea microcarpa*
15. *Acacia aneura*
16. Vine Thicket (Dry Rainforest)

0 1 2
Kilometres

LEGEND

Mining & Coal Lease Boundary

Mining Lease Application Boundary

Source: Orchid Research (2003)

PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

FIGURE 10

Vegetation Communities of Remnants in the Vicinity of the Wambo Development Project

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Regionally Significant Flora

The Rare Plants Committee of the Hunter Region Botanic Gardens has compiled a Preliminary List of Regionally Significant Plants (Bell *et al.*, in prep), comprising 1,217 species. A total of 65 species listed in the *Preliminary List of Regionally Significant Plants of the Hunter Catchment* (Bell, *et al.*, in prep) were recorded within the Wambo Development Project study area. Although largely cleared and heavily infested with weeds, regionally significant populations of the River Red Gum occur in small scattered patches along Wollombi Brook. A number of vegetation communities identified in the vicinity of the Altered Project also contain *Melaleuca decora*. Paperbark woodlands dominated by *M. decora* are also considered to be regionally significant.

3.6 TERRESTRIAL FAUNA

3.6.1 Fauna Surveys

Avifauna, mammals, reptiles and amphibians were surveyed in September and October 2002 as part of the Wambo Development Project EIS terrestrial fauna assessment. Bat fauna were surveyed separately in September 2002 as part of the bat fauna assessment. Both surveys incorporated survey of the rail loop area. A number of reference sources containing the results of regional fauna surveys and database records (e.g. NPWS Atlas of NSW Wildlife, Birds Australia, Australian Museum and Hunter Bird Observers Club) were also reviewed and, where appropriate, included in these assessments.

Species Composition

The number of terrestrial fauna species identified during the surveys of the Wambo Development Project EIS is provided per fauna type in Table 11.

Table 11
Terrestrial Fauna Species

Fauna Type	Number of Species Identified
Amphibians	10
Reptiles	15
Birds	117
Mammals	23
Total	**165**

After: WCPL (2003)

The majority of amphibians recorded by the surveys were associated with waterbodies, however, several species not closely associated within open water were also recorded, including Sudell's Frog (*Neobatrachus sudelli*), Smooth Toadlet (*Uperoleia laevigata*) and several *Limnodynastes* species. Four species of tree frogs were recorded by the surveys, namely, the Eastern Dwarf Tree Frog (*Litoria fallax*), Broad-palmed Frog (*Litoria latopalmata*), Rocket Frog (*Litoria nasuta*) and Peron's Tree Frog (*Litoria peronii*).

The Eastern Snake-necked Turtle (*Chelodina longicollis*), Lace Monitor (*Varanus varius*), Bearded Dragon (*Pogona barbata*) and Robust Ctenotus (*Ctenotus robustus*) were the most common reptile species recorded during the surveys.

The fauna surveys recorded a relatively large number of woodland birds and birds associated with waterbodies. The surveys also recorded a high diversity of woodland bird species including a number of woodland birds observed to have a declining population status in NSW.

Twenty-three native mammals were recorded by the surveys including the Short-beaked Echidna (*Tachyglossus aculeatus*), Yellow-footed Antechinus (*Antechinus flavipes*), Common Wombat (*Vombatus cuculla*), Squirrel Glider (*Petaurus norfolcensis*), Common Brushtail Possum (*Trichosurus vulpecula*), four macropods (Kangaroos and Wallabies) and 14 bat species. The Eastern Grey Kangaroo (*Macropus giganteus*) and Red-necked Wallaby (*Macropus rufogriseus*) were recorded in high numbers. The highest number of bat calls was recorded at waterbodies, however the majority of bat fauna utilised the wide variety of habitats available.

Introduced Fauna Species

Eleven introduced species were recorded by the surveys of the Wambo Development Project EIS, including the House Sparrow (*Passer domesticus*), Common Starling (*Sturnus vulgaris*), Common Mynah (*Acridotheres tristis*), House Mouse (*Mus musculus*), Black Rat (*Rattus rattus*), Cat (*Felis catus*), Dog (*Canis familiaris*), Red Fox (*Vulpes vulpes*), Brown Hare (*Lepus capensis*), European Rabbit (*Oryctolagus cuniculus*) and Cow (*Bos taurus*).

Threatened Fauna Species

Threatened fauna species recorded in the vicinity of the Wambo Development Project included eight birds and five mammals. Two of these species, the Glossy Black-cockatoo (*Calyptorhynchus lathami)* and the Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris)* that are both considered vulnerable under the TSC Act were recorded in the vicinity of the rail loop (Figure 11).

Eight Part Tests of Significance conducted for 41 threatened fauna species, were conducted for the Wambo Development Project and the findings of the assessments are discussed in Section 4.7.

3.7 COMMUNITY INFRASTRUCTURE

The Altered Project is located in the Hunter Statistical Division (SD) of NSW which covers approximately 31,000 km^2 and extends from Tuncurry to Lake Macquarie and west to the Great Dividing Range. The Hunter SD comprises the Newcastle and the Hunter Statistical Subdivisions.

The Altered Project is located in the Singleton Statistical Local Area (SLA).

The local area has a significantly younger population than the Hunter region with a higher percentage of the population under the age of 15 and in the 25-44 year age group. Persons aged over 65 years constitute a relatively low percentage of the population within the local area.

Housing and Unemployment

An investigation of local housing and short-term accommodation conducted for the Wambo Development Project EIS indicated that approximately 9% of all private dwellings were unoccupied in the Cessnock, Singleton and Muswellbrook SLAs and approximately 5.6% of all private dwellings were unoccupied in the Maitland SLA. Consultation with local real estate agents suggested that the Singleton and Maitland SLAs are experiencing a shortage of available vacant land and housing, including rental housing. The Cessnock SLA has a higher number of available houses, for sale or rent.

LEGEND

- Mining & Coal Lease Boundary
- Mining Lease Application Boundary
- Brown Treecreeper
- Diamond Firetail
- Glossy Black-cockatoo
- Grey-crowned Babbler
- Hooded Robin
- Speckled Warbler
- Square-tailed Kite
- Turquoise Parrot
- Squirrel Glider
- Large-eared Pied Bat
- Little Bentwing Bat
- Large Bentwing Bat
- Yellow-bellied Sheathtail Bat

0 1 2
Kilometres

Source: Mount King Ecological Surveys (2003) & Greg Richards and Associates Pty Ltd (2003)

PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

FIGURE 11
Location of Threatened Fauna Species Recorded by Wambo Development Project Surveys

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Short-term accommodation facilities are abundant in the Hunter region with over 6,500 bed spaces available in motels, hotels or guesthouses. Vacancy rates for motels in Singleton are generally around 30% despite seasonal variations. Other short-term accommodation facilities in the town include nine hotels, three caravan parks and six bed and breakfast establishments. Similar facilities are available in the Cessnock, Muswellbrook and Maitland SLAs.

At the local level the unemployment rate has decreased marginally in the Cessnock, Muswellbrook and Maitland SLAs since 1996, although these rates remained above the national unemployment rate of 6.5% for the corresponding period in 2002. The Singleton SLA continues to experience the lowest rate of unemployment in the local area (5.2% in 2002).

Community Facilities

The Cessnock, Maitland and Singleton SLAs are well equipped with education facilities including a range of kindergartens, pre-schools, and primary and secondary schools. Tertiary education opportunities are available at Technical and Further Education facilities in Cessnock, Singleton and Maitland, while the University of Newcastle is situated approximately 25 minutes from Maitland.

Maitland is the major sub-regional centre for the local area and surrounding districts offering a wide range of recreational and retail facilities such as an art gallery, libraries, community swimming pools, golf courses, shopping centres and restaurants. Services available within the local area include Rotary and Lions Clubs, aged care facilities and recreational sporting clubs that cover activities such as football, cricket, swimming, tennis, netball and bushwalking.

The Maitland Hospital services a population of approximately 72,000 including the Maitland, Cessnock, Singleton and Muswellbrook SLAs and is the referral facility for the Upper and Lower Hunter Regions. Coronary care and emergency, surgical and mental health facilities are included in the hospital's comprehensive range of health services. The Maitland Hospital is supplemented by the Maitland Private Hospital, and district hospitals in Singleton (53 beds), Cessnock (68 beds) and Kurri Kurri (41 beds).

3.8 REGIONAL ECONOMY

A benefit cost analysis and regional economic assessment was prepared for the Wambo Development Project EIS by Gillespie Economics (2003). A summary of the results of the assessment with regard to the existing regional economy is provided below.

The regional economic assessment is based on the Hunter SD. The Hunter SD comprises the SLAs of Cessnock, Lake Macquarie, Maitland, Newcastle, Port Stephens, Dungog, Gloucester, Great Lakes, Merriwa, Murrurundi, Muswellbrook, Scone and Singleton.

In 2001 the gross regional product (GRP) (household income and other value added contributions) for the Hunter economy was $17,259M and included $9,096M in wages and salaries and $8,163M in other value added contributions (includes gross operating surplus, depreciation and net indirect taxes and subsidies). The workforce of the region was approximately 222,000 with the average salary being approximately $41,000 per person.

The comparative distribution of various industry sectors to the GRP, employment and output earnings for the Hunter region, is presented in Table 12.

Table 12
Contributions to Gross Regional Product, Employment and Output
by Industry Sector – Hunter Statistical Division 2001

Sector	Total Employment (%)	Contribution to GRP (%)	Contribution to Output (%)
Agriculture/Forestry and Fishing	3	2	2
Mining	3	21	18
Manufacturing	12	12	20
Utilities	1	4	4
Building	8	7	8
Services	73	52	48

After: WCPL (2003)

Comparison with the state economy reveals that the mining, utilities and building sectors are of greater relative importance to the economy of the Hunter SD. The manufacturing, mining and services sectors contribute 97% of exports from the Hunter SD while imports are more evenly spread across economic sectors.

3.9 ABORIGINAL HERITAGE

3.9.1 Background

The Altered Project is located within the Wonnarua Aboriginal linguistic or tribal area, which extends throughout the Hunter Valley. The Hunter region was officially opened for white settlement in the early 1820s and by 1825 more than 360,000 acres had been occupied. The introduction of diseases such as smallpox and influenza combined with agricultural activities of the settlers that altered land and other resources, resulted a decline in the number of Aboriginal people practising traditional lifestyles.

Prior to European contact the area in the vicinity of the Wambo Development Project would have supported a wide range of plant and animal resources. Surveys conducted as part of the flora assessment for the Wambo Development Project EIS identified a number of plants and animals that may have provided food and other resources to Aboriginal people.

Several archaeological studies have previously been carried out in the vicinity of the Altered Project. These include studies by Brayshaw (1981), Brayshaw *et al*. (1996), Corkill (1990), Dyall (1980, 1981), Effenberger (1992), ERM Mitchell McCotter (information on NPWS site forms), Kuskie (1998, 2000), Rich (1991a, 1991b), Silcox (1998), and Sutton (2002). Most of these studies were carried out primarily to identify sites and provide management advice.

3.9.2 Surveys

The Aboriginal heritage assessment for the Wambo Development Project EIS utilised the results of a search of the NPWS Aboriginal Sites Register and the results of Project surveys conducted by an archaeological team and representatives of the Lower Wonnarua Tribal Council, Upper Hunter Wonnarua Council and Ungooroo Aboriginal Corporation in November and December 2002. Results of the NPWS search and Project surveys were supplemented by a geomorphological study.

A total of 292 sites were identified and consist of:

- a carved tree/ceremonial site;
- grinding groove sites;

- possible grinding groove sites;
- probable scarred tree;
- contact sites with flaked glass objects;
- possible contact sites with scatters of historic material together with stone objects; and
- isolated objects and object scatters (open sites).

Of these sites, some six sites were located east of Wollombi Brook in the vicinity of the rail spur/loop and nine sites were located to the west of Wollombi Brook (Table 13 and Figure 12).

Table 13
Relevant Aboriginal Sites*

Site	Description
13	Large open site located adjacent to the rail spur south of Wollombi Brook.
14-18	Open sites located adjacent to the rail spur east of Wollombi Brook.
19-27	Open sites located adjacent to the Project rail spur west of Wollombi Brook.

After: WCPL (2003)
* Refer Figure 12

3.10 NON-ABORIGINAL HERITAGE

Lands in the vicinity of the Altered Project were originally explored in 1819 by a party led by John Howe. John Howe was subsequently granted 700 acres of land at Patrick Plains as a reward for his discoveries and expeditions in the Hunter Valley, and the remainder of the Warkworth area was opened for settlement in 1821 (Collins, 1994).

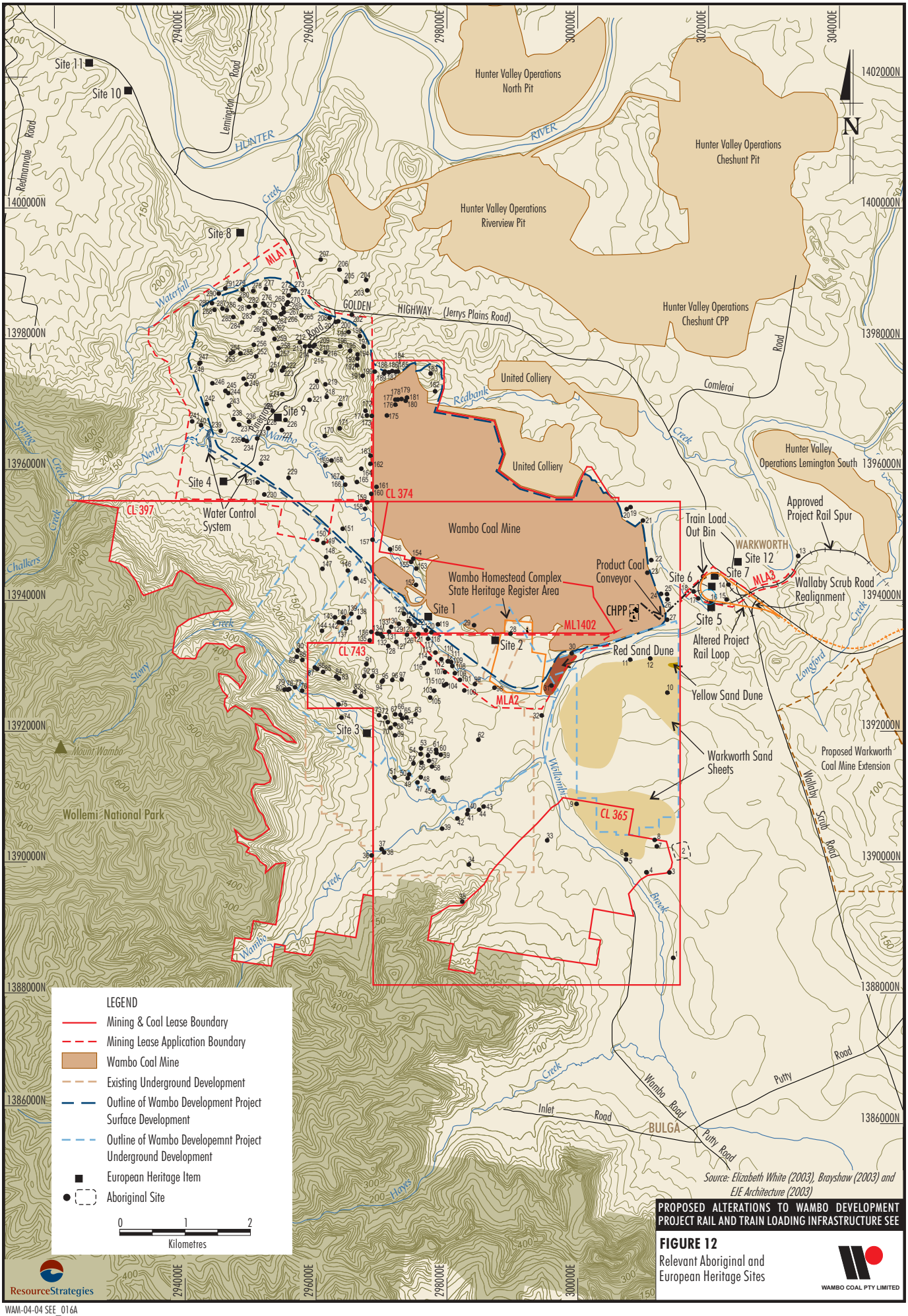
The heritage assessment undertaken for the EIS identified two sites of heritage significance in accordance with the *NSW Heritage Manual* (Table 14) in the vicinity of the Altered Project (Figure 12).

Table 14
Items Considered of Heritage Significance

Site Number	Site Name	Description	Significance
Site 5	Abandoned Homestead B	Located adjacent to Wollombi Brook in the vicinity of the rail loop. Homestead B consists of an abandoned cottage and shed. The physical condition of the buildings is poor.	Local Significance
Site 6	Piggery and Butcher's Hut	Located within the rail loop. The Piggery and Butcher's Hut are dilapidated and beginning to fall apart.	Minor Local Significance

After: WCPL (2003)

The remaining site located near the rail loop (Site 7 - an aerial footing, Figure 12) was not considered to be an item of heritage significance.



Source: Elizabeth White (2003), Brayshaw (2003) and EJE Architecture (2003)

PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

FIGURE 12
Relevant Aboriginal and European Heritage Sites

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3.11 TRANSPORT

The existing road system and traffic flows in the vicinity of the Altered Project are summarised below.

3.11.1 Road Hierarchy

The main classified roads under the administration of the RTA in the vicinity of the Altered Project are illustrated on Figure 13 and are listed below:

- The New England Highway (National Highway 15), which is the inland route between Sydney and Brisbane. Although not located in the immediate area, the New England Highway is the major arterial road in the region.
- The Golden Highway (State Highway 27) (Jerrys Plains Road), which links the New England Highway south of Singleton to the Newell and Mitchell Highways to the west of the State.
- Putty Road (Main Road 503) (south of the Golden Highway), which links the Hunter region to the upper Hawkesbury region and the north-western suburbs of Sydney via the Yengo and Wollemi National Parks.

Classified roads in the vicinity of the Altered Project under the management of the SSC include a section of Putty Road (Main Road 128) (north of the Golden Highway), which provides a link between Singleton and the Wambo Coal Mine (Figure 13).

Wallaby Scrub Road is a sealed road administered by the SSC that provides a link between Putty Road and the Golden Highway at Warkworth.

The majority of roads in the vicinity of the Altered Project have good surface conditions, signage and intersection geometry.

3.11.2 Existing Traffic Conditions

RTA traffic count station locations are shown on Figure 13. The measured RTA Average Annual Daily Traffic (AADT) and other available traffic flow records are summarised in Table 15.

Table 15
Daily RTA AADT and Other Measured Traffic Flows 1982-2002

Station Number	Location	RTA AADT Traffic Counts							Other Counts
		1982	1988	1990	1992	1995	1998	2001	2002
05485	Golden Highway at Hunter River Bridge	-	1,351	-	1,502	1,528	2,213	2,337	-
-	Golden Highway – at the intersection of Pinegrove Road	-	-	-	-	-	-	-	2,300
-	Golden Highway – east of the United Colliery Haul Road	-	-	-	-	-	-	-	3,664
05638	Golden Highway/Putty Road east of Mount Thorley	4,759	-	4,800	-	6,447	7,164	7,966	-
05481	Golden Highway North of Putty Road	4,757	-	4,508	-	7,957	6,256	7,059	-
05840	Wallaby Scrub Road 900 m south of the Golden Highway	-	698	-	-	-	-	-	660
05167	Putty Road south of Milbrodale	-	1,420	1,072	1,075	860	799	793	-

Source: WCPL, 2003

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The percentage of heavy vehicles is generally not recorded in RTA AADT traffic counts, however, the level of heavy vehicles on the Golden Highway where coal haul trucks operate between the MTCL and the Wambo Coal Mine is generally accepted to be as high as 40% during peak coal haulage campaigns.

Coal Haulage Traffic Flows

Product coal from the Hunter Valley Operations Lemington Mine, United Colliery and the Wambo Coal Mine is hauled to the MTCL using a fleet of 37 t payload B-double trucks and single trailer 28 t payload trucks.

Truck movements (ie. in and out) associated with haulage of approximately 6.7 Mt of product coal for the period July 2000 to June 2001 have been reported as approximately 388,000 truck movements averaging approximately 1,090 movements per day Monday to Saturday and 904 movements per day on Sunday (HLA Envirosciences Pty Ltd, 2002).

Over the 2002 calendar year, approximately 7 Mt of product coal was transported to the MTCL from the Wambo Coal Mine, Lemington Mine and United Colliery (WCPL, 2003). The number of truck movements for 2002 was approximately 390,000 truck movements or 1,070 movements per day (7 day average).

3.11.3 Traffic Safety

Over the 1998 to 2002 period on the Golden Highway, some 67 accidents were recorded that required towing or involved an injury (1 fatality, 24 injuries and 42 tow away accidents). The most common accidents included drivers leaving the carriageway and collisions with animals. A single fatality, involving a motorcycle, was recorded in the Mount Thorley section of the highway.

Traffic records indicate that there have been a number of accidents recorded near the intersection of Wallaby Scrub Road and the Golden Highway. The majority of accidents recorded on the Golden Highway and Wallaby Scrub Road were single light vehicle accidents with very few recorded accidents involving heavy vehicles.

4 ENVIRONMENTAL EFFECTS

The key environmental effects of the Altered Project in comparison to the approved Project are as follows:

- Significant reduction in the area of land disturbance associated with rail (reducing from approximately 7 hectares to 4.4 hectares) and a 1.4 km decrease in the length of rail requiring construction.
- No change to the operational noise emissions of the development.
- Increase in the offset distance between the rail and the Henderson dwelling from approximately 100 m to 413 m.
- Minor reduction in the potential air quality impacts of the development during construction due to the decreased area of land disturbance.
- No change to potential air quality impacts of the development during operation.
- Reduction in potential visual impacts on the Henderson residence and the St Philips Church due to the rail alignment remaining on the southern side of the Golden Highway.
- Potential increase in the visual exposure of the Hawkes residence to the southern limb of the rail loop, although this section of the loop would be in a cutting and tree screening (existing and/or additional plantings) would be utilised.
- Reduced potential for disruptions to traffic flows on the Golden Highway due to the removal of the need for the construction of a rail underpass beneath the Golden Highway. Disruptions to traffic flows on Wallaby Scrub Road would be minimised by constructing the two rail underpasses prior to the commissioning of the realigned section of road.
- Reduced potential for erosion and sedimentation related impacts on Wollombi Brook due to the decreased area of land disturbance and removal of the rail spur from the Wollombi Brook flood plain north of the Golden Highway.

This section outlines the potential environmental impacts and mitigation measures of the Approved Project (extracted from Section 4 of the EIS) followed by the potential impacts and mitigation measures of the Altered Project.

Extracts from the EIS are provided in italics. In these extracts the Wambo Development Project is referred to as “the Project”. While the EIS assessed both the mine (DA1) and the construction and operation of the rail spur, rail loop, coal reclaim area, product coal conveyor and train loadout bin (the Approved Project), where possible the mine related aspects of Section 4 of the EIS have not been reproduced below. This includes deletion of paragraphs and sentences, abbreviation of tables and simplification or amendment to references where appropriate.

4.1 LAND RESOURCES

4.1.1 Topography and Landscape Features

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Approved Project in relation to topography and landscape features are outlined below (as extracted from Section 4.1.1 of the EIS).

Potential Impacts

The main modifications to the existing topography that would result from the Project relate to …landform alterations associated with the construction of the rail spur (including an underpass beneath the Golden Highway), rail loop and train loading system.

Mitigation Measures

Mine infrastructure and landforms have been designed and located to integrate with existing topography and landscape features via: …

- *maximum utilisation of Wambo Coal Mine infrastructure, services and amenities;*
- *integration of the Project surface infrastructure with Wambo Coal Mine infrastructure areas;*
- *rehabilitation of Project landforms in a manner that maximises integration with the surrounding landscape.*

ALTERED PROJECT

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

The underpass of the Golden Highway would no longer be required and would be replaced with two underpasses on the realigned section of Wallaby Scrub Road.

Overall the realignment and 1.4 km reduction in the total length of the rail line would reduce topographic and landscape effects associated with the Project. The Altered Project rail loop would be located predominantly within cuttings.

Rehabilitation activities would be unchanged (Section 5).

4.1.2 Erosion and Sedimentation Potential

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Approved Project in relation to erosion and sedimentation potential are outlined below (as extracted from Section 4.1.2 of the EIS).

Potential Impacts

Potential impacts of the Project on soils relate primarily to:

- *loss of in-situ soil resources beneath mine landforms;*
- *alteration of soil structure beneath infrastructure and hardstand areas, stockpile areas … and roads;*
- *soil contamination as a result of spillage of fuels, lubricants and other chemicals;*
- *increased erosion and sediment movement due to exposure of dispersive soils and during construction of mine infrastructure; and*
- *alteration of physical and chemical soil properties (e.g. structure, fertility and microbial activity) during stripping and stockpiling operations.*

The alluvial soil deposits (Quaternary alluvium) within the Project area, and the geomorphological environment in which they occur, are not conducive to the formation of acid sulphate soils which are generally confined to the occurrence of "recent" Holocene deposits in coastal estuaries and floodplains of major rivers (i.e. below 5 m above sea level).

Mitigation Measures

Erosion and sediment control strategies for the Project would be based on accepted practices established for the existing Wambo Coal Mine and would be further developed and documented in an erosion and sediment control plan…

The primary objectives of these erosion control measures would be to:

- *control soil erosion and sediment generation from areas disturbed by mining and construction activities; and*
- *maintain water quality (primarily in terms of total suspended solids content) in local watercourses.*

Specific mitigation measures to control soil erosion and sediment migration would include:

- *minimising surface disturbance and restricting access to undisturbed areas;*
- *progressive rehabilitation and revegetation of mine infrastructure areas;*
- *minimising compaction during soil excavation and movement;*
- *use of erosion control features (e.g. silt fences and temporary sediment traps, diversion banks, channels and rip-rap structures) to minimise sediment migration, divert surface water around disturbed areas and to control runoff velocity; and*
- *use of sediment retention storages to contain runoff from disturbed areas.*

In addition to the above, soil resource management practices have been developed…..These practices would be further developed as part of the Project rehabilitation programme….

Soil stockpiles would be managed to ensure long-term viability through implementation of the following management practices:

- *Soil stockpiles to be located outside of active mining areas.*
- *Construction of stockpiles with a "rough" surface condition to reduce erosion hazard, improve drainage and promote revegetation.*
- *Where stockpiles are to be inactive for extended periods they would be fertilised and seeded to maintain soil structure, organic matter and microbial activity.*

ALTERED PROJECT

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

The Altered Project would reduce potential impacts with respect to soil and sedimentation potential by significantly reducing the area of land disturbance associated with rail construction (from 7 hectares to 4.4 hectares) and, in particular, by reducing the length of rail line that is located within the floodplain of Wollombi Brook north of the Golden Highway (Figure 3). The mitigation measures outlined above for the Approved Project would be applied for the Altered Project.

4.1.3 Landuse and Capability

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Approved Project in relation to landuse and capability are outlined below (as extracted from Section 4.1.3 of the EIS).

Potential Impacts

> *The impacts on land use would … comprise the loss of some grazing land and vegetation remnants followed by a net gain of woodland vegetation post-rehabilitation.*

Mitigation Measures

> *As at May 2003, WCPL controls approximately 3,560 ha of land in the Project area. WCPL would either purchase properties or negotiate lease or compensation agreements with landholders directly affected by the Project.*
>
> *Land management practices would be undertaken in accordance with the Land Management Plan…*
>
> *Rehabilitation concepts for the Project provide for the ability to return much of the mine affected land to a mixture of agricultural use and endemic woodland habitat…Final rehabilitation requirements and post-mining land use would be determined in consultation with relevant statutory authorities and stakeholders.*

ALTERED PROJECT

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

The impacts on landuse and capability would be reduced by the Altered Project due to the reduction in land disturbance. Further, the rail line would no longer bisect an area of agricultural land located adjacent to Wollombi Brook to the north of the Golden Highway.

4.1.4 Land Contamination Potential

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Approved Project in relation to land contamination potential are outlined below (as extracted from Section 4.1.4 of the EIS).

Potential Impacts

> *The main potential land contamination risks have been identified as spills, fires or explosions associated with the transport, storage and usage of fuels, chemicals and explosives.*

Mitigation Measures

Measures to prevent or reduce the potential for contamination of land from fuel, chemicals and explosives include the following:

- *Contractors carrying dangerous goods loads would be appropriately licensed in accordance with the provisions of the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code) (DTRS, 2000). Contractors would operate under the provisions of the WCPL Contractor Management Plan to ensure safety standards and work procedures meet statutory requirements.*
- *Carriers of dangerous goods would maintain a communications system (e.g. two-way radio or mobile telephone) in truck cabs to allow for prompt notification in the event of an accident. Trucks would carry fire fighting equipment.*
- *On-site consumables storage areas would be designed with appropriate bunding and would continue to be operated, where applicable, in compliance with the requirements of AS 1940-1993 The Storage and Handling of Flammable and Combustible Liquids and AS 2187.1-1998 Explosives – Storage, Transport and Use – Storage. Storage areas would be regularly inspected and maintained as required.*
- *Project rail infrastructure and signalling systems would be designed in accordance with the relevant standards. Project train loading activities and rail infrastructure would be regularly inspected and maintained as required. Rail transport contractors would operate under the provisions of the WCPL Contractor Management Plan to ensure safety standards and work procedures meet statutory requirements.*

ALTERED PROJECT

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

Apart from the reduction in the rail line length requiring construction, there are no significant alterations to the land contamination potential associated with the Altered Project as the nature of the development is unchanged. The land contamination mitigation measures outlined above for the Approved Project would be implemented for the Altered Project.

4.1.5 Bushfire Hazard

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Approved Project in relation to bushfire hazard are outlined below (as extracted from Section 4.1.5 of the EIS).

Potential Impacts

Fires moving on or off the Project area present potentially serious impacts to surrounding properties as well as WCPL personnel and equipment. The degree of potential impact would vary with climatic conditions (e.g. temperature and wind) and the vegetative cover present in these areas.

Mitigation Measures

The Wambo Coal Mine currently has a Bushfire Management Plan that identifies bushfire hazards and assesses fire risks to various land uses and ecological values. The plan provides fire prevention, protection and suppression strategies for the mine and adjacent land and describes how WCPL fire management activities integrate with management strategies developed by the NPWS, SSC and other fire authorities.

The Bushfire Management Plan would be reviewed and revised to cover the Project in consultation with the SSC and Rural Fire Service…

Fire awareness and fire safety training are covered during the site specific induction which all WCPL staff and contractors are required to undertake prior to working at the Wambo Coal Mine. Fire awareness and fire safety training would continue to be undertaken as part of the site induction and training programme…

In addition to environmental responsibilities, there exists significant economic incentive to prevent fire damage to mining infrastructure and equipment.

ALTERED PROJECT

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

The Altered Project is not expected to result in any alteration to the potential impacts or mitigation measures associated with bushfire hazard as the nature of the development is unchanged. The bushfire mitigation measures outlined above for the Approved Project would be implemented for the Altered Project.

4.2 VISUAL

4.2.1 Approved Project

The potential environmental impacts and mitigation measures for the Approved Project in relation to visual aspects are outlined below (as extracted from Sections 4.3 and 4.8.2 of the EIS).

Potential Impacts

Visual Landscape Impacts

The Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of New South Wales (DMR, 1999) identifies land clearing, modification of landforms, mine infrastructure and night-lighting as potential causes of visual impacts arising from coal mining. Elements of the Project considered to have the potential to impact on the visual landscape include:

- *realignment of Wallaby Scrub Road;*
- *construction and operation of a rail spur (including underpass beneath the Golden Highway), rail loop and train load-out bin; and*
- *lighting associated with night-time operations.*

Following the exhaustion of coal reserves, mining infrastructure including administration areas, CHPP and rail infrastructure would be removed and the land beneath rehabilitated.

Visual Impacts

The Upper Hunter region covers an area of approximately 18,000 km^2 with a diverse visual character, including mining (approximately 147 km^2) and associated infrastructure (DUAP, 1997). Regionally significant visual features such as the landforms of the Wollemi National Park, Wollombi Brook and Hunter River would not be affected by the Project.

Golden Highway – East of Wollombi Brook

Views of the Project from this section of the Golden Highway would include the realignment of Wallaby Scrub Road, the rail spur, rail spur underpass, train load-out bin and rail operations. Vegetation clearance associated with the construction of these items would reduce the screening effect of roadside vegetation, enabling partial views of the rail spur, train load-out bin and rail operations to the west.

The visual contrast between the rail spur, rail spur underpass, train load-out bin, rail operations and the surrounding landscape, and the proximity of these items to this section of the Golden Highway is expected to be similar to the many existing views of rail and other industrial infrastructure along the highway.

Wallaby Scrub Road

Views of the Project from Wallaby Scrub Road would be similar to those of the Wambo Coal Mine. The realignment of the intersection of Wallaby Scrub Road and the Golden Highway would provide limited views of the Project rail spur through roadside vegetation.

Warkworth

In general, views from dwellings within Warkworth would not be altered by the Project. Limited views of the train load-out bin may be available above existing vegetation. Dwellings within Warkworth to the north of the Golden Highway may have views of rail operations and the Project rail spur as it crosses the Hunter River flood plain to the south-east.

Figure 4-6 [in the EIS] *simulates the view from the easement immediately beside St. Philips Anglican Church looking toward the Project rail spur. This easement has an uninterrupted view over the Wollombi Brook flood plain and represents the easternmost view point in Warkworth. Views from this location would include rail operations and the Project rail spur as it passes westward from behind vegetation on the banks of Wollombi Brook to cross under the Golden Highway. The rail spur underpass would be obscured from view by gently rising topography as it approaches the Golden Highway. Coal trains would be visible on the rail spur at an average frequency of approximately four per day.*

Rural Dwellings/Properties

Views from rural dwellings/properties in the vicinity of the Project would include mine waste rock emplacements, open cut mining operations, the water control system and other items of Project infrastructure.

Night-Lighting

The glow produced by night-lighting at the Wambo Coal Mine is visible at nearby dwellings and along transport routes, while direct views of mobile machinery lights and operational lighting are available from some exposed positions. Project night-lighting would be similar to that used at the existing Wambo Coal Mine.

The glow above operational areas contrasts with the night sky. This effect is exacerbated during overcast conditions and would decrease with distance as the light disperses.

Mitigation Measures

Measures that would be employed to mitigate potential visual impacts include… design and construction of Project infrastructure in a manner that minimises visual contrasts.

The following additional measures would be investigated and, where feasible, implemented for locations assessed as having a high potential visual impact:

- *implementation of landscaping works in consultation with affected rural residents; and/or*
- *placement and maintenance of visual screens between Project infrastructure and the viewing location.*

Project Design

Project infrastructure, such as the train load-out bin, would be coloured to minimise the contrast with the surrounding environment.

Progressive Rehabilitation

Progressive rehabilitation of mine waste rock emplacements and other areas of disturbance would be undertaken in order to reduce the contrast between Project landforms and the surrounding environment. This would include partial rehabilitation with selected grass species with a particular focus on the outer batters of mine waste rock emplacements.

Landscaping Works

Landscaping works, including the installation of bunds at appropriate locations and the planting of selected flora species to screen Project views, would be investigated for rural dwellings identified in Section 4.3.3 as having a high potential visual impact. Where practicable, these works would then be implemented in consultation with the affected landholder.

Visual Screening

Planting of selected flora species would be undertaken in order to increase the degree of visual screening at locations where the visual impact has been assessed as high.

Planting and monitoring of screening vegetation to provide a functional visual barrier would also be considered at the following locations (as suggested by the Project CCC) ….Between the Project rail spur (Wollombi Brook to the Golden Highway) and St. Philips Anglican Church, and some dwellings in Warkworth.

The planting and monitoring of screening vegetation would be undertaken on WCPL owned land wherever possible. Planting and monitoring of screening vegetation outside WCPL land would be undertaken, where practicable, subject to agreement by the relevant landholder.

Night-Lighting

Night-lighting would be restricted to the minimum required for operational and safety requirements and would be directed away from incoming views. All lighting above natural topographic screens would be directed downwards.

4.2.2 Altered Project

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

A discussion of the visual implications of the altered rail alignment and road crossings is provided from relevant viewpoints below:

- **Golden Highway East of Warkworth** – the altered rail alignment would reduce visual impacts looking north from the Golden Highway as there will no longer be views of the rail spur or the Golden Highway rail underpass. To the south of the Golden Highway there would be increased views of the rail loop due to the increased length of loop in proximity to the highway (Figure 3).
- **Warkworth Residences North of the Golden Highway** – views of the rail spur from Warkworth residences would be significantly reduced by the relocation of the rail line to the south side of the Golden Highway;
- **St Philips Church** – views of the rail spur from the St Philips church would be significantly reduced by the relocation of the rail line to the other side of the Golden Highway.
- **Henderson Residence** – views of the rail spur from the Henderson's residence would be significantly reduced by the relocation of the line to the south side of the Golden Highway;
- **Wallaby Scrub Road** – the altered rail alignment would necessitate the construction of two underpasses beneath the realigned section of Wallaby Scrub Road. Views of the rail line and associated embankments would be available from these split level crossings. Views of this nature are typical of road/rail intersections in the region.
- **Hawkes Property** – the altered rail alignment would result in an increased length of rail loop adjacent to the northern boundary of the Hawkes property in comparison to the Approved Project (Figure 3). Existing screening vegetation located near this property boundary, along with the lowered elevation of the trains due to this section of rail being in a cutting, is anticipated to partially screen the rail activities from the Hawkes residence. However, there may be locations where construction clearing or gaps in the vegetation result in the visibility of trains operating on the parts of the new alignment. Coal trains would be operating on the rail spur at an average frequency of approximately four per day.

Night lighting impacts associated with train movements on the rail infrastructure are expected to remain generally unchanged south of the Golden Highway and significantly reduced to the north of the highway.

In conclusion, the potential visual impacts of the Altered Project would be similar in nature to the impacts of the Approved Project and no significant additional visual impacts have been identified.

Mitigation measures that would be implemented to minimise the potential for excessive clearing of screening vegetation would be implemented (Section 4.8.2 of the EIS), *viz.*:

> *Mitigation measures relevant to vegetation clearance activities include the following:*
>
> - *Wherever practicable, existing native vegetation would be retained and vegetation clearance avoided.*
> - *A vegetation clearance protocol would be developed to minimise the impact of Project vegetation clearance activities on flora. As a component of the Protocol, vegetation adjoining proposed clearance areas would be delineated and clearly marked or fenced to prevent accidental damage.*

The visual mitigation measures described above for the Approved Project (ie. progressive rehabilitation, landscaping works and visual screening) would also be implemented to address the potential visual impacts of the Altered Project.

4.3 ACOUSTICS

4.3.1 Noise Impact Assessment

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Wambo Development Project are outlined below (as extracted from Section 4.4.1 of the EIS).

> *The noise impact assessment presented in this section has been undertaken in accordance with the NSW EPA Industrial Noise Policy (INP) (EPA, 2000). The INP provides the framework and process for Project noise impact assessment.*
>
> *In accordance with INP objectives, background noise levels for the Project area and surrounds have been characterised ….* [refer Section 3.2 of this SEE]*. Noise assessment criteria, which form the basis for impact assessment and determining mitigation requirements, have been derived for the Project based on the background levels.*
>
> *Project specific noise assessment criteria derived from this approach … are outlined in* [Table 16]. [Landowner reference numbers refer to Figure 14].

Table 16
Project Specific Noise Assessment Criteria (dBA re 20 µPa)

Locality	*Land Owner*	*Project Specific Assessment Criteria*					
		Intrusive $L_{Aeq(15minute)}$			*Amenity $L_{Aeq(period)}$[1]*		
		Day	*Evening*	*Night*	*Day*	*Evening*	*Night*
Warkworth Village (INP Suburban)	*19(A, B) Kelly*	*40*	*38*	*38*	*55*	*45*	*40*
	51 Hawkes	*38*	*36*	*36*	*55*	*45*	*40*
	56 Haynes	*39*	*37*	*36*	*55*	*45*	*40*
	Other Residential	*39*	*37*	*36*	*55*	*45*	*40*
INP Place of Worship	*St Philips Anglican Church (Internal)*	*Intrusive criteria apply only to residential receivers*		*Not in use*	*40*	*40*	*Not in use*
INP Passive/Active Recreation Area	*St Philips Anglican Church Grounds (External)*				50-55	50-55	

After: WCPL, 2003

1 Daytime 7.00 am to 6.00 pm, Evening 6.00 pm to 10.00 pm, Night-time 10.00 pm to 7.00 am.

In those cases where the INP Project specific assessment criteria in [Table 16] *are not achieved, it does not automatically follow that all people exposed to the noise would find the noise noticeable or unacceptable. In subjective terms, exceedances of the INP Project specific assessment criteria can be generally described as follows:*

- *negligible noise level increase (less than 1 dBA) (not noticeable by all people);*
- *marginal noise level increase (between 1 dBA and 2 dBA) (not noticeable by most people);*
- *moderate noise level increase (between 3 dBA and 5 dBA) (not noticeable by some people but may be noticeable by others); and*
- *appreciable noise level increase (greater than 5 dBA) (noticeable by most people).*

For the purposes of assessing potential noise impacts, exceedances can be separated into the Noise Management Zone (i.e. 1 dBA to 5 dBA above the criteria) and the Noise Affectation Zone (i.e. greater that 5 dBA above the criteria). [Table 7 of this SEE] *presents a description of noise levels from various common noise sources for comparative reference.*

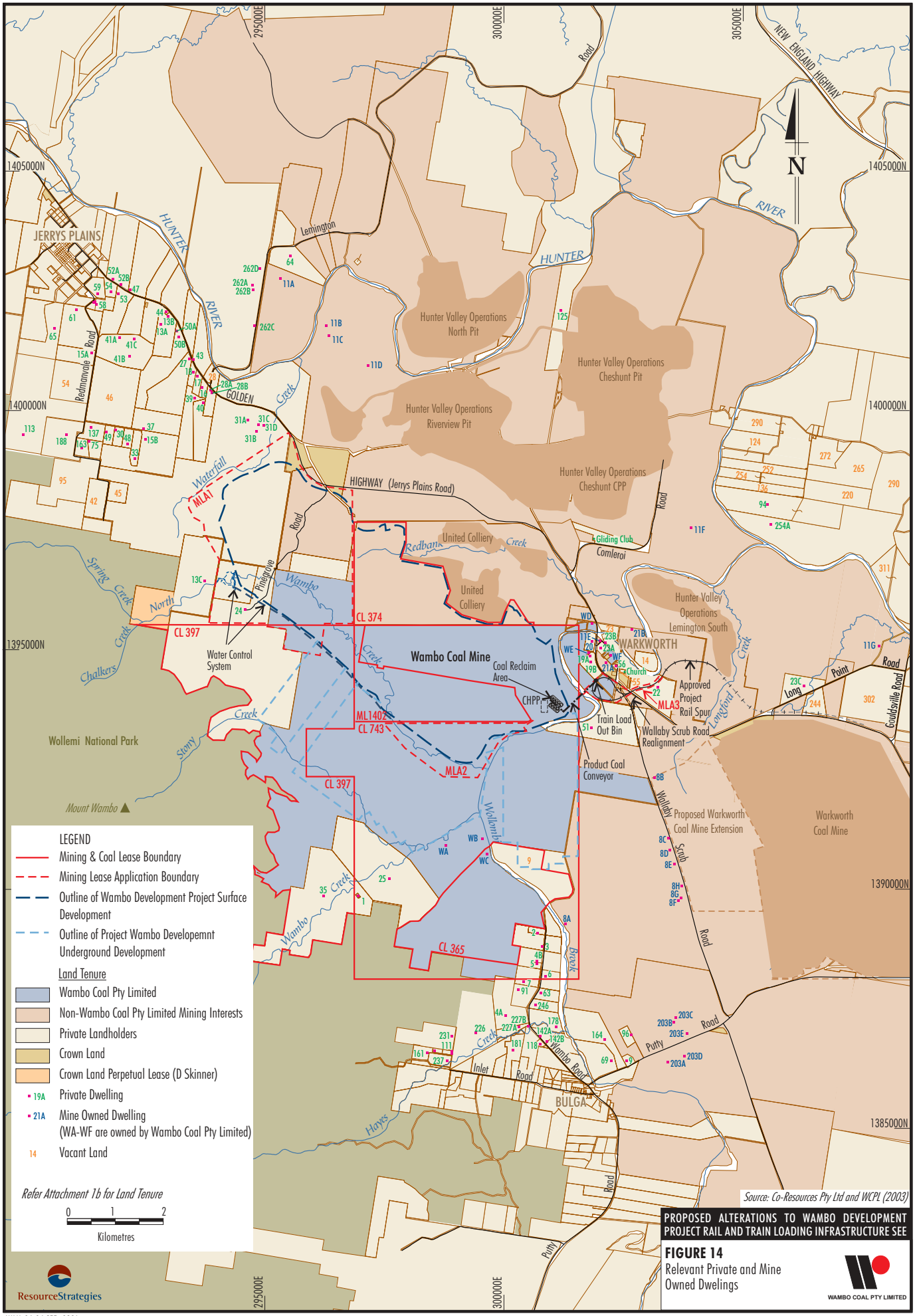
Noise Modelling

An acoustic computer model was developed that simulates Project components and noise source information (sound levels and locations). The model also considers meteorological effects, surrounding terrain, distance from source to receiver and noise attenuation.

The meteorological effects included in the modelling are those characterised as prevailing in accordance with INP assessment methodologies. The definition of prevailing conditions included statistical analysis of site meteorological data (including consideration of wind speed and direction, as well as temperature lapses and inversions).

Noise emissions were modelled for the following prevailing conditions:

- *daytime non-adverse (annual wind speed of 0 m/s and a temperature gradient of 0^oC/100 m);*
- *evening and night-time summer, autumn and spring adverse (summer, autumn and spring wind speed of 3 m/s from the south-east and a temperature gradient of 0^oC/100 m); and*



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- *evening and night-time winter adverse (winter wind speed of 2 m/s from the west and a temperature inversion gradient of 3^{o}C/100 m).*

Potential Impacts

Modelling of daytime, evening and night-time noise emissions from the Approved Project in isolation from the remainder of the Wambo Development Project was conducted by Richard Heggie Associates (Appendix A). The assessment indicates that there would be exceedances of the Project specific noise assessment criteria (Table 16) at a number of nearby dwellings.

Table 17 summarises the privately owned dwellings where the $L_{Aeq(15minute)}$ intrusive emissions are predicted to exceed the criteria during operation of the Approved Project. Landowner reference numbers refer to Figure 14.

Table 17
Private Dwellings within Noise Management and Affectation Zones

Locality	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Project Specific Criteria	3 dBA to 5 dBA above Project Specific Criteria	>5 dBA above Project Specific Criteria
Warkworth Village	Non-Adverse Annual Daytime	22 Henderson	Nil	19(B,A) Kelly 23(A) Kannar 23(B) Kannar 51 Hawkes 56 Haynes
	Adverse SE Wind Summer, Autumn, Spring Evening/Night	22 Henderson	Nil	19(B,A) Kelly 23(A) Kannar 23(B) Kannar 51 Hawkes 56 Haynes
	Adverse W Wind and Inversion Winter Evening/Night	Nil	Nil	19(B,A) Kelly 22 Henderson 23(A) Kannar 23(B) Kannar 51 Hawkes 56 Haynes

Source: Appendix A

Table 18 summarises the mine owned dwellings where the $L_{Aeq(15minute)}$ intrusive emissions are predicted to exceed the criteria during operation.

Table 18
Mine Owned Dwellings within Noise Management and Affectation Zones

Locality	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Project Specific Criteria	3 dBA to 5 dBA above Project Specific Criteria	>5 dBA above Project Specific Criteria
Warkworth Village	Non-Adverse[1] Annual Daytime	Nil	Nil	WE WCPL WF WCPL 11(E) Coal & Allied 20 JPCT 21(A) Coal & Allied
	Adverse SE Wind[2] Summer, Autumn, Spring Evening/Night	Nil	21(B) Coal & Allied	WD WCPL WE WCPL WF WCPL 11(E) Coal & Allied 20 JPCT 21(A) Coal & Allied 21(B) Coal & Allied
	Adverse W Wind and Inversion[3] Winter Evening/Night	Nil	Nil	WD WCPL WE WCPL WF WCPL 11(E) Coal & Allied 20 JPCT 21(A) Coal & Allied 21(B) Coal & Allied

Source: Appendix A

Project Noise Mitigation Measures

During the noise assessment a number of iterative steps were undertaken to develop noise mitigation measures for the Project.

In order to minimise any residual noise impact at the St. Philips Anglican Church from the rail transport of coal, WCPL would liaise with the rail service provider to minimise the potential impact of noise emissions on St. Philips Anglican Church (where practicable) particularly on Friday evenings (i.e. approximately 6.00 pm to 9.00 pm) and Sunday mornings (i.e. approximately 9.00 am to 12.00 pm).

As detailed in [Table 17 of this SEE]*, the private dwellings where noise emissions are predicted to be above Project specific noise assessment criteria can be divided into a noise management zone (1 to 5 dBA above Project specific criteria) and a noise affectation zone (greater than 5 dBA above Project specific criteria). Proposed noise management procedures for these zones are detailed below.*

Noise Management Zone

Depending on the degree of exceedance of the Project specific criteria (1 dBA to 5 dBA) noise impacts could range from negligible to moderate within the noise management zone. In addition to the noise mitigation measures included in the predictive modelling, noise management procedures would include:

- *noise monitoring on site and within the community;*
- *prompt response to any community issues of concern;*
- *refinement of on-site noise mitigation measures and mine operating procedures where practicable;*
- *discussions with relevant landowners to assess concerns;*

- *consideration of acoustical mitigation at receivers; and*
- *consideration of negotiated agreements with landowners.*

Noise Affectation Zone

Exposure to noise levels greater than 5 dBA above the Project specific noise criteria may be considered unacceptable by some landowners. Management procedures for noise affectation zones would include:

- *discussions with relevant landowners to assess concerns and develop practical mitigation;*
- *implementation of acoustical mitigation at receivers (e.g. bunding, double glazing of windows); and*
- *negotiated agreements with landowners if required.*

Recommended Project Noise Limits

In accordance with the procedures described in the INP, recommended noise limits for nearby dwellings and the St. Philips Anglican Church have been assessed using the following procedure:

- *where the predicted noise emission is less than (or equal to) the Project specific criteria then the Project specific criteria is the noise limit;*
- *where the predicted noise emission is within the noise management zone then the predicted noise level is applied as the achievable noise limit; and*
- *where the predicted noise emission is within the noise affectation zone then the upper limiting level applying to the noise management zone is the noise limit.*

Based on the above procedure the recommended operating noise limits for privately owned dwellings and the St. Philips Anglican Church are presented in [Table 19].

Table 19
Recommended Operating Noise Limits

General Locality	***Reference/ Landowner***	***NSW INP (2000) Noise Amenity Area***	***$L_{Aeq(15minute)}$ Intrusive Noise Emission***		
			Non-Adverse	***Adverse***	
			Daytime	***Evening***	***Night***
Warkworth	*19(A,B) Kelly*	*Suburban*	*45*	*43*	*43*
	22 Henderson		*42*	*42*	*41*
	23(A,B) Kannar		*44*	*42*	*41*
	51 Hawkes		*43*	*41*	*41*
	56 Haynes		*44*	*42*	*41*
	Other Residential		*39*	*37*	*36*
	St Philips Anglican Church[1] (Internal)	*Place of Worship*	*40*	*40-45*	*Not in Use*
	St Philips Anglican Church[1] (External)	*Passive/Active Recreation Area*	50-55	50-55	

After: WCPL, 2003

ALTERED PROJECT

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

A noise assessment conducted by Richard Heggie Associates (Appendix A) indicates that the proposed alteration to the rail alignment would not alter the operational noise emissions as the coal reclaim, product coal conveyor, train load-out bin would be unchanged from the Approved Project and these are the dominant noise sources of this development.

The noise mitigation measures described above for the Approved Project would be implemented for the Altered Project.

4.3.2 Rail Transportation Vibration

APPROVED PROJECT

Relevant environmental impacts for the Approved Project in relation to rail transportation vibration are outlined below (as extracted from Section 4.4.3 of the EIS).

> *Product coal would be transported off-site using nominal 8,600 t capacity trains requiring an average of approximately four train trips (i.e. four arrivals and four departures) per day.*
>
> *Rail transport vibration was assessed against German Standard DIN 4150-3 (1999) Structural Vibration: Effects of Vibration on Structures. The criteria for evaluating the long-term (or continuous) effects of vibration on structures are presented in* [Table 20].

Table 20
Continuous Vibration Criteria for Long-term Effects on Structures (DIN 4150-3)

Line	***Type of Structure***	***Vibration Velocity in Horizontal Plane***
1	*Buildings used for commercial purposes, industrial buildings and buildings of similar design*	*10.0 mm/s*
2	*Dwellings and buildings of similar design and/or occupancy*	*5.0 mm/s*
3	*Structures that, because of their particular sensitivity to vibration, cannot be classified under lines 1 and 2 and are of great intrinsic value (e.g. listed buildings under preservation order)*	*2.5 mm/s*

Source: WCPL, 2003

> *The two potentially affected structures proximal to the Project rail line (i.e. St. Philips Anglican Church and the Henderson dwelling) were assessed for potential train generated vibration. The assessment was based on the "Generalised Ground Surface Vibration Curves" presented in the "Transit Noise and Vibration Impact Assessment" (US Department of Transportation, April 1995). These predictions yielded the following results* [Table 21]

Table 21
Predicted Train Generated Peak Component Vibration Levels

Structure/ Dwelling	***Near Point Distance***	***Predicted Peak Vibration Levels***		***Vibration Criteria***
		Train Passby Speed		
		10 km/hr	*30 km/hr*	
St. Philips Anglican Church	*300 m*	*<0.03 mm/s*	*<0.09 mm/s*	*2.5 mm/s*
22 Henderson Dwelling	*100 m*	*0.03 mm/s*	*0.09 mm/s*	*5.0 mm/s*

Source: WCPL, 2003

The predicted peak vibration levels are well below the relevant potential damage criteria.

ALTERED PROJECT

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

Although the Altered Project would result in the rail infrastructure remaining on the southern side of the Golden Highway, the altered loop alignment would result in a slight reduction in the minimum distance between the St Philips Church and the loop (Figure 3). However, the off-set distance would remain in excess of 200 m, more than twice that assessed above for the Henderson dwelling for the Approved Project, which resulted in peak vibration levels below the relevant damage criteria. The increased distance of the altered rail alignment from the Henderson dwelling (Figure 3) would result in a reduction in the peak vibration levels.

4.3.3 Blasting Vibration and Overpressure

The focus of the EIS blasting assessment was to assesses and manage the potential impacts associated with open cut and underground development blasting. While it is not anticipated that any significant blasting would be required during construction of the Altered Project, some minor blasting may be required if hard rock is encountered during rail cutting and underpass excavations.

APPROVED PROJECT

The general requirements for the Approved Project in relation to blasting are outlined below (as extracted from Section 4.4.4 of the EIS).

The EPA advocates the use of the ANZECC guidelines for assessing potential residential disturbance (human comfort) arising from blast emissions.

The ANZECC guidelines for the control of blasting impact at a dwelling are as follows:

- *The recommended maximum level for airblast is 115 dBL.*
- *The level of 115 dBL may be exceeded on up to 5% of the total number of blasts over a period of 12 months, however, the level should not exceed 120 dBL at any time.*
- *The recommended maximum level for ground vibration is 5 mm/s PVS vibration velocity. It is recommended however that 2 mm/s PVS vibration velocity be considered as the long-term regulatory goal for the control of ground vibration.*
- *The PVS level of 5 mm/s may be exceeded on up to 5% of the total number of blasts over a period of 12 months, however levels should not exceed 10 mm/s at any time (at a sensitive receiver).*

In addition, the ANZECC guidelines specify blasting should generally only be permitted during the hours between 9.00 am and 5.00 pm Monday to Saturday. Blasting should not take place on Sundays and public holidays and should generally take place no more than once per day. Blasting may however be conducted outside of these hours in accordance with the applicable blast emission assessment criteria provided in the EPA's Environmental Noise Control Manual (1994).

AS 2187.2-1993 Explosives – Storage, Transport and Use – Use of Explosives nominates blast vibration building damage assessment criteria which range from 5 mm/s to 25 mm/s PVS according to building type and use. The airblast criteria for building damage is 133 dBL (peak).

ALTERED PROJECT

In the event that some minor blasting is required for the Altered Project, blasting activities would be managed to meet the requirements listed above. If this blasting is within 500 m of the Golden Highway, road closures during blasting would be undertaken as described in Section 4.12.

4.4 AIR QUALITY

4.4.1 Air Quality Criteria

The following is extracted from Section 4.5.1 of the EIS.

Dust Deposition

The NSW EPA amenity criteria for dust deposition seek to limit the maximum increase in the mean annual rate of dust deposition from a new development to 2 g/m^2/month and total dust deposition to 4 g/m^2/month.

Concentrations of Suspended Particulate Matter

Human health effects of dust are related to exposure to suspended particulates rather than deposited dust. The effects of dust particles when inhaled are related to the types of particles inhaled, particle sizes and the ability of the respiratory tract to capture and eliminate the particles. Such particles (total suspended particulate) are typically less than 50 micrometers (µm) in size and can be as small as 0.1 µm. Fine particles less than 10 µm are referred to as PM_{10}.

Air quality criteria used in the assessment comprised the following:

- *The United States (US) EPA 24 hour 150 µg/m^3 PM_{10} standard has been utilised as a target that should be met at all dwellings in the vicinity of the Project (concentrations due to the Project and other mining operations).*
- *The National Health and Medical Research Council's (NHMRC) annual goal for Total Suspended Particulate (TSP) of 90 µg/m^3 has been interpreted as a goal that should be met at all locations in the vicinity of the Project where there are dwellings (concentrations due to the Project and other mining operations).*
- *The National Environment Protection Measure (NEPM) 24 hour long-term reporting standard for PM_{10} of 50 µg/m^3 and the NSW EPA 24 hour PM_{10} reporting goal of 50 µg/m^3 (for concentrations due to the Project alone).*

- *The NSW EPA annual goal for 30 µg/m^3 has been interpreted as a goal for PM_{10} that should be met within the region (concentrations due to the Project and other mining operations).*

Details of the air quality criteria for concentrations of particulate matter are provided in [Table 22]*.*

Table 22
Health Based Air Quality Standards/Goals for Particulate Matter Concentrations

Pollutant	*Standard/Goal*	*Agency*
Total Suspended Particulate Matter (TSP)	*90 µg/m^3 (annual mean)*	*NHMRC*
Particulate Matter < 10 µm (PM_{10})	*150 µg/m^3 (average of 99th percentile of 24 hour averages over three years)*	*US EPA Standard*
	50 µg/m^3 (24 hour maximum)	*NSW EPA Reporting Goal*
	30 µg/m^3 (annual mean)	*NSW EPA Long-term Reporting Goal*
	50 µg/m^3 (24 hour average, 5 exceedances permitted per year)	*NEPM Long-term Reporting Standard*

Source: WCPL, 2003

4.4.2 Dust Deposition

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Wambo Development Project (Approved Project plus expanded operation of Wambo Coal Mine) are outlined below (as extracted from Section 4.5.2 of the EIS).

Potential Impacts

The Project would produce two primary sources of dust, viz. wind blown dust from exposed areas and dust generated from mining activities. Cumulative dust deposition impacts were assessed by estimating Project dust emissions (Years 2, 7 and 9) and adding relevant contributions from surrounding mining operations (i.e. Warkworth Coal Mine, Hunter Valley Operations and United Colliery).

Project-only increases in annual average dust deposition at all non-WCPL owned dwellings are predicted to remain below the applicable 2 g/m^2/month EPA amenity criteria.

Annual average dust deposition at all privately owned dwellings within the vicinity of the Project are predicted to remain below the applicable 4 g/m^2/month EPA amenity criteria.

Following submission of the EIS, the EPA (now DEC) requested some further information which was provided by Holmes Air Sciences. Responses to the EPA information requests were provided in a letter from Holmes Air Sciences to the DIPNR dated September 2003 and titled *Wambo Development Project – Responses Air Quality Assessment*. The response indicated that cumulative dust deposition levels would exceed the applicable cumulative criteria at seven mine owned dwellings (8B-8H) over the life of the Wambo Development Project. These dwellings are not located in close proximity to the Approved Project (Figure 14) and dust emissions at these dwelling are dominated by the emissions of the Warkworth Mine (and Wambo Coal Mine).

Mitigation Measures

A range of controls would be employed by WCPL to reduce dust emissions from the Project. These controls are based on current procedures developed at the Wambo Coal Mine and techniques recommended by the NSW EPA.

The main components of controls for wind blown dust may include:

- *Disturbing only the minimum area necessary for mining with reshaping, topsoiling and rehabilitation of mine waste rock emplacement areas to occur progressively and as soon as practicable.*
- *Maintaining coal-handling areas in a moist condition using water carts to minimise wind blown and traffic generated dust.*
- *Maintaining water sprays on product coal stockpiles and use of sprays to reduce the risk of airborne dust.*

Controls for mine generated dust may include the following:

- *Fixed irrigation and/or chemical dust suppressants would be used on select permanent (trunk) haul roads to minimise the generation of dust.*
- *All active roads and traffic areas would be watered using water carts to minimise the generation of dust.*
- *The number of active haul roads would be minimised and clearly defined.*
- *Development of minor roads would be limited and the locations of these would be clearly defined.*
- *Minor roads used regularly for access would be constructed so as to minimise dust generation (well-compacted select material) and watered as required.*
- *All obsolete roads would be rehabilitated.*
- *Access tracks used by topsoil stripping equipment during their loading and unloading cycle would be watered.*
- *Topsoil stockpiles which are not planned to be used for over six months would be revegetated.*
- *Dust aprons would be lowered during drilling.*
- *Drill rigs would be equipped with dust suppression equipment which would be operated whenever the potential for high levels of dust generation is identified.*
- *Blast stemming would be designed to provide optimum confinement of the blast charge.*
- *Automatic sprays or other dust control mechanisms would be used when tipping raw coal generates excessive dust quantities.*
- *Spillage of CHPP materials would be cleaned up to prevent dust.*
- *Dust suppression systems would be fitted at transfer points to prevent high dust levels where necessary.*

ALTERED PROJECT

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

An assessment of the implications of the alteration of the rail alignment from an air quality perspective was conducted by Holmes Air Sciences (Appendix B). The assessment concluded that the Altered Project would not result in any significant changes (increases or decreases) in the air quality effects described in the EIS. However, there may be a slight reduction in construction air quality emissions due to the reduction in the disturbance area. The dust mitigation measures outlined above for the Approved Project would be implemented for the Altered Project.

4.4.3 Concentrations of Suspended Particulate Matter

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Wambo Development Project (Approved Project plus expanded operation of Wambo Coal Mine) are outlined below (as extracted from Section 4.5.3 of the EIS).

Potential Impacts

> *Potential impacts associated with concentrations of suspended particulate matter were calculated as 24 hour average and annual average PM_{10} concentrations and annual average TSP concentrations for comparison against the applicable criteria* [Table 22]. *The cumulative impacts of the Project (Years 2, 7 and 9) and relevant surrounding mining operations (Warkworth Coal Mine, Hunter Valley Operations and United Colliery) were calculated. The non-cumulative impacts of the Project were also calculated (Years 2, 7 and 9).*

Following submission of the EIS, the EPA (now DEC) requested some further information which was provided by Holmes Air Sciences. Responses to the EPA information requests were provided in a letter from Holmes Air Sciences to the DIPNR dated September 2003 and titled *Wambo Development Project – Responses Air Quality Assessment*.

The response indicated that the non-cumulative modelling (Wambo Development Project only) for Years 2, 7 and 9 predicted that concentrations of annual average TSP, 24 hour average PM_{10} and annual average PM_{10} would remain below the applicable air quality standards/goals for particulate matter at all dwellings in the vicinity of the Wambo Development Project except 51 (Hawkes), 31A and 31B (Fisher) where annual average PM_{10} criteria would be exceeded (refer Figure 14 for dwelling locations).

The response also indicated that cumulative particulate levels (i.e. dust emissions from the Wambo Development Project combined with the emissions of other mines) would also exceed the annual average PM_{10} applicable air quality standards/goals at the St Philips Church, Gliding Club and the following private dwellings and parcels of private land over the life of the Wambo Development Project (refer Figure 14 for dwelling locations):

- **Private dwellings** – 19A, 19B, 22, 23A, 23B, 31A, 31B, 31C, 31D, 40, 51, 56, 125.
- **Vacant land** – 23, 55, 14.

The response also indicated that cumulative particulate levels (i.e. dust emissions from the Wambo Development Project combined with the emissions of other mines) would also exceed the applicable annual average TSP and/or PM_{10} air quality standards/goals at the following mine owned dwellings over the life of the Wambo Development Project (refer Figure 14 for dwelling locations):

- **Mine owned dwellings** – 21A, 8B-8H, 11B, 11C, 11D, 11E, 11F, WD, WE, 21A, WF, 20.

It should be noted that a large proportion of the above listed dwellings that have been identified as potentially impacted by the Wambo Development Project are not located in close proximity to the Approved Project (Figure 14). Particulate emissions at these more distant locations are dominated by the emissions of the Wambo Coal Mine and other coal mines, not the Approved Project.

Mitigation Measures

> *The dust generation mitigation measures outlined in* Section 4.4.2 *would also be effective in reducing the potential for generation of suspended particulate matter.*

ALTERED PROJECT

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

An assessment of the implications of the alteration of the rail alignment from an air quality perspective was conducted by Holmes Air Sciences (Appendix B). The assessment concluded that the Altered Project would not result in any significant changes (increases or decreases) in the air quality effects described in the EIS. However, there may be a slight reduction in construction air quality emissions due to the reduction in the disturbance area. The dust mitigation measures outlined above for the Approved Project would be implemented for the Altered Project.

4.5 SURFACE WATER RESOURCES

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Approved Project in relation to surface water resources are outlined below (as extracted from Section 4.6 of the EIS).

Potential Impacts

> *Surface water runoff from mine landforms and disturbed areas could potentially contain sediments, soluble salts, process reagents (i.e. flocculant), fuels, oils and grease. The potential surface water quality impacts of the Project that relate to these contaminants are summarised in* [Table 23].

Table 23
Potential Surface Water Quality Impacts

Operational Areas	***Potential Impact Scenario***	***Type of Potential Contamination***
Infrastructure (i.e. haul and access roads, hardstands and train loading system)	*Drainage of sediment laden runoff to downstream surface waters during construction. Spillage to downstream surface waters during operation.*	*Sediments, soluble salts, fuels, oils and grease.*
Wallaby Scrub Road realignment	*Drainage of sediment laden runoff to downstream surface waters during construction of road realignment. Potential erosion and sedimentation resulting from runoff from road surface and associated drainage system.*	*Sediments.*
Project rail loop and rail spur	*Drainage of sediment laden runoff to downstream surface waters during construction of the rail loop and rail spur. Potential erosion and sedimentation resulting from runoff from rail surface and associated drainage system.*	*Sediments.*

After: WCPL, 2003

Mitigation Measures

The surface water monitoring programme at Wambo Coal Mine would be expanded to accommodate the additional disturbances resulting from the Project. The frequency, parameters and locations monitored as part of the surface water quality monitoring programme would be reviewed on an annual basis.

Minimising Disturbance Areas

Areas disturbed by active mining would be minimised as far as practicable. The site would be segregated into undisturbed runoff areas, development/construction runoff areas, operation runoff areas and rehabilitated areas to minimise the generation of waters requiring on-site containment.

Isolation, Containment and Recycling

Runoff from development/construction areas and operation areas would be intercepted and channelled to containment storages across the site. Sediment retention and containment storages would be sized to contain runoff from rainfall events between a 1 in 10 year and 1 in 100 year ARI, depending on the function of the storage and the potential consequences of uncontrolled release. Secure storages would be provided for the containment of spills and runoff from within these areas.

Runoff from rehabilitated and revegetated areas would initially be directed to sediment retention storages prior to being allowed to drain to local drainages.

Progressive Stabilisation and Revegetation of Disturbed Areas

Development/construction areas and operation areas would be progressively rehabilitated during the Project life. It is anticipated that once rehabilitated areas become established, surface runoff would be of comparable quality to undisturbed areas. Passive treatment systems in the form of temporary sediment retention storages, silt fences and vegetation buffers would be employed as interim erosion and sediment control measures during the rehabilitation process.

Erosion and Sediment Control

Erosion and sediment control measures would be designed in accordance with the above water management principles and would involve the preparation and implementation of an Erosion and Sediment Control Plan (ESCP) [Section 6]*.*

The ESCP would entail sequencing construction works so as to minimise the area of disturbance at any given time in conjunction with the implementation of a progressive rehabilitation programme. Specific mitigation measures to control soil erosion and sediment migration are described in [Section 4.1.2]*.*

ALTERED PROJECT

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load-out bin.

The altered rail alignment would not result in any significant alteration to the potential impacts of the Project on surface water resources. However, there would be reduced potential for erosion and sedimentation related impacts on Wollombi Brook due to the decreased area of land disturbance associated with the removal of the rail spur from the Wollombi Brook floodplain, north of the Golden Highway (Figure 3).

The surface water mitigation measures outlined above for the Approved Project would be implemented for the Altered Project.

4.6 FLORA

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Approved Project in relation to flora are outlined below (as extracted from Section 4.8 of the EIS).

Potential Impacts

Vegetation Clearance

Approximately 473 ha of remnant vegetation would be removed by the Project. The majority of vegetation clearance would occur within the open cut operations area (some 460 ha). …Project infrastructure has, where practicable, been situated in cleared agricultural areas to minimise the amount of vegetation clearance required. Construction of Project infrastructure [for both DA1 and DA2] *would remove approximately 13 ha of remnant vegetation.*

Threatened Flora Species, Populations and Communities

No threatened flora species or endangered populations listed in the schedules of the TSC Act and/or EPBC Act have been identified in the vicinity of the Project.

Warkworth Sands Woodland

The Warkworth Sands Woodland has a patchy, yet extensive distribution on lands to the east of Wollombi Brook around Warkworth, and between Wollombi Brook and Wallaby Scrub Road (vegetation community 5, [Figure 10]*). This community is considered to be the most threatened vegetation community occurring within the region (Peake, in prep. in Peake et. al., 2002) due to its restricted distribution and absence within any conservation reserve.*

The Project would entail the removal of less than 1 ha of the Warkworth Sands Woodland to accommodate the rail loop. The area of Warkworth Sands Woodland that would be disturbed by the rail loop is heavily invaded by weeds, fragmented and in poor condition.

Eight Part Tests of Significance

In accordance with the provisions of Section 5A of the EP&A Act, Eight Part Tests of Significance have been prepared for 17 threatened flora species and three endangered ecological communities considered possible occurrences in the vicinity of the Project. Based on the information presented in the Eight Part Tests it was determined that the Project is unlikely to place any threatened flora species, populations, ecological communities, or their habitats at risk of extinction.

Introduced Species

The presence and possible introduction of weed species poses a potential threat to native plant species by reducing floristic structure and diversity. Disturbance can act as a catalyst for weed incursion and if management initiatives are not implemented, proliferation of weeds can occur.

Dust and Vegetation

Given the predicted dust deposition associated with the Project, the health and viability of surrounding vegetation is unlikely to be deleteriously affected.

Mitigation Measures

The following measures have been developed to mitigate the potential impacts (including cumulative impacts) of the Project on flora.

Flora Management

Flora management strategies, including those listed below, would be detailed in the Flora and Fauna Management Plan (FFMP) to be prepared for the Project prior to construction.

Vegetation Clearance Activities

Mitigation measures relevant to vegetation clearance activities include the following:

- *Wherever practicable, existing native vegetation would be retained and vegetation clearance avoided.*
- *A vegetation clearance protocol would be developed to minimise the impact of Project vegetation clearance activities on flora. As a component of the Protocol, vegetation adjoining proposed clearance areas would be delineated and clearly marked or fenced to prevent accidental damage.*

- *In circumstances where vegetation removal is necessary, clearing operations would be managed to maximise the re-use of cleared vegetative material. This would include implementation of a seed collection programme prior to disturbance for use in the rehabilitation programme and the re-use of cleared vegetation (e.g. provision of habitat for fauna associated with the rehabilitation and remnant woodland enhancement programmes, fence posts etc.), wherever practicable.*
- *In areas of significant earthworks, topsoil resources would be identified, stripped and stockpiled. Soil resources would be stockpiled for short time periods, where practicable, and would be re-spread and seeded.*

Revegetation Programme

- *While some 473 ha of remnant woodland would be removed by the Project, the rehabilitation programme would establish significant areas (some 1,570 ha) and a net increase in woodland vegetation over the long-term* [Table 24].
- *A flora monitoring programme would be developed for the rehabilitation areas and documented in the FFMP.*

Table 24
Estimate of Vegetation Clearance, Revegetation and Woodland Enhancement Areas

Project Component	*Area (ha)*
Project Vegetation Clearance[1] *Open cut operations area (460 ha) and* *Infrastructure areas (13 ha)*	*473*
Revegetation of Open Cut Operations Area *Revegetation to woodland*[2, 3]	*1,570*
Remnant Woodland Enhancement Programme *Woodland enhancement areas*[4]	*1,080*

Source: WCPL (2003)

1 *The areas shown do not include the area approved to be disturbed by the existing Wambo Coal Mine (some 1,090 ha).*

2 *May vary depending on the shape of the final landforms and agreed post closure land use. The calculation is based on the establishment of 50% woodland within the mixed woodland/pasture areas. The final rehabilitation strategy would be determined during closure planning in consultation with relevant regulatory authorities and key stakeholders. The calculation does not include areas to be revegetated with Angophora floribunda and Banksia integrifolia in the vicinity of the rail loop, nor the planting of the primary channel and secondary overflow zone of the water control system with riparian vegetation.*

3 *Includes rehabilitation of areas approved to be disturbed by the existing Wambo Coal Mine which are subject to this development proposal.*

4 *Existing areas of remnant woodland would be fenced to exclude stock during the initial stages of Project development to allow natural regeneration of native trees, shrubs and grasses. Woodland areas to be conserved and enhanced include the Warkworth Sands Woodland endangered ecological community, Box-Gum Woodland endangered ecological community, known habitat for threatened fauna species such as the Grey-crowned Babbler, Hooded Robin, Glossy Black-cockatoo, Speckled Warbler, Diamond Firetail, Squirrel Glider, Large Bentwing Bat, Yellow-bellied Sheathtail Bat and Large-eared Pied Bat and potential habitat for a number of other threatened species.*

Remnant Woodland Enhancement Programme

A remnant woodland enhancement programme (RWEP) would be developed and documented in the FFMP to help conserve regional biodiversity, whilst enhancing the habitat available to flora and fauna. During the initial stages of Project development remnant woodland vegetation (some 1,080 ha, refer [Table 24] *located within WCPL owned land and outside of the Project open cut operations area would be managed to maintain and enhance their inherent conservation values. This initiative is consistent with the objectives of the native vegetation/biodiversity target of the Integrated Catchment Management Plan for the Hunter Catchment 2002 (HCMT, 2002) to conserve existing regionally significant vegetation communities.*

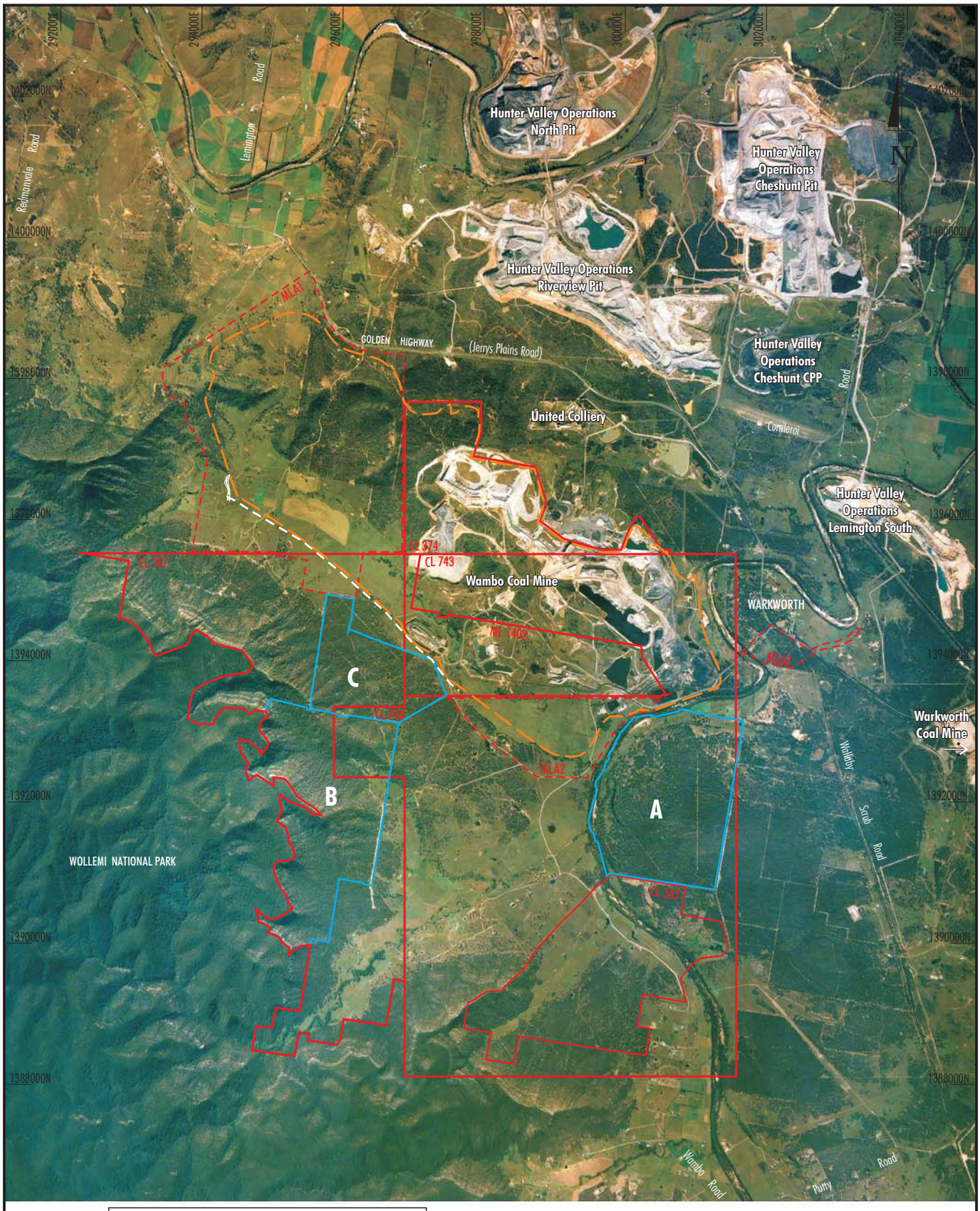
Three areas of remnant woodland have been selected for enhancement and are shown on [Figure 15 of this SEE]*. The areas selected would be subject to further consultation with regulatory authorities and key stakeholders during preparation of the FFMP. The flora values of the enhancement areas are described in* [Table 25]*.*

Table 25
Flora Values of the Woodland Enhancement Areas

Woodland Enhancement Area **[Figure 15]**	***Flora Values***
Area A	*The flora values of Area A include the occurrence of:* • *The Warkworth sands woodland endangered ecological community (listed in the TSC Act). As noted earlier, this community is considered to be the most threatened vegetation community occurring within the region due to its restricted distribution and absence within any conservation reserve. As indicated by Peake et. al. (2002), no areas of Warkworth sands woodland currently occur within a conservation reserve. While there has been patchy clearing and regeneration within this remnant, overall the community is in good condition and is considered to be capable of recovery close to its original condition if grazing is limited to minimise damage to the natural regeneration of native species.* • *White Box, Yellow Box, Blakely's Red Gum woodland/grassy White Box woodlands (Box-Gum woodland) endangered ecological community. This community is listed in both the TSC Act and EPBC Act. This particular stand of Box-Gum woodland is considered to be in close to pristine condition.* • *Regionally significant populations of the River Red Gum (Eucalyptus camaldulensis) within the flood plain of Wollombi Brook.* • *Vegetation community 6 (E. crebra/E. moluccana/A. luehmannii/M. decora), the community that would primarily be disturbed by the open cut mining operations.* • *The ROTAP species, Grevillea montana.*
Area B	*The flora values of Area B include the occurrence of:* • *The same dominant overstorey species that would be removed by the open cut operations (such as E. crebra, A. luehmannii, M. decora, A. floribunda, G. salicifolia and N. microcarpa).* • *A variety of vegetation communities, specifically vegetation communities 6, 9, 10, 3 and 14, thereby increasing the project's contribution to regional biodiversity.*
Area C	*The flora values of Area C include the occurrence of:* • *Vegetation community 6 (E. crebra/E. moluccana/A. luehmannii/M. decora), the community that would primarily be disturbed by the open cut operations.* • *Vegetation communities 10 and 11. Only relatively small patches of vegetation community 11 (E. punctata/E. crebra/A. luehmannii/M. decora) occur in the vicinity of the project. Conservation and enhancement of this patch would further contribute to regional biodiversity.*

Source: WCPL, 2003

The RWEP includes the conservation and enhancement of a variety of vegetation communities, including vegetation community 6 (E. crebra/E. moluccana/A. luehmannii/M. decora), which is the community that would primarily be disturbed by the open cut operations.



LEGEND

- Mining & Coal Lease Boundary
- Mining Lease Application Boundary
- Outline of Wambo Development Project Surface Development
- A — Project Remnant Woodland Enhancement Programme (RWEP) Area

0 1 2 Kilometres

Source: WCPL (2003)

PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

FIGURE 15
Location of Remnant Woodland Enhancement Programme Areas
Wambo Development Project

ResourceStrategies

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The management measures to be implemented within the enhancement areas would be detailed in the FFMP. Management measures relevant to flora would include the fencing of remnants to exclude stock to allow the natural regeneration of native species, the implementation of weed control measures and selective planting of native vegetation to enlarge the remnants and to link existing remnant vegetation, where appropriate.

Endangered Ecological Communities

- *Vegetation clearance required for the rail loop, rail spur and train loading system would be undertaken to minimise disturbance to the Warkworth Sands Woodland endangered ecological community. To compensate for the removal of a small portion (less than 1 ha) of Warkworth Sands Woodland, areas in the vicinity of the rail loop would be revegetated with native species characteristic of the Warkworth Sands Woodland (such as Angophora floribunda and Banksia integrifolia).*
- *In recognition of the high conservation value of the Warkworth Sands Woodland endangered ecological community, areas of Warkworth Sands Woodland located on WCPL land between Wollombi Brook and Wallaby Scrub Road would be enhanced and conserved (Area A as discussed above).*
- *The occurrence of the White Box, Yellow Box, Blakely's Red Gum Woodland/Grassy White Box Woodlands endangered ecological community located on WCPL owned land between Wollombi Brook and Wallaby Scrub Road would also be enhanced and conserved (Area A as discussed above).*

Weed Control

A weed control programme would be implemented to limit the spread of weeds into Project areas. A Weed and Animal Pest Control Plan would be prepared for the Project prior to construction.

Bushfire Management

High frequency bushfire resulting in the disruption of lifecycle processes in plants and animals, and loss of vegetation structure and composition, is listed as a threatening process in Schedule 3 of the TSC Act. The Wambo Coal Mine Bushfire Management Plan would be revised to include Project activities.

Employee Education

An environmental education programme would be included in the employee and contractor inductions and would provide relevant training in the management of native flora.

ALTERED PROJECT

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

Vegetation mapping undertaken for the EIS indicates that the altered alignment of the rail loop may result in a minor increase in the area of disturbance of vegetation community 6 (Figure 16). Vegetation community 6 is well represented in the Warkworth area (Figure 16). The EIS mapping also indicates that no additional areas of Warkworth Sands Woodland would be affected by the Altered Project (Figure 16). The extensive flora mitigation measures, including revegetation programmes and the remnant woodland enhancement programme described above for the Approved Project would mitigate the minor impacts associated with the small area of additional clearing of vegetation community 6 required for the Altered Project.

4.7 TERRESTRIAL FAUNA

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Approved Project in relation to terrestrial fauna are outlined below (as extracted from Section 4.9 of the EIS).

Potential Impacts

Habitat Disturbance

Remnant vegetation within the Project area and surrounds provides (to varying degrees) opportunities for foraging, breeding, nesting, predator avoidance and movement between areas thus promoting genetic diversity and facilitating dispersal/migration. These opportunities could potentially be reduced as a result of clearance activities associated with the Project.

Habitat Fragmentation and Connectivity

Vegetation clearance can fragment remnant vegetation and as a result create a barrier to the movement/dispersal of fauna. …The type of barrier and the species involved would determine the level of impact on dispersal capability or the degree of isolation. Notwithstanding, vegetation clearance associated with the Project has the potential to fragment vegetation remnants, impact on the continuity of corridors and affect the movement/dispersal of fauna.

Threatened Fauna Species

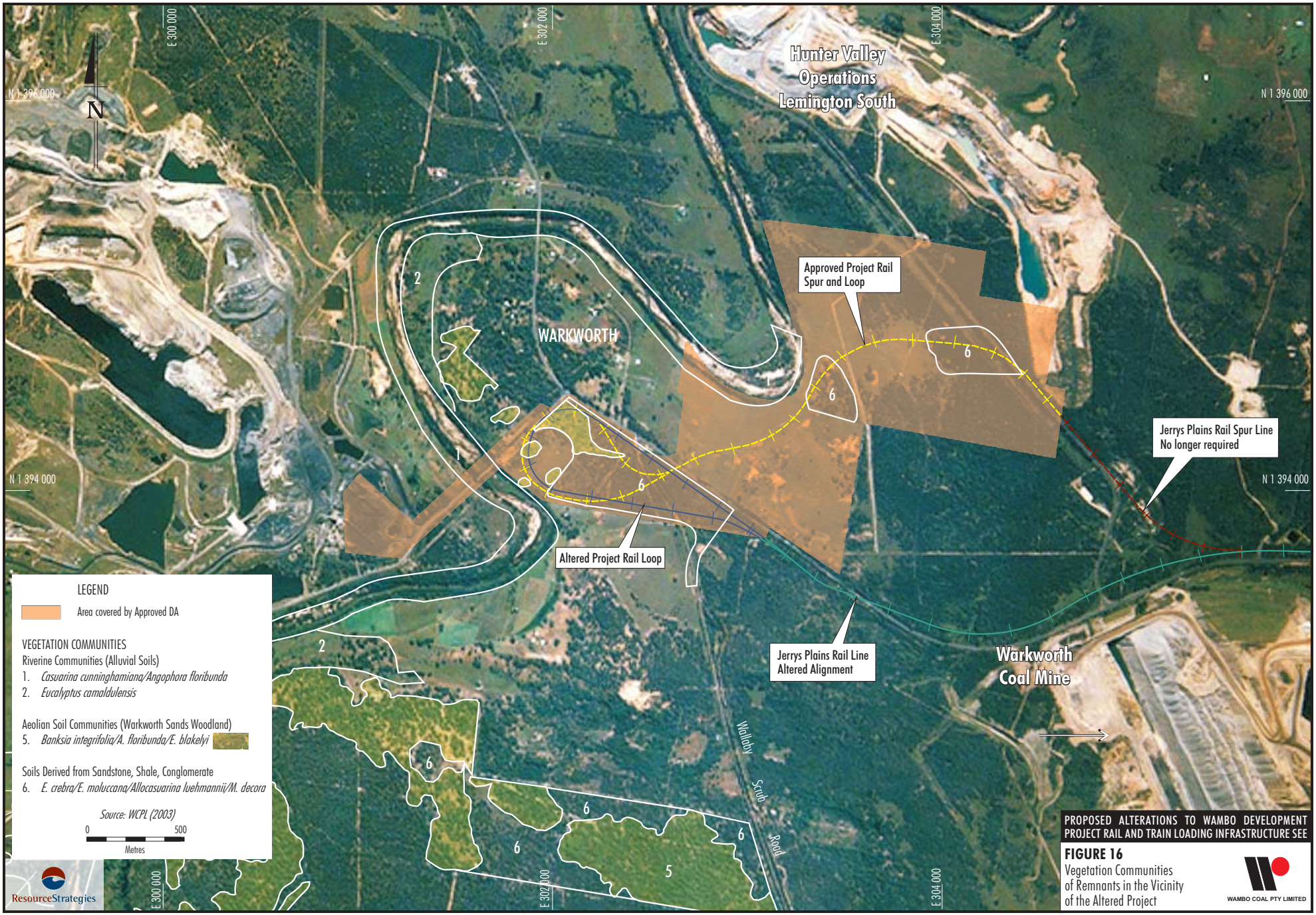
In accordance with the provisions of Section 5A of the EP&A Act, Eight Part Tests of Significance were completed for 41 threatened fauna species considered possible occurrences within the Project area and/or surrounds. Based on the information presented in the Eight Part Tests, it was determined that the Project is unlikely to significantly affect any threatened fauna species to the extent of undermining the viability of a local population of that species.

Introduced Fauna Species

Due to the potential for habitat disturbance, increased refuge and scavenging areas (i.e. discarded food scraps and other rubbish), populations of introduced species could increase or become concentrated in and around the Project.

Fauna and Noise

The Project is expected to increase the existing level of noise, which has the potential to disrupt the routine activities of vertebrate fauna.



PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

FIGURE 16
Vegetation Communities of Remnants in the Vicinity of the Altered Project

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Fauna and Road Traffic

The movement of vehicles (both within the Project area and transport to and from the site) has the potential to increase the incidence of fauna mortality via vehicular strike.

Fauna and Artificial Lighting

Project lighting has the potential to affect the behavioural patterns of some species. Some bird and bat species, for example, are attracted to insects around lights. As a consequence of this, they could become prey for larger predators (e.g. owls) which may lead to changes in population structure and community composition.

State Environmental Planning Policy No. 44 (Koala Habitat Protection)

The Project does not fall within the definition of core Koala habitat and does not have a resident population of Koalas. The Koala has not been recorded in the vicinity of the Project despite numerous surveys and no recent records exist of a population occurring in the area. …it is concluded that the provisions of SEPP 44 do not apply.

Cumulative Impacts

Cumulative impacts of the Project on terrestrial fauna predominantly relate to habitat disturbance and fragmentation which are associated with the clearance of vegetation.

Measures developed to mitigate the potential cumulative impacts of the Project on fauna are outlined below.

Mitigation Measures

In addition to the measures presented in regard to flora, the following initiatives have been developed to mitigate the potential impacts (including cumulative impacts) of the Project on fauna.

Fauna Management

Fauna management strategies, including those listed below, would be detailed in the FFMP to be prepared for the Project prior to construction.

Vegetation Clearance Activities

Mitigation measures relevant to vegetation clearance activities include the following:

- *The FFMP would include a vegetation clearance protocol to minimise the potential impacts of vegetation clearance on fauna. The Protocol would include the delineation of areas to be cleared of vegetation, pre-clearance surveys, identification of fauna management strategies and specific procedures for vegetation clearance.*
- *Prior to ground disturbance works, mature trees and stags with hollows would be identified, marked and retained wherever feasible.*

- *The removal of native vegetation would be undertaken, where practicable, in consideration of seasonal factors to minimise disturbance to potential breeding and hibernation activities. This process would be facilitated by the Project's vegetation clearance protocol which would specify pre-clearance surveys to identify potential roosting/nesting habitat, their usage by fauna, and the identification of fauna management strategies.*
- *Fauna management strategies would be developed to minimise the impact of clearing activities on resident fauna in the short-term and minimise the impact of loss of habitat in the long-term. Fauna management strategies would be implemented in accordance with the FFMP developed for the Project.*
- *Where practicable, habitat features (e.g. large hollows) identified during the pre-clearance surveys would be salvaged and utilised in the rehabilitation or woodland enhancement programmes.*
- *Consideration would be given to the utilisation of artificial nesting/roosting boxes for fauna to replace those removed by vegetation clearance activities.*

Threatened Fauna Species

- *Pre-clearance surveys would include the identification and survey of potential roosting habitat for the Yellow-bellied Sheathtail Bat (Saccolaimus flaviventris). Surveys and vegetation clearance activities would be conducted, where practicable, to avoid the hibernation period of the Yellow-bellied Sheathtail Bat.*

  Where practicable, any Yellow-bellied Sheathtail Bat roosts would be relocated to suitable proximal habitat. Roost relocation would not be attempted during the hibernation period, and would, where practicable, avoid the breeding season (i.e. December to mid-March).

- *Pre-clearance surveys would include, but not necessarily be limited to, the identification and survey of potential nesting/breeding habitat for the Glossy Black-cockatoo, Spotted-tailed Quoll, Brush-tailed Phascogale and Squirrel Glider.*

- *A threatened species management protocol would be developed as a component of the FFMP to facilitate the:*
  - *assessment of threatened species identified during any Project activity and not previously assessed by the Project Eight Part Tests of Significance; and*
  - *implementation of threatened species management strategies to minimise potential impacts on all threatened flora and fauna species.*

Revegetation Programme

- *The revegetation programme would include the use of native species with the potential to offer habitat resources for native wildlife (e.g. breeding, roosting/nesting or foraging resources), including threatened fauna species. For example, the rehabilitation programme would include the use of food tree species for the Grey-headed Flying Fox (e.g. E. crebra and E. moluccana); Allocasuarina and Casuarina for the Glossy Black-cockatoo; and Box-Ironbark species local to the area for the Black-chinned Honeyeater.*
- *The rehabilitation programme would establish significant areas (some 1,570 ha) and a net increase in woodland vegetation over the long-term* [Table 24]. *A key objective of the rehabilitation programme is to establish linkages between the woodland rehabilitation areas, existing remnant vegetation and Wollemi National Park to increase the continuity of vegetation, thereby maximising opportunities for the creation of wildlife corridors (Section 5* [of the EIS]*).*

Remnant Woodland Enhancement Programme

As discussed in [Section 4.6]*, a RWEP would be developed to help conserve regional biodiversity, whilst enhancing the habitat available to flora and fauna. During the initial stages of Project development remnant woodland vegetation (some 1,080 ha* [Table 24]*) located within WCPL owned land and outside of the Project open cut operations area would be managed to maintain and enhance their inherent conservation values. The three areas selected for enhancement are shown on* [Figure 15]*. The fauna values of the enhancement areas are described in* [Table 26]*.*

Table 26
Fauna Values of the Woodland Enhancement Areas

***Woodland Enhancement Area* [Figure 15]**	***Fauna Values***
Area A	*The fauna values of Area A include the occurrence of:* *Known habitat for the threatened Squirrel Glider and Grey-Crowned Babbler. The exclusion of grazing, which is recognised as a threatening process to this species, would improve the habitat for the Grey-Crowned Babbler, as well as a number of other threatened species.* *Potential habitat for a number of other threatened species including those listed under the TSC Act and EPBC Act (e.g. the Swift Parrot and Regent Honeyeater, both listed as Endangered under the EPBC Act).*
Area B	*The fauna values of Area B include the occurrence of:* *Known habitat for threatened fauna species including the Large Bentwing Bat, Yellow-bellied Sheathtail Bat and Large-eared Pied Bat.* *Potential habitat for a number of other threatened species including the Glossy Black-cockatoo, Square-tailed Kite, Brown Treecreeper, Speckled Warbler, Grey-crowned Babbler, Hooded Robin, Squirrel Glider and Grey-headed Flying Fox.*
Area C	*The fauna values of Area C include the occurrence of:* *Known habitat for a number of threatened species including the Glossy Black-cockatoo, Speckled Warbler, Hooded Robin, Yellow-bellied Sheathtail Bat, Large Bentwing Bat and Large-eared Pied Bat.* *Potential habitat for a number of other threatened species including the Square-tailed Kite, Diamond Firetail, Brown Treecreeper, Grey-crowned Babbler, Squirrel Glider and Grey-headed Flying Fox.*

Source: WCPL, 2003

The programme includes the conservation and enhancement of areas of remnant woodland adjacent to Wollemi National Park. Conservation and enhancement of these areas would strengthen the linkages to be developed between Wollemi National Park, existing remnant woodland and the rehabilitation areas and assist in the faunal recolonisation of the rehabilitation areas.

The management measures to be implemented within the enhancement areas would be detailed in the FFMP. Management measures would include the fencing of remnants to exclude stock and to allow natural regeneration of native species, feral animal control, habitat enhancement initiatives (such as the provision of nest boxes and resources for threatened fauna species) and selective planting of native vegetation to enlarge the remnants and to link existing remnant vegetation, where appropriate.

Introduced Fauna Species

A clean, rubbish-free environment would be mandated to discourage scavenging and reduce the potential for colonisation of these areas by non-endemic fauna (e.g. introduced rodents, birds). A feral animal control programme would be implemented in accordance with the control strategies detailed in the Weed and Animal Pest Control Plan to be prepared for the Project prior to construction.

Fauna and Road Traffic

Speed limits would be imposed on roads and tracks within the Project area and signposting installed, to reduce the potential for vehicle strike on native fauna.

Bushfire Management

High frequency bushfire resulting in the disruption of lifecycle processes in plants and animals, and loss of vegetation structure and composition is listed as a threatening process in Schedule 3 of the TSC Act. The Wambo Coal Mine Bushfire Management Plan would be reviewed so as to include Project-related activities.

Employee Education

An environmental education programme would be included in the employee and contractor inductions and would include relevant training in the management of native fauna.

Domestic pets would be prohibited from the Project area and employees and contractors would not be permitted to take native fauna or encourage fauna through feeding.

ALTERED PROJECT

As discussed in Section 2.3, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

The Altered Project would not result in any significant change to the potential flora and fauna habitat impacts when compared to the Approved Project. The extensive mitigation measures described above for the Approved Project would be implemented for the Altered Project.

4.8 COMMUNITY INFRASTRUCTURE

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Approved Project in relation to community infrastructure are outlined below (as extracted from Section 4.11 of the EIS). Note, the EIS presents potential impacts and mitigation measures for both the initial development and increased production phases of the Wambo Development Project. The rail loop and associated train loading infrastructure (Approved Project) would be constructed in the initial development stage.

Initial Development

It is anticipated that up to 100 people would be employed to undertake initial development activities, which would include construction of the Project rail and train loading infrastructure. These activities would be undertaken in parallel with current open cut mining operations.

The operational Project workforce during this period would increase from 137 to in the order of 145 full-time employees.

As a result of the high concentration of coal mines in the Hunter Valley and the existing industries in the region that support these mines, it is anticipated that in the order of 90% of the construction workforce would be provided from within the local area or the wider Hunter region. The remainder of the workforce would be expected to reside primarily in Singleton. A transient population increase of this scale is expected to have a minimal impact on local community services, health, education and short-term accommodation facilities in the town due to the extensive range of services available.

Increased Production Phase

Workforce

Project employment would range from 160 full-time jobs during the period of exclusively underground mining operations (expected in Years 14 to 21) to in the order of 370 full-time jobs during the period of maximum coal production (expected in Years 3 to 13). These numbers represent the creation of up to 233 full-time jobs in addition to the existing 137 full-time WCPL employees.

It is estimated that 90% of the operational workforce and flow-on jobs would be sourced from within the Hunter region. The following sections assess the potential impact on community infrastructure of the 10% of Project-generated employment (i.e. direct and indirect jobs) that would be sourced from outside the Hunter region.

Potential Project impacts on community services and facilities presented below assume that the peak period where 233 additional full-time jobs are created represents the greatest potential for direct impacts on population, housing requirements and community infrastructure in the local area.

Population and Housing

Of the 233 additional full-time employees, approximately 10% (i.e. 23 employees) are expected to originate from outside the Hunter region.

In addition to direct Project employment, potential indirect, or flow-on, employment generation resulting from the Project has been estimated at 388 full-time jobs within the Hunter region. Of these 388 additional indirect full-time jobs, it is assumed that approximately 10% (i.e. 39) would be filled by people who originate from outside the Hunter region. It is further assumed that approximately 50% (i.e. 20 people) of the indirect workforce sourced from outside the Hunter region would reside within the local area.

The estimated total Project-related population increase in the local area presented in [Table 27]*, assumes that half of the 43 people moving to the local area from outside the Hunter region bring spouses and that half of these spouses are accompanied by two children.*

Table 27
Projected Total Population Increase
in the Local Area During Peak Production

Workforce	***43***
Direct	*23*
Indirect	*20*
Spouses/Children	***44***
Spouses	*22*
Children	*22*
Total Project-induced Population Increase	***87***

Source: WCPL, 2003

With housing requirements expected to be divided primarily between the Cessnock, Singleton and Maitland SLAs, this minimal increase in population is expected to have a negligible impact on the housing market in the local area.

School Facilities and Services

The impact of the total increase in population attributable to the Project on school facilities is not expected to be significant at any stage throughout the Project life. Considering the range of education facilities available …, it is anticipated that the Project would have a negligible impact on education facilities in the local area.

Health Services and Facilities

Consultation with the Cessnock/Kurri Kurri Health Service in Cessnock, Singleton District Hospital and Maitland Hospital in January 2003 suggested that the expected minor population increases [Table 27] *would not have a significant impact on the delivery of hospital services in the local area.*

Population increases in the Cessnock area may place additional pressure on general practitioner services which are currently under-supplied. This pressure is likely to be short-term as the current doctor shortage is being addressed through the development of a general practitioners centre at the Cessnock District Hospital.

Community Organisations and Support Services

Community organisations and support services are expected to experience a negligible impact as a result of the minor population increases in the local area.

Cumulative Impacts

The coal mining sector is the most productive sector of the regional economy (as measured through Gross Regional Product per employee) and is also the major sector responsible for exports from the region. The Project would reduce the current trend of decreasing employment in the mining sector and contribute to the regional productivity of the mining industry.

The regional mining workforce is of a transient nature with many mine employees having worked at several different mines due to regular restructuring of the various mining operations throughout the Hunter Valley coalfields. In response to the transient nature of the mining workforce, services and facilities in the region have adapted to accommodate a fluctuating population and the levels of community services available in the local area are generally high. No significant cumulative effects are therefore expected.

ALTERED PROJECT

The Altered Project would not significantly alter the capital expenditure or employment when compared to the Approved Project. The predicted cumulative community infrastructure effects described above would be unchanged by the Altered Project.

4.9 ABORIGINAL HERITAGE

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Approved Project in relation to Aboriginal Heritage are presented below (as extracted from Section 4.13 of the EIS).

The survey was conducted in conjunction with local Aboriginal groups (the Upper Hunter Wonnarua Council, the Lower Wonnarua Tribal Council, the Wanaruah Local Aboriginal Land Council (LALC), the Ungooroo Aboriginal Corporation, the Combined Council of Hunter Valley Elders and the Wonnarua Nation Aboriginal Corporation) with a number of Aboriginal cultural heritage sites and isolated Aboriginal objects being identified.

Potential Impacts

As described in Section 3.9, Aboriginal sites were located in the vicinity of the rail infrastructure west of Wollombi Brook (Sites 19-27) and east of Wollombi Brook (Sites 13 to 18) (Figure 12).

Infrastructure Areas

As part of the Project detailed design phase the final alignment of the rail spur, Wallaby Scrub Road intersection and water control structure would be determined. Prior to construction, pre-clearance surveys would be conducted to identify Aboriginal objects located within the footprint of these works. Consent to destroy would be sought under section 90 of the NPW Act for Aboriginal objects unable to be avoided by these Project components.

Mitigation Measures

The mitigation measures detailed below were developed in consultation with the Upper Hunter Wonnarua Council (also representing the Wonnarua Nation Aboriginal Corporation), the Lower Wonnarua Tribal Council, the Wanaruah LALC, the Ungooroo Aboriginal Corporation, and the Combined Council of Hunter Valley Elders both during and after the Aboriginal cultural heritage survey.

In recognition of issues raised during the consultation process with Aboriginal groups and based on the results of the archaeological studies a number of modifications were made to the Project layout including:…

- *Aligning the rail spur, the Wallaby Scrub Road intersection and the water control system so to avoid Aboriginal objects wherever possible (after formal surveying).*

Mitigation measures for Aboriginal cultural heritage objects which cannot be avoided by the Project were also discussed during consultation with the Aboriginal community. Consent would be sought under section 90 of the NPW Act to cover the life of the mine to allow for staged archaeological works. Mitigation measures for Aboriginal objects which would be impacted include:

- *Prior to disturbance, Aboriginal objects located within the Project surface development footprint would be collected and relocated to a "Keeping Place" where the objects would be analysed, documented and stored. … Aboriginal objects would be replaced in the landscape once final rehabilitation works are completed. The above process would be documented in the Aboriginal Cultural Heritage Management Plan.*

ALTERED PROJECT

As discussed above, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor or rail load out bin. Sites west of Wollombi Brook (19-27) are therefore not relevant to the Altered Project.

As described above the EIS proposed that the final alignment of the rail spur would be subject to pre-clearance surveys to identify Aboriginal objects located within the footprint of the works prior to construction and if required a consent to destroy would be sought under section 90 of the NPW Act for Aboriginal objects unable to be avoided by the construction works. This approach would be applied to the Altered Project in accordance with the EIS commitments.

The altered alignment would reduce the risk of any damage to the identified Aboriginal Heritage Site 13 (large open site located adjacent to the Project rail spur south of Wollombi Brook) during rail construction works (Figure 12).

4.10 NON-ABORIGINAL HERITAGE

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Approved Project in relation to non-Aboriginal Heritage are outlined below (as extracted from Section 4.14 of the EIS).

Potential Impacts

Rail Spur and Realignment of Wallaby Scrub Road

Two heritage items were identified in the vicinity of the rail spur. Site 5 is an abandoned homestead building and Site 6 consists of a timber piggery and butchers hut.

An aerial footing (Site 7) located in the vicinity of the Project rail spur may be affected by construction works. No mitigation measures are considered necessary for this site.

The realignment of Wallaby Scrub Road would not affect any identified heritage sites.

Mitigation Measures

The following mitigation measures would be implemented for the above heritage items identified within the Project disturbance areas:…

- *Prior to construction of the rail spur, Sites 5 and 6 would be identified and avoided during both the construction and operation of the rail spur. If this is not practicable, Sites 5 and 6 would be … recorded to an archival standard (written description and photographic record). These records would be provided to Tourism Singleton and the State Library of NSW.*

ALTERED PROJECT

As discussed above, the Altered Project would not include any changes to the coal reclaim area, product coal conveyor and rail load out bin.

The above mitigation measures for the Approved Project would be implemented for the Altered Project.

4.11 ROAD TRANSPORT

APPROVED PROJECT

The potential environmental impacts and mitigation measures for the Approved Project in relation to road transport are outlined below (as extracted from Section 4.15 of the EIS).

Potential Impacts

Project Generated Traffic

Initial development activities would be completed within approximately two years and would involve the construction of Project rail and train loading infrastructure and the continuation of current open cut mining operations. In the order of 100 people would be employed during the construction of Project rail and train loading infrastructure, which would be undertaken generally during daytime hours up to seven days per week. Predicted traffic generation for this period would comprise an increase in both light and heavy vehicle movements.

During the peak production period increased levels of employment would result in an increase in light vehicle traffic movements. The increased volumes of light vehicle traffic generated by the Project during this period would be offset by the removal of in the order of 160,000 annual coal haulage movements following the commissioning of Project rail and train loading infrastructure. Predicted traffic generation for this period would comprise a net decrease in total vehicle movements.

Traffic generated by the Project is predicted to originate predominantly from the regional centres of Singleton, Cessnock and Maitland and, to a lesser extent, from Newcastle. [Table 28] *presents predicted daily traffic flows on the local road network for the peak Project traffic generation periods. The predicted distribution of Project traffic assumes that 100% of heavy vehicles and 90% of light vehicles would travel to and from the east along the Golden Highway (i.e. the workforce and supplies would originate predominantly from Singleton, Cessnock, Maitland and Newcastle).*

Table 28
Predicted Peak Period Daily Traffic Flows on the Local Road Network

RTA Station Number	*Location Description*	*Baseline Total Traffic Movements*[1]	*Initial Development Period*	*% Change (rounded)*	*Peak Production Period*	*% Change (rounded)*
5485	*Golden Highway at Hunter River Bridge*	*2,337*	*2,344*	*0*	*2,352*	*1*
-	*Golden Highway at Pinegrove Road*	*2,300*	*2,321*	*1*	*2,340*	*2*
-	*Golden Highway east of the United Colliery Haul Road*	*3,824*	*3,845*	*1*	*3,864*	*1*
-	*Golden Highway at Wallaby Scrub Road*	*4,456*	*4,706*	*6*	*4,390*	*-1*
5481	*Golden Highway North of Putty Road*	*7,219*	*7,463*	*3*	*7,153*	*-1*
5638	*Golden Highway/Putty Road east of Mount Thorley*	*8,126*	*8,370*	*3*	*8,060*	*-1*
-	*Wambo Coal Mine Access Road*	*648*	*919*	*42*	*626*	*-3*
5840	*Wallaby Scrub Road 900m south of Golden Highway*	*660*	*666*	*1*	*660*	*0*
05167	*Putty Road – south of Milbrodale*	*793*	*793*	*0*	*793*	*0*

Source: WCPL, 2003
[1] *Includes traffic currently generated by the Wambo Coal Mine.*

Examination of turning movements at the Wambo Access Road/Golden Highway intersection indicates that during periods of peak Project traffic generation (i.e. a peak coal haulage campaign during the initial development period), the intersection would continue to operate at a level of service with acceptable delays and spare capacity during morning and afternoon peak periods.

Peak hour flows would be lower during the peak production period, as road haulage of product coal would have ceased, significantly reducing the number of truck movements into and out of the site.

Management Measures

All works undertaken on the public road network as part of the Project would be undertaken by a RTA-approved contractor in accordance with relevant RTA and Austroads design standards and relevant quality assurance specifications. Potential impacts arising from works affecting the public road network would be managed in accordance with a Traffic Management Plan that would be prepared in consultation with the relevant authorities. The Traffic Management Plan would contain detailed engineering plans for Project roadworks and traffic control measures to be adopted during roadworks. Details relating to the management of the closure or partial closure of public roads would be included as necessary. Road closure issues to be addressed include:

- *method of road closure;*
- *signage providing advance warning and at the road closure;*
- *review of traffic volumes;*
- *lengths of closures and expected queue lengths;*
- *access for emergency services;*
- *notification process; and*
- *monitoring and reporting requirements.*

The Traffic Management Plan would address blasting-related road closures on the Golden Highway and would be developed in consultation with the RTA and in accordance with the RTA Traffic Control at Worksites Manual.

ALTERED PROJECT

The Altered Project is not expected to result in any change to the workforce or number of transport movements estimated for the Approved Project. The Altered Project would require some changes to the required roadworks including:

- removal of the need for construction of the rail underpass beneath the Golden Highway; and
- requirement for the construction of two rail underpasses beneath the realigned section of Wallaby Scrub Road.

These changes would provide advantages for both ease of construction and minimisation of disturbance to public use of the Golden Highway, *viz.:*

- disruption to traffic associated with the construction of the rail underpass on the Golden Highway (State Road 27) would not be required; and
- the rail underpasses would be constructed on the realigned section of Wallaby Scrub Road prior to closure of the existing section of the road and commissioning of the realigned section.

The road transport mitigation measures outlined above for the Approved Project would be implemented for the Altered Project.

4.12 HAZARD AND RISK

The EIS included a preliminary hazard analysis (PHA) to assess the potential hazards and risks associated with the Approved Project. The PHA was conducted in accordance with the general principles of risk evaluation and assessment provided in the DIPNR guidelines for *Multi-Level Risk Assessment* (DUAP, 1999).

The PHA was then revised by WCPL to address the Altered Project (Appendix C). The findings of the Altered Project PHA are discussed below.

4.12.1 Hazard identification and Risk Assessment

Potentially hazardous materials required for the Altered Project are generally limited to conventional explosives, diesel and petrol. The risks posed by the usage of these materials for the Altered Project would include their transport, handling and consumption.

For the purposes of risk identification, the Altered Project was subdivided into a number of operational areas and potential incidents were identified and divided into generic classes for each operational area including:

- fire;
- explosion;
- leaks/spills;
- theft;
- unplanned movement to off-site; and
- vehicle accident.

The potential risks identified in the PHA relate to the following Altered Project activities:

- transport of general or potentially hazardous goods to site, on-site and from site (e.g. fires, leaks/spills, theft and vehicle accident); and
- general operations, including construction, ground preparation, coal transport and rehabilitation (e.g. fires and equipment failure).

Following the identification of the potential hazards associated with the Altered Project, a qualitative assessment of risks to the public, property and the environment associated with the development and operation of the Altered Project was undertaken (Appendix C).

Given the in-place or proposed mitigation measures outlined below, no incremental risks posing significant off-site impacts have been identified.

A number of hazard prevention and mitigation measures are currently in-place for the existing Wambo Coal Mine. These measures are documented in the existing Wambo Coal Mine management plans including:

- Mining Operation Plan;
- Coal Handling and Preparation Plant Environmental Management Plan;
- Coal Handling and Preparation Plant Emergency Response Procedure (Draft);
- Wambo Coal Mine Spontaneous Combustion Plan; and
- Bushfire Management Plan.

The above plans would be revised where necessary to address the Altered Project requirements.

The following hazard mitigation and/or preventative measures would be adopted by WCPL to reduce the likelihood and/or consequences of potentially hazardous incidents associated with the Altered Project:

- **Maintenance –** Ongoing and timely maintenance of all mobile and fixed plant and equipment in accordance with the recommended maintenance schedule. Only vehicles permitted to carry dangerous goods would be used for explosive transport.
- **Staff Training –** Operators and drivers would be trained and (where appropriate) licensed for their positions. Only those personnel licensed to undertake skilled and potentially hazardous work would be permitted to do so.
- **Rail Spur and Coal Terminal –** The proposed construction of the rail spur and coal terminal would provide a method of product coal transport that does not include public road haulage. This would significantly reduce the number of truck trips on the 13 km public road route to the MTCL and thereby reduce the potential for vehicle accidents.
- **Engineering Structures –** Mining and civil engineering structures would be constructed in accordance with applicable codes, guidelines and Australian Standards. Where applicable, WCPL would obtain the necessary licences and permits for engineering structures (eg. Dam Safety Committee approvals).
- **Blast Management –** Temporary closures of a short section of the Golden Highway would occur if blasting is required within 500 m of the road. These brief closures would be undertaken in accordance with Roads and Traffic Authority (RTA) traffic control requirements and would halt vehicle traffic for 15-20 minutes per blast.

- **Water Management –** Water management structures would be constructed to separate runoff from undisturbed areas and disturbed areas. The collection drain and sediment dam system would be designed and constructed with capacity to contain potential spills or fire suppression water runoff within operational areas.
- **Relocation of Wallaby Scrub Road Intersection –** The intersection of Wallaby Scrub Road and the Golden Highway would be relocated to allow construction of the Project. The relocated intersection would be constructed with improved intersection geometry in accordance with RTA requirements.
- **Emergency Response** – Revision of the existing emergency response procedures manuals and systems to include consideration of the Project operations.

5 ALTERATIONS TO REHABILITATION PROGRAMME

The rehabilitation strategy presented in this section for the Altered Project is based on that presented in the EIS for the Approved Project. The rehabilitation strategy should be regarded as conceptual to allow a degree of flexibility for consideration of future research and design studies. Final rehabilitation requirements would ultimately be formulated in consultation with key government authorities and other relevant stakeholders.

5.1 ALTERED PROJECT REHABILITATION PROGRAMME

5.1.1 Rehabilitation Goals and Planning

The following rehabilitation goals would be implemented for the Project:

- the area of land requiring disturbance to be kept to a practicable minimum;
- previously disturbed areas to be rehabilitated as soon as practicable;
- soil erosion to be controlled to regulatory standards; and
- the restriction of livestock access to Altered Project rehabilitation areas while growth is stabilised and the preclusion of livestock from selected areas identified for enhancement and regeneration.

Infrastructure with no ongoing beneficial use would be removed from the site at the completion of the Altered Project. Fuels unused at the completion of activities would be returned to the supplier in accordance with relevant safety and handling procedures.

Foundation soils would be chemically tested, contour ripped and chemically ameliorated, in accordance with regulatory requirements. Stockpiled soils would then be applied as necessary and stabilised. Revegetation would be undertaken with suitable endemic tree species or pastures.

Roads that have no specific post-mining use would be ripped, topsoiled and revegetated. Some access roads may be retained post-mining to enable access and for use in bushfire and other land management activities.

Areas in the vicinity of the rail loop would be revegetated with native species characteristic of the Warkworth Sands Woodland (such as *Angophora floribunda* and *Banksia integrifolia*).

Water management structures and sediment control structures would either be retained as wetland habitat/water features or decommissioned and rehabilitated.

6 ALTERATIONS TO ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAMMES

The environmental monitoring programme will provide the basis from which environmental management decisions are made in regard to the Altered Project. Section 6.1 outlines integrated environmental management plans to be implemented for the Altered Project and Section 6.2 details environmental monitoring to be undertaken.

6.1 INTEGRATED ENVIRONMENTAL MANAGEMENT PLANS

Extensive mitigation and management measures have been presented for the Altered Project to manage and minimise potential environmental impacts. The following environmental management plans would be developed for the Altered Project in consultation with relevant regulatory authorities to facilitate the implementation of these mitigation measures. Key regulatory authorities must approve these plans prior to their implementation.

A summary of the plans to be prepared include:

- Annual Environmental Management Report;
- Noise Monitoring Programme;
- Vibration Monitoring Programme;
- Soil and Water Management Plan;
- Erosion and Sediment Control Plan (as a component of the Soil and Water Management Plan);
- Surface Water Monitoring Programme (as a component of the Soil and Water Management Plan);
- Construction Management Plan;
- Flora and Fauna Management Plan;
- Vegetation Clearance Protocol (as a component of the Flora and Fauna Management Plan);
- Revegetation and Landscaping Plan (as a component of the Flora and Fauna Management Plan); and
- Environmental Monitoring Programme.

6.2 INTEGRATED ENVIRONMENTAL MONITORING

The following monitoring programme is provisional and must be approved by the relevant regulatory authorities prior to implementation.

Figure 17 depicts the location of each environmental monitoring site for the Approved Project. Environmental monitoring sites relevant to the Altered Project are listed in Table 29.

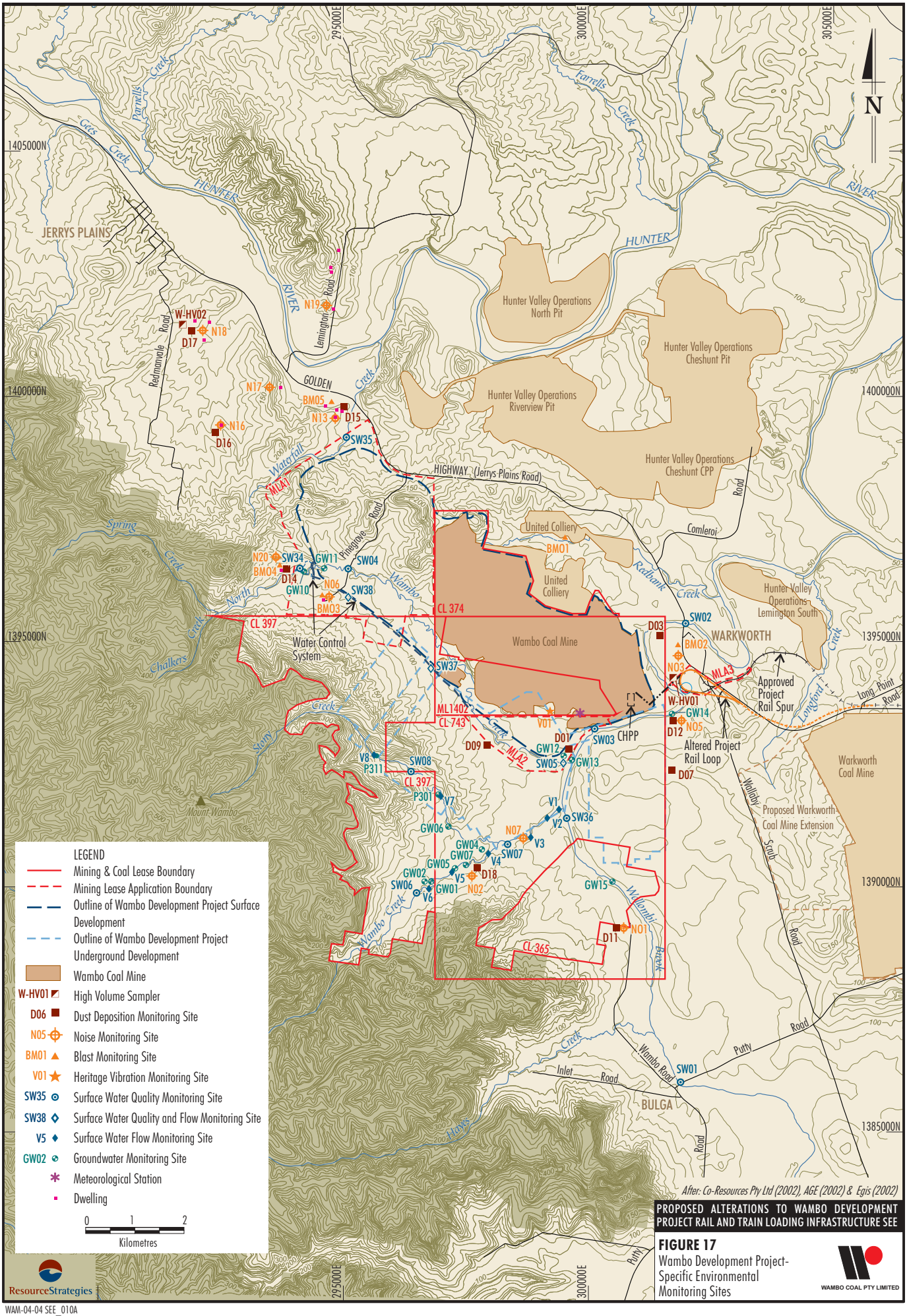

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Table 29
Overview of the Project Environmental Monitoring Programme

Monitoring Focus	Monitoring Sites	Frequency
Meteorology • Wind speed and direction. • Rainfall. • Temperature.	Automated meteorological station.	Continuous.
Air Quality • Dust deposition • High volume sampling (PM_{10}).	• D03 and D12. • W-HV01.	• Monthly. • Continuous six day cycle.
Noise • Attended and unattended noise monitoring.	• N03 and N05.	Quarterly.
Blasting • Ground vibration and airblast overpressure.	• BM02.	• Every blast event.
Erosion and Sediment Control Structures	Sediment control structures.	Inspected monthly and following significant (>20 mm of rain in 24 hours) rainfall events.
Surface Water Quality, Levels and Flows • pH, EC, TDS, TSS.	• SW02.	• Monthly and following significant rainfall events (as above).

After: WCPL (2003)

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APPENDIX A

NOISE ASSESSMENT OF THE ALTERED PROJECT

RICHARD HEGGIE
ASSOCIATES

27 May 2004 10-2470 DA Area 2 270504

Wambo Coal Pty Limited
PO Box H287
AUSTRALIA SQUARE
SYDNEY NSW 1215

Attention: Mr Peter Doyle

Dear Peter

Rail Infrastructure Alignment Amendment
Development Application Area 2

1 Introduction

Wambo Coal Pty Limited (WCPL) seeks to amend the Rail Infrastructure component of Development Application Area 2 as detailed in the Wambo Development Project EIS dated July 2003. The EIS Volume 2 Appendix A presents the Noise and Blasting Assessment for the cumulative operation of Development Application (DA) Areas 1 and 2.

On behalf of the proponent, Richard Heggie Associates Pty Ltd (RHA) has been requested to:

quantify the noise contributed from DA Area 2 in isolation (ie. the emissions without the noise emissions associated with DA Area 1 (the mine components) of the Wambo Development Project); and

determine the noise impact of the proposed amendment to DA Area 2 (ie. change to the rail alignment).

2 Development Application Area 2 - Rail Alignment Amendment

The Rail and Train Loading Infrastructure Component (DA Area 2) of the Wambo Development Project comprises (**Figure 1)**:

- Construction and operation of a rail spur, rail loop, coal reclaim area, product coal conveyor and train load-out bin to enable the transport of product coal by rail to market;
- Construction of a rail spur underpass beneath the Golden Highway;
- Realignment of the intersection between Wallaby Scrub Road and the Golden Highway, and
- Transportation of product coal to the market via nominal 8,600 t capacity trains 24 hours per day, seven days per week.

MEMBER FIRM OF THE ASSOCIATION OF AUSTRALIAN ACOUSTICAL CONSULTANTS

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Quality Endorsed Company

In consideration of land access constraints and as an outcome of the detailed design process, WCPL propose the following alterations to the Rail and Train Loading Infrastructure Component of the Wambo Development Project (**Figure 1**):

alter the alignment of the rail loop and connect onto the Jerrys Plains Rail Line at a point that removes the requirement to build the 2.5 km rail spur;

alter the alignment of the rail loop so as to remove the need for the rail spur underpass beneath the Golden Highway in DA Area 2; and

construct two rail underpasses where the realigned Wallaby Scrub Road and the altered rail loop intersect.

The construction and operation of the coal reclaim, product coal conveyor, coal load out bin and the transportation of product coal would not be altered.

3 Approved Rail and Train Loading Infrastructure Component (DA Area 2) in Isolation

3.1 Predicted Noise Emissions

Noise modelling was undertaken of all of the Rail and Train Loading Infrastructure plant items operating concurrently to simulate the overall maximum energy equivalent (ie $L_{Aeq(15minute)}$) intrusive noise level. The model includes coal loading operations and train movements on the rail loop (as loading operations cease when the train leaves the loop).

Attachment A (Operation Year 2), Attachment B (Operation Year 7) and Attachment C (Operation Year 9) present the predicted noise emissions associated with DA Area 2 (in isolation) to the nearest potentially affected receivers in Warkworth Village, together with the project specific criteria as determined in the EIS.

3.2 Noise Impact Summary on Privately Owned Dwellings

Based on the predicted $L_{Aeq(15minute)}$ intrusive noise emissions for Years 2, 7 and 9, **Table 1** presents a summary of all known private dwellings where the project specific criteria are anticipated to be exceeded.

Table 1 Private Dwellings within Noise Management and Affectation Zones

Locality	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Project Specific Criteria	3 dBA to 5 dBA above Project Specific Criteria	>5 dBA above Project Specific Criteria
Warkworth Village	Non-Adverse[1] Annual Daytime	22 Henderson	Nil	19(B,A) Kelly 23(A) Kannar 23(B) Kannar 51 Hawkes 56 Haynes
	Adverse SE Wind[2] Summer, Autumn, Spring Evening/Night	22 Henderson	Nil	19(B,A) Kelly 23(A) Kannar 23(B) Kannar 51 Hawkes 56 Haynes
	Adverse W Wind and Inversion[3] Winter Evening/Night	Nil	Nil	19(B,A) Kelly 22 Henderson 23(A) Kannar 23(B) Kannar 51 Hawkes 56 Haynes

Note 1: Non-adverse - Annual wind speed 0 m/s and temperature gradient $0^oC/100$ m.
Note 2: Adverse - Summer Autumn, Spring, wind speed 3 m/s southeast and temperature gradient $0^oC/100$ m.
Note 3: Adverse - Winter wind speed 2 m/s west and temperature gradient $3^oC/100$ m.

3.3 Noise Impact Summary on Mine Owned Dwellings

Based on the predicted $L_{Aeq(15minute)}$ intrusive noise emissions for Years 2, 7 and 9, **Table 2** presents a summary of all known mine owned dwellings where the project specific criteria are predicted to be exceeded.

Table 2 Mine Owned Dwellings within Noise Management and Affectation Zones

Locality	Period	Noise Management Zone		Noise Affectation Zone
		1 dBA to 2 dBA above Project Specific Criteria	3 dBA to 5 dBA above Project Specific Criteria	>5 dBA above Project Specific Criteria
Warkworth Village	Non-Adverse[1] Annual Daytime	Nil	Nil	WE WCPL WF WCPL 11(E) Coal & Allied 20 JPCT 21(A) Coal & Allied
	Adverse SE Wind[2] Summer, Autumn, Spring Evening/Night	Nil	21(B) Coal & Allied	WD WCPL WE WCPL WF WCPL 11(E) Coal & Allied 20 JPCT 21(A) Coal & Allied 21(B) Coal & Allied
	Adverse W Wind and Inversion[3] Winter Evening/Night	Nil	Nil	WD WCPL WE WCPL WF WCPL 11(E) Coal & Allied 20 JPCT 21(A) Coal & Allied 21(B) Coal & Allied

Note 1: Non-adverse - Annual wind speed 0 m/s and temperature gradient $0^oC/100$ m.
Note 2: Adverse - Summer Autumn, Spring, wind speed 3 m/s southeast and temperature gradient $0^oC/100$ m.
Note 3: Adverse - Winter wind speed 2 m/s west and temperature gradient $3^oC/100$ m.

4 Altered Rail and Train Loading Infrastructure Component (DA Area 2) in Isolation

4.1 Predicted Noise Emissions and Impact Assessment

An assessment of the altered Rail Infrastructure Component was undertaken to determine the potential impacts of the altered rail alignment. The findings of the assessment indicate that the noise emission levels would be unchanged by the altered alignment (refer Tables 1 and 2 and Attachment A, B and C). This is because the loading of coal trains together with the unchanged operation of the coal reclaim, product coal conveyor and rail loadout bin remain as the dominant operational noise sources associated with the Rail and Train Loading Infrastructure Component of the Wambo Development Project.

5 Conclusion

The proposed alteration to the rail alignment within DA Area 2 would not change the operational noise emissions (and associated noise impacts) from DA Area 2 as the coal reclaim, product coal conveyor, train loadout bin and position of the train during loading would be unchanged and these are the dominant noise sources of this development as assessed under the Industrial Noise Policy.

Yours sincerely

GLENN THOMAS

Operation Year 2 – Privately Owned Dwellings

The predicted $L_{Aeq(15minute)}$ intrusive noise emissions from Year 2 operation to the nearest affected noise sensitive receivers are presented in **Table 3** together with the Consent project specific criteria.

Table 3 Year 2 Operation $L_{Aeq(15minute)}$ Intrusive Emissions (dBA re 20 μPa)

General Locality	Reference/ Land Owner	Non-Adverse Annual	Adverse SE Wind Summer, Autumn, Spring		Adverse Inversion W Wind Winter		Project Specific Criteria		
		Day	Evening	Night	Evening	Night	Day	Evening	Night
Warkworth Village	WD WCPL	37	47	47	48	48	39	37	36
	WE WCPL	>50	>50	>50	>50	>50			
	WF WCPL	>50	>50	>50	>50	>50			
	11(E) Coal & Allied	42	46	46	49	49			
	19(B,A) Kelly	53	57	57	57	57	40	38	38
	20 JPCT	44	49	49	50	50	39	37	36
	21(A) Coal & Allied	54	56	56	58	58			
	21(B) Coal & Allied	38	40	40	46	46			
	22 Henderson	40	38	38	50	50			
	23(A) Kannar	49	53	53	53	53			
	23(B) Kannar	47	50	50	52	52			
	51 Hawkes	47	41	41	55	55	38	36	36
	56 Haynes	52	53	53	57	57	39	37	36
	St Philips Anglican Church Ground External[1] (with train loading)	48	47	Not in use	53	Not in use	50-55	50-55	Not in use

Note 1: $L_{Aeq(Period)}$ noise amenity level.

Operation Year 2 - Private Vacant Land

PlanningNSW does not consider vacant land to be noise affected in the absence of a dwelling. For indicative purposes, however, based on the noise contours presented in the EIS, exceedance of the project specific criteria estimated over 25% of the vacant land area is summarised in **Table 4**. Note the land owner's entitlement to construct a dwelling is unknown.

Table 4 Year 2 Private Vacant Land with Project Specific Criteria Exceedances (>25% Land Area)

Locality	1 dBA to 2 dBA above Criteria	3 dBA to 5 dBA above Criteria	>5 dBA above Criteria
Warkworth Village	Nil	14 Keys	23 Kannar 55 Burley

Operation Year 7 - Privately Owned Dwellings

The predicted $L_{Aeq(15minute)}$ intrusive noise emissions from Year 7 operation to the nearest affected noise sensitive receivers are presented in **Table 5** together with the project specific criteria.

Table 5 Year 7 Operation $L_{Aeq(15minute)}$ Intrusive Emissions (dBA re 20 µPa)

General Locality	Reference/ Land Owner	Non-Adverse Annual	Adverse SE Wind Summer, Autumn, Spring		Adverse Inversion W Wind Winter		Project Specific Criteria		
		Day	Evening	Night	Evening	Night	Day	Evening	Night
Warkworth Village	WD WCPL	39	44	44	44	44	39	37	36
	WE WCPL	>50	>50	>50	>50	>50			
	WF WCPL	>50	>50	>50	>50	>50			
	11(E) Coal & Allied	46	51	51	51	51			
	19(B,A) Kelly	53	57	57	56	56	40	38	38
	20 JPCT	47	52	52	51	51	39	37	36
	21(A) Coal & Allied	54	56	56	57	57			
	21(B) Coal & Allied	37	39	39	44	44			
	22 Henderson	40	37	37	49	49			
	23(A) Kannar	49	53	53	53	53			
	23(B) Kannar	47	50	50	51	51			
	51 Hawkes	48	45	45	55	55	38	36	36
	56 Haynes	52	53	53	56	56	39	37	36
	St Philips Anglican Church Ground External[1] (with train loading)	48	47	Not in use	53	Not in use	50-55	50-55	Not in use

Note 1: $L_{Aeq(Period)}$ noise amenity level.

Operation Year 7 - Private Vacant Land

PlanningNSW does not consider vacant land to be noise affected in the absence of a dwelling. For indicative purposes, however, based on the noise contours presented in the EIS exceedance, of the project specific criteria estimated over 25% of the vacant land area is summarised in **Table 6**. Note, the land owners entitlement to construct a dwelling is unknown.

Table 6 Year 7 Private Vacant Land with Project Specific Criteria Exceedances (>25% Land Area)

Locality	1 dBA to 2 dBA above Criteria	3 dBA to 5 dBA above Criteria	>5 dBA above Criteria
Warkworth Village	Nil	14 Keys	23 Kannar 55 Burley

Operation Year 9 - Privately Owned Dwellings

The predicted $L_{Aeq(15minute)}$ intrusive noise emissions from Year 9 operation to the nearest affected noise sensitive receivers are presented in **Table 7** together with the project specific criteria.

Table 7 Year 9 Operation $L_{Aeq(15minute)}$ Intrusive Emissions (dBA re 20 µPa)

General Locality	Reference/ Land Owner	Non-Adverse Annual	Adverse SE Wind Summer, Autumn, Spring		Adverse Inversion W Wind Winter		Project Specific Criteria		
		Day	Evening	Night	Evening	Night	Day	Evening	Night
Warkworth Village	WD WCPL	39	44	44	44	44	39	37	36
	WE WCPL	>50	>50	>50	>50	>50			
	WF WCPL	>50	>50	>50	>50	>50			
	11(E) Coal & Allied	46	51	51	51	51			
	19(B,A) Kelly	53	57	57	56	56	40	38	38
	20 JPCT	47	52	52	50	50	39	37	36
	21(A) Coal & Allied	54	56	56	57	57			
	21(B) Coal & Allied	37	39	39	44	44			
	22 Henderson	40	37	37	49	49			
	23(A) Kannar	49	53	53	53	53			
	23(B) Kannar	47	50	50	51	51			
	51 Hawkes	48	45	45	54	54	38	36	36
	56 Haynes	52	53	53	56	56	39	37	36
	St Philips Anglican Church Ground External[1] (with train loading)	48	47	Not in use	53	Not in use	50-55	50-55	Not in use

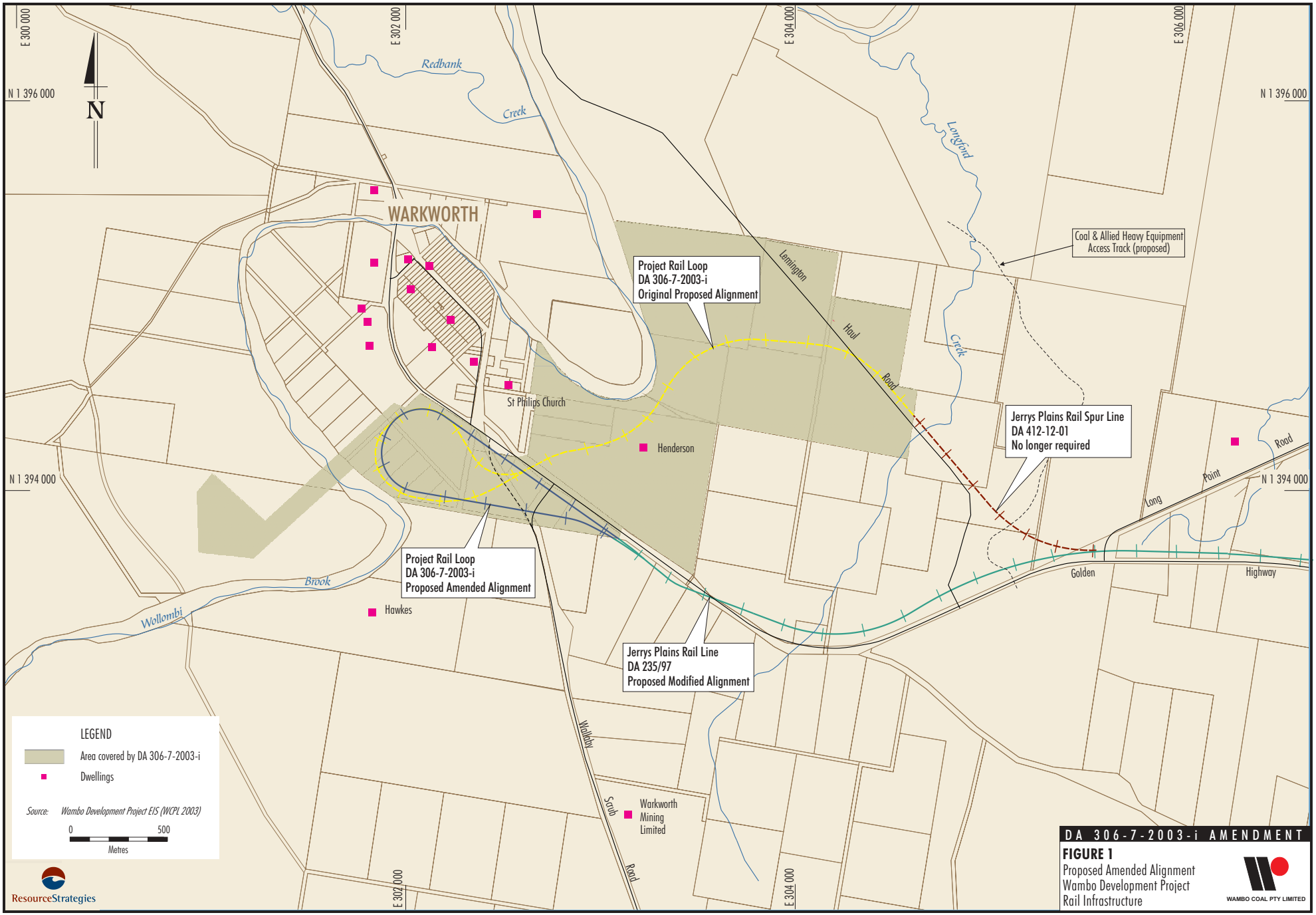
Note 1: $L_{Aeq(Period)}$ noise amenity level.

Operation Year 9 - Private Vacant Land

PlanningNSW does not consider vacant land to be noise affected in the absence of a dwelling. For indicative purposes, however, based on the noise contours presented in the EIS, exceedance of the project specific criteria estimated over 25% of the vacant land area is summarised in **Table 8**. Note, the land owners existing entitlement to construct a dwelling is unknown.

Table 8 Year 9 Private Vacant Land with Project Specific Criteria Exceedances (>25% Land Area)

Locality	1 dBA to 2 dBA above Criteria	3 dBA to 5 dBA above Criteria	>5 dBA above Criteria
Warkworth Village	Nil	14 Keys	23 Kannar 55 Burley



WAM-04-04 DA 306_002E

APPENDIX B

AIR QUALITY ASSESSMENT OF THE ALTERED PROJECT

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Eastwood, NSW 2122
Phone 61-2-9874-8644
Fax 61-2-9874-8904
E-mail : has@holmair.com.au
ACN 003-741-035
ABN 79-003-741-035

25 May 2004

Wambo Coal Pty Limited
PO Box H287
AUSTRALIA SQUARE
SYDNEY NSW 1215

Attention: Peter Doyle

Re: Proposed Alterations to the Wambo Development Project Rail and Train Loading Infrastructure

Dear Peter,

We understand that WCPL proposes to alter the Rail and Train Loading Infrastructure Component of the Wambo Development Project.

We have reviewed the plan provided (Figure 1 attached) and understand that the coal reclaim, product coal conveyor , train loadout bin and proposed production would not be altered. The changes to the rail alignment involve the construction of a realigned rail loop and the connection of the loop to the Jerrys Plain Rail Line (yet to be constructed) on the southern side of the Golden Highway. This would obviate the need for a rail underpass of the Golden Highway and require two rail underpasses of the realigned section of Wallaby Scrub Road.

Air quality emissions associated with construction works would be reduced due to the reduction in land disturbance associated with the realignment.

As a consequence, I do not believe that there will be any significant changes (increases or decreases) in the air quality effects described in the Wambo Development Project EIS as a result of the altered rail alignment. The dust mitigation measures outlined in the EIS should be applied where applicable.

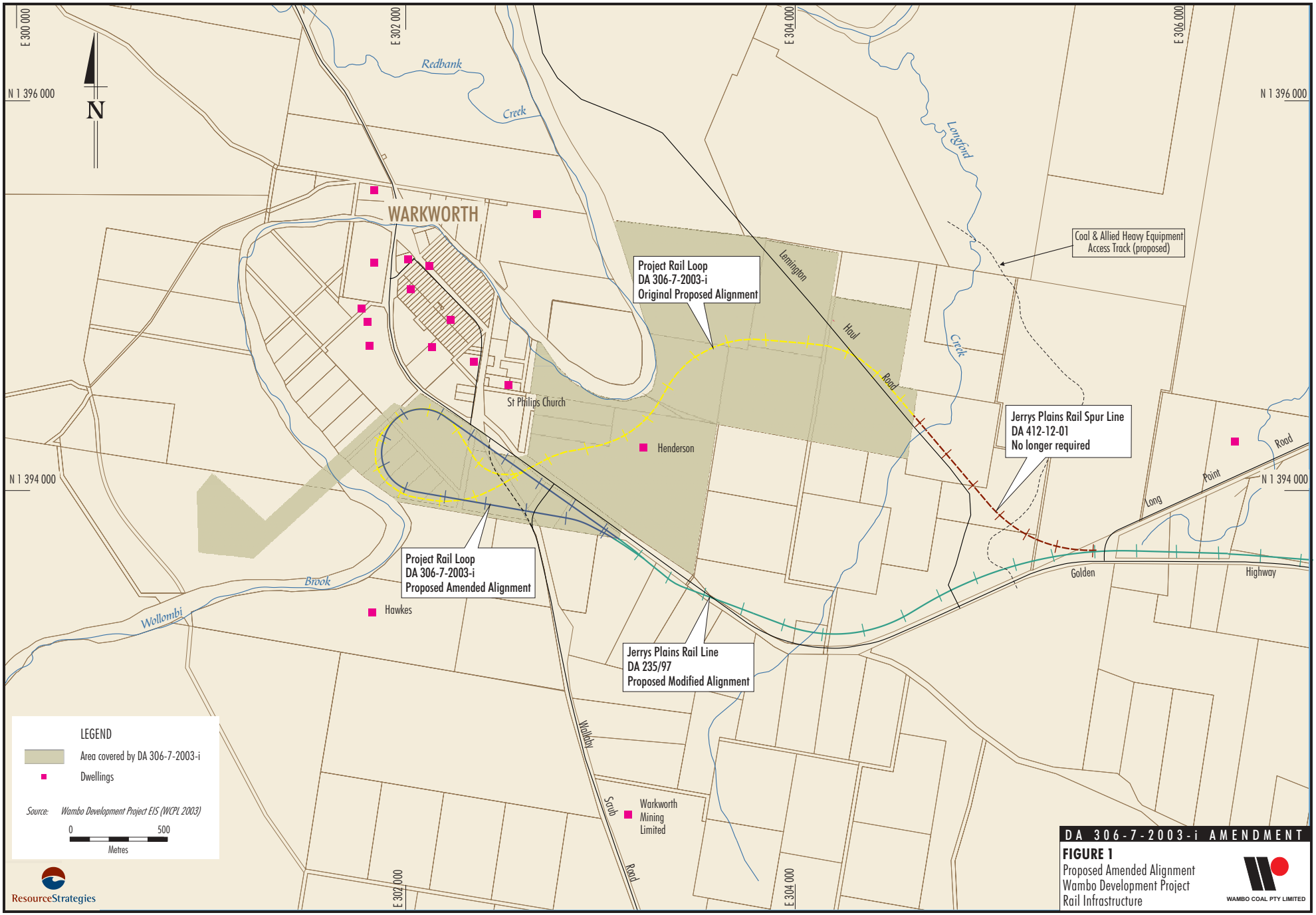
Please feel free to contact me if you require any further comment on the effect of the proposed alterations.

Yours faithfully,
Holmes Air Sciences

N.E. Holmes.

Nigel Holmes PhD
Atmospheric Physicist

WAMBO RAIL LOOP.DOC



WAM-04-04 DA 306_002E

APPENDIX C

PRELIMINARY HAZARD ANALYSIS

APPENDIX C

PRELIMINARY HAZARD ANALYSIS

Wambo Coal Pty Limited

MAY 2004
PROJECT NO. WAM-04-04
Document No. APPENDIX C-A.DOC

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ATTACHMENTS

1 INTRODUCTION

This Preliminary Hazard Analysis (PHA) has been conducted as part of the Statement of Environmental Effects (SEE) to evaluate the hazards associated with the Wambo Development Project Rail and Train Loading Infrastructure (the Project) in accordance with the general principles of risk evaluation and assessment outlined in the NSW Department of Urban Affairs and Planning (DUAP) *Multi-Level Risk Assessment Guidelines* (1999).

In July 2003, WCPL submitted two Development Applications (DAs) (DA1 [the mining component] and DA2 [the rail component]) for the Wambo Development Project accompanied by the Wambo Development Project Environmental Impact Statement (the EIS). The SEE addresses alterations proposed to the alignment of the rail loop in DA2.

This PHA assesses risks associated with activities relating to the Project (ie. in development application area 2). Risks associated with the existing Wambo Coal Mine and development application area 1 (the mining component of the Wambo Development Project) are not assessed. A description of the Project is provided in Section 2 of the SEE.

Assessed risks are compared to the qualitative risk assessment criteria provided in Australian Standard/New Zealand Standard (AS/NZS) 4360:1999 *Risk Management*. Further, this PHA considers the qualitative criteria provided in Risk Criteria for Land Use Planning: Hazardous Industry Planning Advisory paper No. 4 (DUAP, 1992).

1.1 OBJECTIVE AND SCOPE

The objective of this PHA is to qualitatively assess the risks posed by the Project to the environment and surrounding land users and compare the identified risks with applicable qualitative criteria. This assessment considers the risks to the environment, members of the public and their property arising from sudden and unexpected incidents (ie. equipment failure, operator error and external events). The assessment does not consider risks associated with the existing Wambo Coal Mine operations, mining components of the Wambo Development Project, risks to Wambo Coal Pty Limited (WCPL) employees or property and similarly does not consider those risks that are not sudden, nor unexpected (e.g. long term effects of rail vibration on building structures).

1.2 STUDY METHODOLOGY

The PHA methodology was as follows:

(i) Identify the hazards associated with the Project.

(ii) Examine the potential consequences of identified events.

(iii) Qualitatively estimate the likelihood of events.

(iv) Examine the in-place and proposed risk mitigation measures.

(v) Qualitatively assess risks to the environment, members of the public and their property arising from sudden and unexpected incidents and compare these to applicable qualitative criteria.

(vi) Recommend further risk mitigation or remedial measures if considered warranted.

The above methodology was implemented during a PHA workshop at Wambo Coal Mine on the 10th of March 2003. This workshop assessed risks associated with the Wambo Development Project as part of the Wambo Development Project Environmental Impact Statement (WCPL, 2003). The workshop participants included senior management from the existing operation and representatives from Excel Mining Pty Ltd and Resource Strategies Pty Ltd, specifically:

- Bill Dean – WCPL Open Cut Mining Manager;
- Hugh Upward – WCPL CHPP Production Superintendent;
- Tony Sutherland – WCPL Environmental and Underground Mining Manager;
- Peter Doyle – Excel Mining Pty Ltd Project Manager; and
- Josh Hunt - Resource Strategies Pty Ltd Senior Environmental Project Manager.

The outcomes from the workshop were reviewed and revised by Peter Doyle (Excel Mining Pty Ltd Project Manager) for this assessment in order to identify the risks involved with the Project (development application area 2).

1.3 RISK CRITERIA

This assessment compares the assessed risks of the Project with the qualitative risk assessment criteria provided in AS/NZS 4360:1999 *Risk Management* and considers the following qualitative criteria (summarised from DUAP, 1992):

(a) All 'avoidable' risks should be avoided. This necessitates investigation of alternative locations and technologies, where applicable.

(b) The risks from a major hazard should be reduced wherever practicable, irrespective of the value of the cumulative risk level from the whole installation.

(c) The consequences (effects) of the more likely hazardous events should, wherever possible be contained within the boundaries of the installation.

(d) Where there is an existing high risk from a hazardous installation, additional hazardous developments should not be allowed if they add significantly to that existing risk.

1.3.1 Qualitative Measures of Consequence, Likelihood and Risk

To undertake a qualitative risk assessment it is useful to define (in a descriptive sense) the various levels of consequence of a particular event, and the likelihood of such an event occurring. AS/NZS 4360:1999 *Risk Management* provides qualitative measures of consequence and likelihood for hazardous events (Table 1 and Table 2).

Table 1
Qualitative Measures of Consequence

Descriptor	Example Detail Description
Insignificant	No injuries, low financial loss.
Minor	First aid treatment, on-site release immediately contained, medium financial loss.
Moderate	Medical treatment required, on-site release contained with outside assistance, high financial loss.
Major	Extensive injuries, loss of production capability, off-site release with no detrimental effects, major financial loss.
Catastrophic	Death, toxic release off-site with detrimental effect, huge financial loss.

Source: AS/NZS 4360:1999 *Risk Management*

Table 2
Qualitative Measures of Likelihood

Descriptor	Example Detail Description
Almost Certain	Is expected to occur in most circumstances
Likely	Will probably occur in most circumstances
Possible	Might occur at some time
Unlikely	Could occur at some time
Rare	May occur only in exceptional circumstances

Source: AS/NZS 4360:1999 *Risk Management*

Combining the data presented in Table 1 and Table 2, Table 3 provides a qualitative risk analysis matrix to assess risk levels.

Table 3
Qualitative Risk Analysis Matrix – Level of Risk

Likelihood	Consequences				
	Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Almost Certain	High	High	Extreme	Extreme	Extreme
Likely	Moderate	High	High	Extreme	Extreme
Moderate	Low	Moderate	High	Extreme	Extreme
Unlikely	Low	Low	Moderate	High	Extreme
Rare	Low	Low	Moderate	High	High

Source: AS/NZS 4360:1999 *Risk Management*

Legend – Risk Levels:

Low	Manage by routine procedures	High	Senior management attention needed
Moderate	Management responsibility must be specified	Extreme	Immediate action required

An event that presents an extreme or high level of risk must be subject to management control or mitigation measures to reduce the consequences of the event and/or the likelihood of the event to acceptable levels. Whilst risks should be avoided if possible, risks are also a component of any undertaking and some residual risks can be accepted following the application of risk mitigation measures. Risk acceptance criteria for the Project have been formulated following consideration of the Hazardous Industry Planning Advisory Paper Number 4 (DUAP, 1992) and AS/NZS 4360:1999 *Risk Management* guidelines, *viz.*:

> *Qualitative Risk Acceptance Criteria:*
>
> *The risk posed by an event is at a level where consequences are considered minor or insignificant and likelihood of occurrence is considered as rare or unlikely, given the existing and/or proposed risk mitigation and minimisation measures.*

The hazard identification summary table (Attachment A) illustrates the systematic application of the above criteria for the Project. Figure 1 provides a schematic illustration of the risk management process.

2 PROJECT OVERVIEW

In summary, the Project would comprise of the following components (Figure 2):

- construction and operation of a rail loop, coal reclaim area, product coal conveyor and train load-out bin to enable the transport of product coal by rail to market;
- construction of two split level crossings to allow the rail loop to pass under Wallaby Scrub Road;
- realignment of the intersection between Wallaby Scrub Road and the Golden Highway; and
- transportation of product coal to the market via nominal 8,600 t capacity trains 24 hours per day, seven days per week.

Section 2 of the SEE describes the Project in more detail.

3 HAZARD IDENTIFICATION

3.1 DESCRIPTION OF HAZARDOUS MATERIALS

Potentially hazardous materials required for the Project are generally limited to conventional explosives, diesel and petrol. A brief description of these materials is presented below.

3.1.1 Explosives

Explosives may be required during the construction of the Project, however blasting requirements are expected to be minimal. ANFO would be the principal explosive used on-site. ANFO would be produced by a licensed contractor on an as required basis so that there will be no bulk storage. Limited amounts of other explosives such as Tovex© may be required.

Detonators and explosive products (eg ANFO) are classified Class 1.1 (explosives with mass explosion hazard) under *the Australian Code for the Transport of Dangerous Goods by Road and Rail* (ADG Code, 1998). Ammonium nitrate is classed as an oxidising agent (Class 5.1). Explosives would be used in accordance with the safety and operational procedures in Australian Standard (AS) 2187.1 – 1998 *Explosives – Storage, Transport and Use – Storage*.

3.1.2 Diesel

Diesel is classified as a combustible liquid by AS 1940-1993 *The Storage and Handling of Flammable and Combustible Liquids* (Class C1) for the purposes of storage and handling but is not classified as a dangerous good by the criteria of the ADG Code. In the event of a spill, diesel is damaging to soils and aquatic ecosystems and fires can occur if it is ignited (flash point 61-150^{o}C).

No storage of diesel would occur within the Project area.

3.1.3 Petrol

Petrol is classified as a flammable liquid (Class 3) and as such is classified as a dangerous good by the criteria of the ADG Code.

No storage of petrol would occur within the Project area.

3.2 HAZARD IDENTIFICATION PROCESS

The Project hazard identification summary table (Attachment A) was formulated during the PHA workshop discussed in Section 1.2. It provides a summary of the potential off-site risks and hazards identified for the Project and a qualitative assessment of the risks posed.

3.2.1 Project Components

For the purposes of risk identification and assessment, the Project was subdivided into the following areas:

- transport to site;
- general operations;
- transport on-site; and
- transport off-site.

3.2.2 Incident Classes

The following generic classes of incident were identified:

- fire;
- explosion;
- leaks/spills;
- theft;
- unplanned movement to off-site; and
- vehicle accident.

3.2.3 Project Risk Prevention and Remedial Procedures

A number of hazard preventative and mitigative measures are in place for the existing Wambo Coal Mine operation. These measures are documented in the following management plans:

- ***Bushfire Management Plan*** (Egis, 2002) outlines the methods used in minimising the potential of fires, to protect property and people and to prevent the spread of bushfire on and adjacent to the Wambo Coal Mine site.
- ***Coal Handling and Preparation Plant Environmental Management Plan*** (Egis, 2000) provides procedures to ensure that required standards and environmental protection are achieved and maintained at the CHPP.
- ***Coal Handling and Preparation Plant Emergency Response Procedure (Draft)*** (Wambo Mining Corporation, 2001) summarises emergency response procedures and protocols pertaining to the CHPP.
- ***Wambo Coal Mine Spontaneous Combustion Plan*** (Wambo Mining Corporation, Unpublished) details procedures for the prevention and management of spontaneous combustion at the mine.

The above plans would be revised to address the Project requirements, if required.

In addition to the above, the following hazard mitigation/preventative measures would be adopted for the Project:

- **Rail Safety Accreditation –** The construction and operation of the rail loop would require accreditation under the *Rail Safety Act 2002*. The *Rail Safety Act 2002* sets out the legal requirements for operators of railways in relation to the safe construction, operation and maintenance of railways.
- **Maintenance –** Ongoing and timely maintenance of all mobile and fixed plant and equipment in accordance with the recommended maintenance schedule. Only vehicles permitted to carry dangerous goods would be used for explosive transport.
- **Staff Training –** Operators and drivers would be trained and (where appropriate) licensed for their positions. Only those personnel licensed to undertake skilled and potentially hazardous work would be permitted to do so.
- **Rail Spur and Coal Terminal –** The proposed construction of the rail spur and coal terminal would provide a method of product coal transport that does not include public road haulage. This would significantly reduce the number of truck trips on the 13 km public road route to the MTCL and thereby reduce the potential for vehicle accidents.
- **Engineering Structures –** Mining and civil engineering structures would be constructed in accordance with applicable codes, guidelines and Australian Standards. Where applicable, WCPL would obtain the necessary licences and permits for engineering structures.
- **Blast Management –** Temporary closures of a short section of the Golden Highway would occur when blasting is within 500 m of the road. These brief closures would be undertaken in accordance with Roads and Traffic Authority (RTA) traffic control requirements and would halt vehicle traffic for 15-20 minutes per blast.
- **Water Management –** Water management structures would be constructed to separate runoff from undisturbed areas and disturbed areas. The collection drain and sediment dam system would be designed and constructed with capacity to contain potential spills or fire suppression water runoff within operational areas.
- **Relocation of Wallaby Scrub Road Intersection –** The intersection of Wallaby Scrub Road and the Golden Highway would be relocated to allow construction of the Project. The relocated intersection would be constructed with improved intersection geometry in accordance with RTA requirements.
- **Consultation with United Colliery** – Due to the close proximity of the Wambo Coal Mine and United Colliery operations, WCPL and United Collieries Pty Ltd have a range of protocols that have been developed to minimise the risks to the neighbouring operation from activities such as blasting, dewatering and mine subsidence.

- **Emergency Response** – Revision of the existing emergency response procedures manuals and systems to include consideration of the expanded Project operations.

4 RISK MANAGEMENT AND EVALUATION

Attachment A presents a qualitative assessment of risks associated with the development and operation of the Project. The assessment evaluates the risk of the Project impacting on the environment, members of the public and their property. In particular the incremental increase in risks, when compared to the existing Wambo Coal Mine, are assessed. Existing preventative measures have been augmented where required to produce a 'low' level of risk in accordance with the risk acceptance criteria described in Section 1.3.1. Preventative measures include:

- All contractors employed by WCPL would be required to operate in accordance with the relevant Australian Standards, NSW Legislation and WCPL's Contractor Management Plan.
- Existing Wambo Coal Mine operating procedures and maintenance programmes would be expanded to manage Project related activities, where relevant.
- The existing Wambo Coal Mine Bushfire Management Plan would be reviewed and implemented in consultation with the Singleton Rural Fire Brigade.
- The existing Wambo Coal Mine Emergency Response Plan would be reviewed and expanded to address Project related activities.

5 REFERENCES

Department of Urban Affairs and Planning (DUAP) (1999) *Multi-Level Risk Assessment*. Revised Edition.

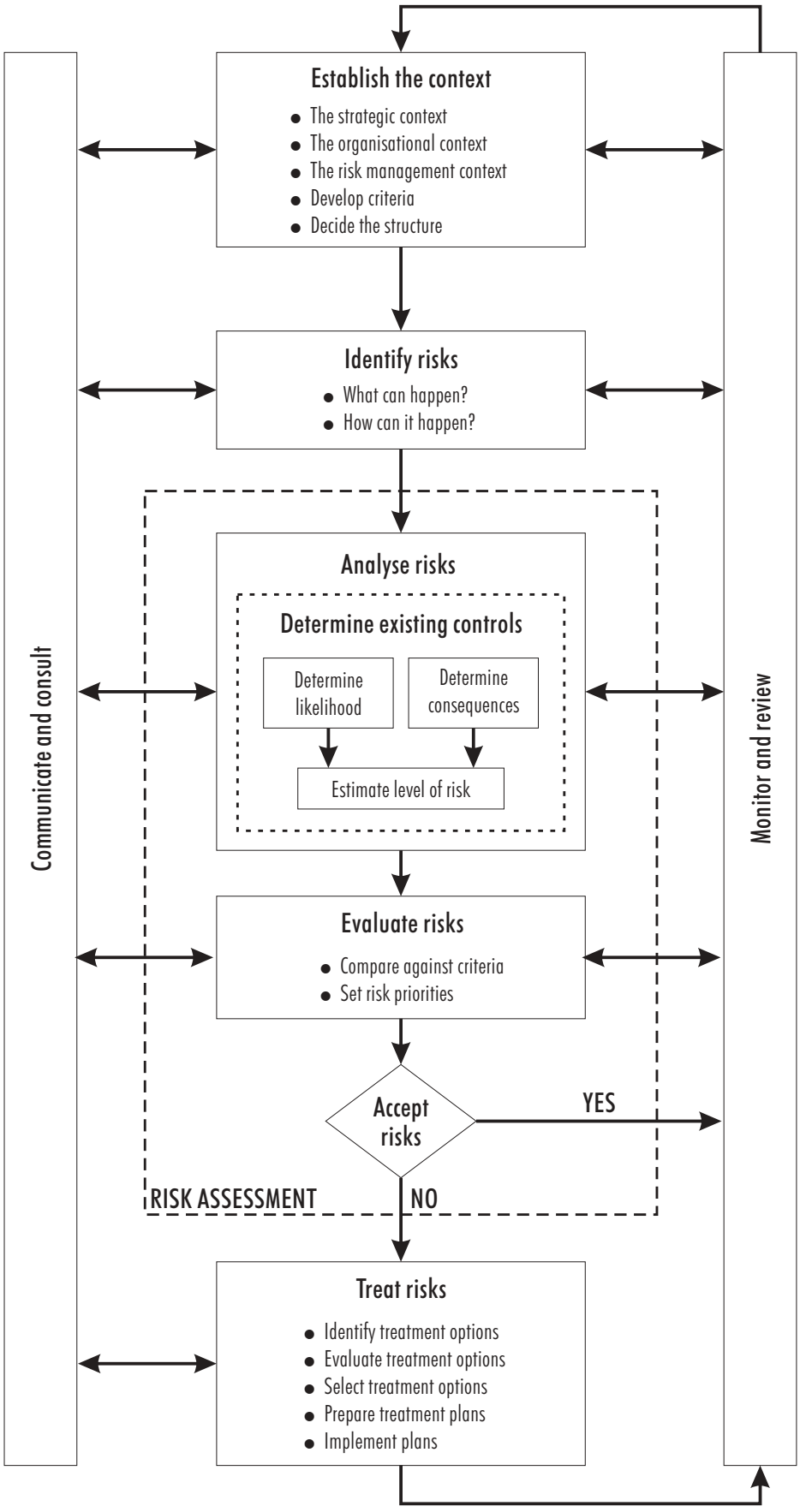
Department of Urban Affairs and Planning (DUAP) (1992) *Hazardous Industry Planning Advisory Paper No 4 – Risk Criteria for Land Use Safety Planning*.

Egis (2002) *Bushfire Management Plan*. Report Prepared for Wambo Mining Corporation Pty Ltd.

Egis (2000) *Coal Handling and Preparation Plant Environmental Management Plan*. Report Prepared for Wambo Mining Corporation Pty Ltd.

Wambo Mining Corporation Pty Ltd (2001) *Coal Handling and Preparation Plant Emergency Response Procedure (draft).*

FIGURES



Adapted from: AS/NZS 4360:1999 Risk Management

PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

FIGURE 1
Risk Management Process

ResourceStrategies

WAMBO COAL PTY LIMITED

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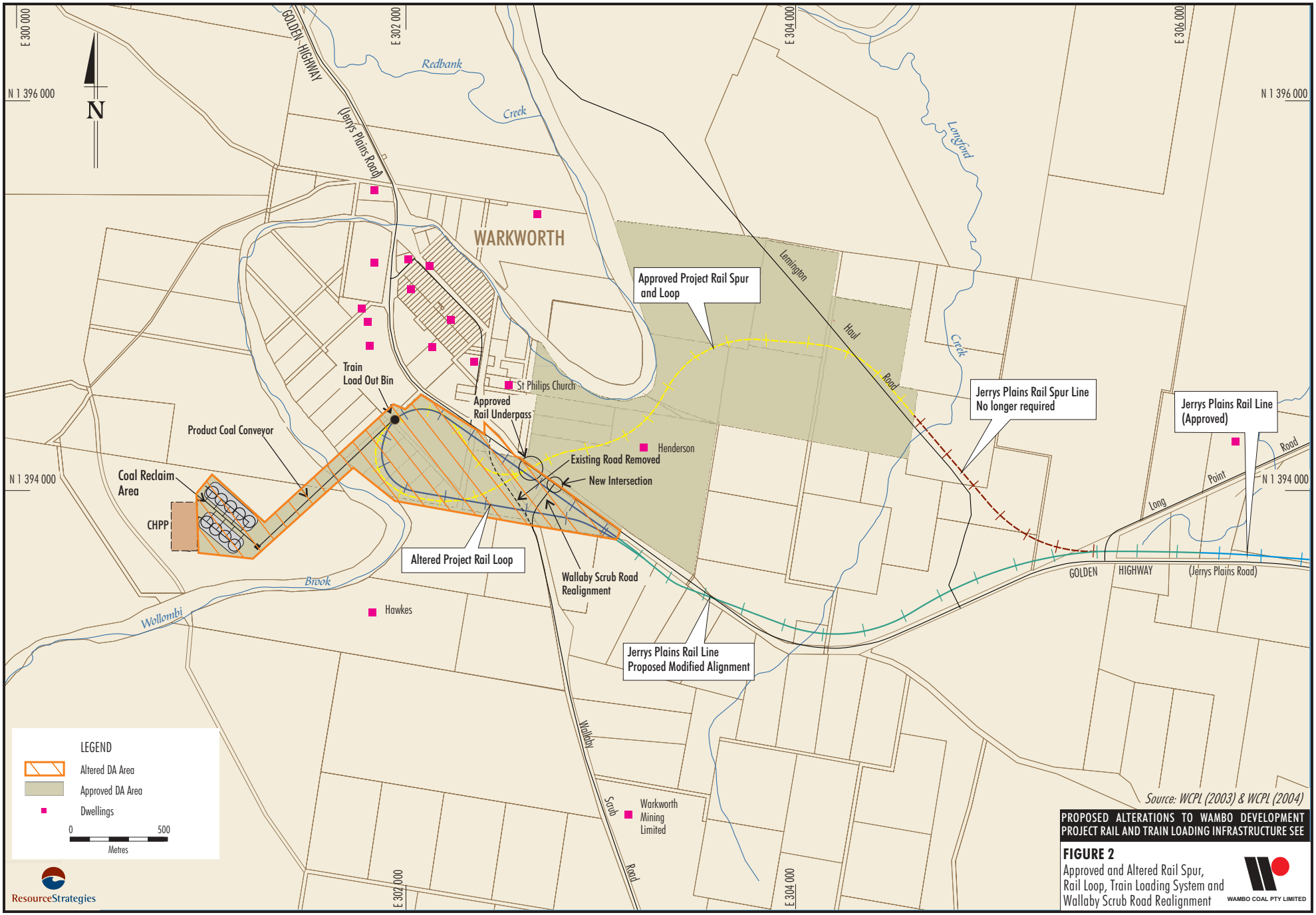

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ATTACHMENT A

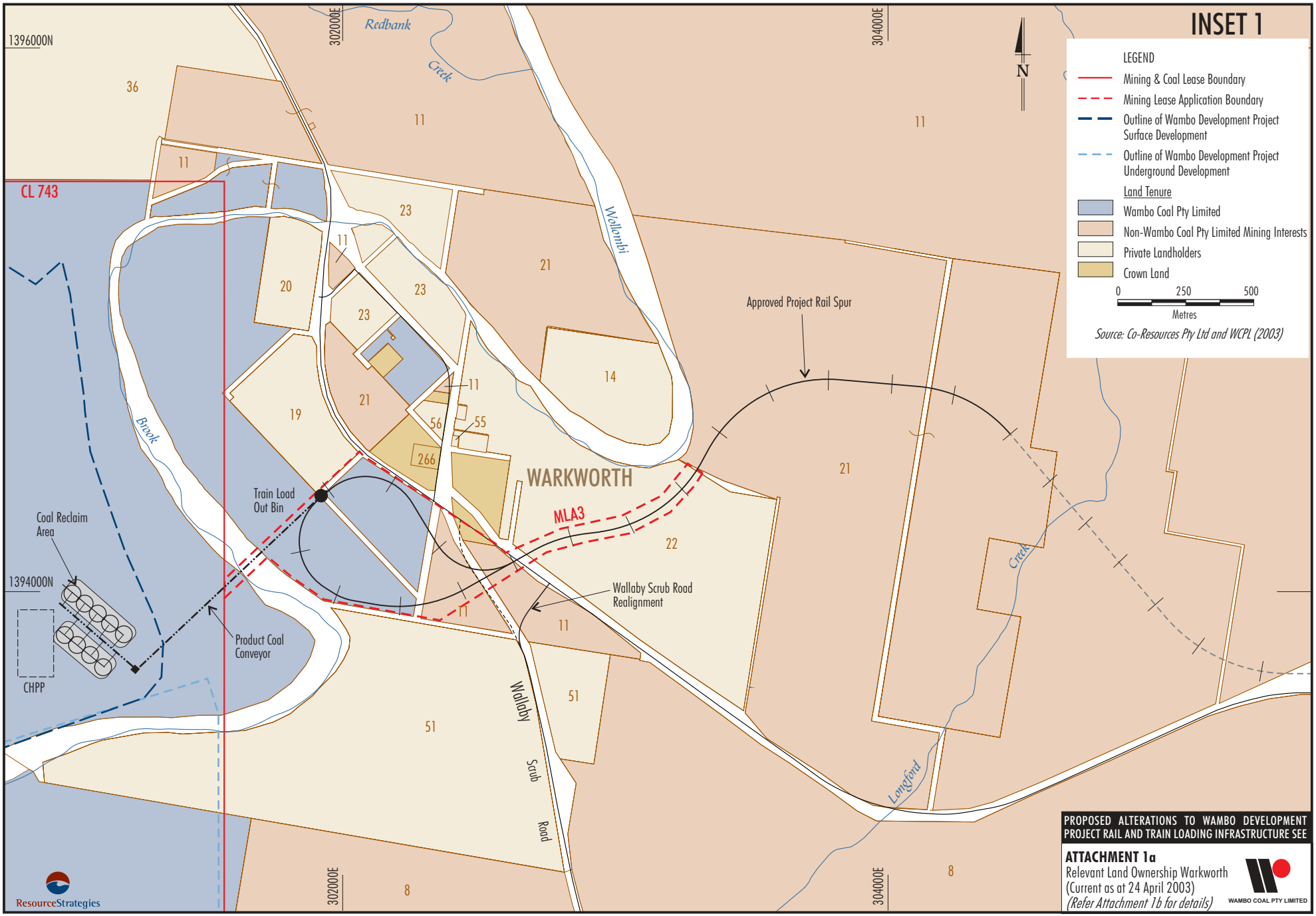
RISK IDENTIFICATION TABLE

Project Component	Incident Type	Scenario	Existing or Proposed Preventative Measures	Probability	Consequence	Risk
Transport to Site (Explosives, Fuel and General Goods)	Spill Fire Explosion	Poor maintenance, poor design, collision or human error leading to off-site impacts.	• Contractors licensed and operate in accordance with Australian Standards and NSW Legislation • WCPL Contractor Management Plan • Radio/mobile telephone communications and on-board fire fighting equipment	Rare	Minor	Low
	Theft	Malicious act resulting in off-site impacts	• As above	Rare	Minor	Low
General Operations (Construction, ground preparation, rehabilitation and coal transport)	Fire	Mobile plant, powerlines, fixed plant, human action or spontaneous combustion leading to off-site fire related impacts	• Expansion of existing operating procedures to manage Project related activities • Regular maintenance of mobile plant and fire fighting equipment • Development and maintenance of appropriate fire breaks • Review and implementation of the existing Bushfire Management Plan in consultation with the Rural Fire Service • Review and implementation of the existing Emergency Response Plan • Regular inspections of mobile and fixed plant, coal stockpiles, fire fighting equipment and fire breaks • Review and implementation of the existing Spontaneous Combustion Plan • Training and competency assessment of plant operators	Rare	Minor	Low
	Unplanned movement to off-site	Mobile plant or equipment parts move off-site in an uncontrolled manner	• Planning of activities to ensure adequate control and buffer distances • Supervision by appropriately qualified persons • Development of appropriate operating procedures • Training and competency assessment of plant operators	Rare	Minor	Low

Project Component	Incident Type	Scenario	Existing or Proposed Preventative Measures	Probability	Consequence	Risk
Transport On-Site (Explosives, Fuel and General Goods)	Spill Fire Explosion	Poor maintenance, poor design, collision or human error leading to off-site impacts.	• Contractors licensed and operate in accordance with Australian Standards and NSW Legislation • WCPL Contractor Management Plan • Site policies, management plans and procedures • Containment structures • Operator training	Rare	Minor	Low
Transport Off-Site (Rail Loop Construction and Rail Loop Operations)	Leaks/Spills	Sediment control structure failure leads to discharge to watercourse	• Sediment control structures to be designed to relevant standards • Development of construction management plans (including an Integrated Erosion and Sediment Control Plan) in consultation with the relevant authorities • Regular inspections and maintenance where required	Unlikely	Minor	Low
	Vehicle Accident	Vehicle accident on a public road due to construction activities associated with the rail loop.	• Development of a Traffic Management Plan in consultation with the relevant authorities • Management of traffic during construction of Golden Highway underpass in accordance with RTA guidelines (including the diversion of traffic and speed limits).	Unlikely	Minor	Low
	Leaks/Spills	Overloading, derailment or collision leading to coal or fuel spillage off-site	• Development of operating procedures and training to minimise the potential for overloading. • Regular inspections of train loading activities and rail infrastructure and intervention/maintenance where required • WCPL Contractor Management Plan • Appropriately qualified engineers to design the rail infrastructure and signalling systems.	Unlikely	Minor	Low

ATTACHMENT 1A

RELEVANT LAND OWNERSHIP – WARKWORTH



WAM-04-04 SEE_008A

ATTACHMENT 1B

LANDHOLDER KEY

1 KM & CM Brosi
2 W & D Lambkin
3 HM Birrell
4 IF & MA Circosta
5 DS & DL Strachan
6 HD Merrick
7 DC & EM Maizey
8 Warkworth Mining Limited
9 H Upward
11 Coal & Allied Pty Ltd
13 DR Skinner
14 S & G Keys
15 L McGowen & AJ Caslick
16 MR & CE Cooper
17 J & HJ Carter
18 GJ Denney
19 L Kelly
20 Jerry's Plains Coal Terminal
21 Coal & Allied Pty Ltd
22 O J Henderson
23 HE Kannar
24 AJ Long
25 RW Fenwick & AM Frost (Fenwick)
26 Amarina Systems
27 Birralee Feeds Pty Ltd
28 C & M Garland
29 C Lowe
30 JE & CN Williams
31 CM Fisher
32 CM Moore
33 DJ Thelander & JA O'Niell
35 GJ Brosi
36 Graham, Coates & Maitland
37 IA & JE Lawry
38 JV Clifton
39 K & DL Northcote
40 KM Muller
41 Jepolo Pty Ltd
42 LM Redman
43 ME & CM Carmody
44 MR Skinner
45 R & PK Mansfield
46 RJ & CC Ball
47 RJ Hayes
48 SJL LL Ponder
49 WB TM Oliver
50 WM & RF & TJ & RJ Nowland
51 C.M. Hawkes Pty Ltd
52 KJ Bennett
53 TP & CM Old
54 PW & BN Nichols
55 E & C Burley
56 K & L Haynes
57 TJ & LM Bennett
58 P & MD Cantrill
59 GW & KM Merrick
60 MJ Williams
61 LW Northgate
62 A Mitchell
63 Abrocuff Pty Ltd
64 AE & MJ Dallas
65 AF & HM Holt
66 AJ Gallagher
67 White Mining
68 AL Tarrant
69 AM & NM Renaud
70 Anglican Church
71 ARD & KM Spinks
72 AS Bowman
73 AW & CA Louis
74 B Fogwell
75 BA Barnes
76 Barrington Group of Companies
77 BD Medhurst
78 BE & TA Moxey
79 BE Norton
80 BH & CJ Witchard
81 BJ & MG Anderson
82 BR McTaggart
83 Bulga Community Centre
84 BV Kbodler & ML Swain
85 C & PJ Reid
86 Calogo Bloodstock
87 CG Wallace
88 CI Maskey
89 CJ & MB Cowlard
90 CL & L Price
91 CL Bailey
92 Country Womens Association
93 CS & EA Neville
94 Curlewis Pastoral
95 CW & RM Gee
96 D & D Townsend
97 D & VM Saunders
98 D Macey
99 D Vikas & SJ Mitchell
100 DA Hodge
101 DB Roser
102 DE Leslie
103 DE Morrow
104 Department of Education
105 DG & H Walton
106 DG & JC De Somer
107 DJ & IB Birkett
108 DJ & VA Goldstein
109 DJ Cassidy & AE Conley
110 DK & AG Margery
111 DK Partridge
112 DP & EJ Van Rensburg
113 DR & KG Nichols
114 DV & KN Cameron
115 DW & JA Hadley
116 DW & SP Butler
117 E MacKenzie
118 EA Quilan
119 EE McNaught
120 EI & RC & DE Chapman & PA Salton
121 EJ & DL St John
122 EM Lannigan
123 Energy Australia
124 ES Bowman
125 Estate of the late JE Barry
126 Estate of the late TM Brown
127 F & J Fameli
128 F H Turnbull
129 FJ Carruthers
130 G & JA Lee Wood
131 G & SF O'Brien
132 G & T Carnevale
133 GA & GG Cross
134 GF Morley
135 GJ & BA Wild
136 GJ & JG Ernst
137 GJ & K Woodruff
138 GJ & TM Tlaskal
139 GK & SR Grainger
140 GL Turnbull
141 Glendell Tenements
142 GM Caban
143 GR & JR Mumford
144 GR Duff
145 GW & ME Banks
146 GW Jennison
147 GW McTaggart
148 H & T & H Fotopoulos
149 HJ Kauter
150 IH & RA Moore
151 IK Mitchell
152 IN & AM Batholomew
153 Inchnuek
154 Irene investments
155 IV Farmer
156 IW Killen
157 J & D Vassallo
158 J & G Seiffhart
159 J & V Ferlito
160 J Kladis
161 J Leslie
162 JA Pritchard
163 JA Rodger & CM Williams
164 JC Mullaly & PE McMaugh
165 JE Killin
166 Jerry Plains Cemetery
167 Jerry's Plains Pony Club
168 JF Lannigan
169 JM & M Player
170 JM Woodruff
171 JP & S Evans
172 JR & DC Lamb
173 JR & KA Wulff
174 JT & PJ Walmsley
175 JT Lambkin
176 Justice Dept
177 JW & LM Clements
178 KJ & NL Smith
179 KJ & PD Slade
180 KJ Mitchell
181 KM Hunt
182 KM Merrick
183 KR & JM Dubois

Source: Co-Resources Pty Ltd and WCPL (2003)

PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

ATTACHMENT 1b
Landholder Key
(Current as at 24 April 2003)

ResourceStrategies

WAMBO COAL PTY LIMITED

184 KR & MJ Lobb
185 L & M Fletcher
186 L Edwards
187 L Farrugia
188 LA & GI Fuller
189 LC Krey
190 LJ & V Bodiam
191 LM & RB Caban
192 LM Crisp
193 LW & NR McLachlan
194 M & B Dragicevic
195 M & SE Bendall
196 M E Vidler
197 M G White
198 M N Killen
199 Macquarie Generation
200 MC & SJ Mitchell
201 MF & NV Chapman
202 MH & EJ Richards
203 Miller Pohang Coal
204 Minister for Education and Training
205 MJ & JG Bryan
206 MJ Dallas
207 MM & N Roser
208 MS & S Dawson
209 MV & SM Thompson
210 MV Ford
211 MW & P Charlton
212 N & L Holz
213 National Parks & Wildlife
214 ND Chalker & JR Spiller
215 Newcastle Gliding Club
216 Nippon Steel
217 NJ Barry
218 NO & RJ Cole
219 Novacoal Australia
220 NR & GJ Nelson
221 NR Bourke & EL White
222 NR Walters & TJ Barry
223 P Adamthwaite
224 PA & JA Cooke
225 Packtron Packaging
226 Paka Investments
227 PD Culbert
228 Peabody Resources
229 PF & FJ Ritchie
230 PG Gee
231 PJ & ER Hearse
232 PJ & GTL Magin
233 PJ & H Kolatchew
234 PJ Carlyon
235 PJ Keegan
236 PR & CM Burley
237 PT Jessop
238 PW & TA Harris
239 R McLauglin
240 RA & LJ Lannigan
241 RA Corino & PM Rayner
242 Raynest Pty Ltd
243 Recluse Pty Ltd
244 Redbank Project Pty Ltd
245 RG & A Godyn
246 RG & FS Bailey
247 RG & KL Caban
248 RG Nichols & SA Anderson
249 RGW Richardson
250 RI & JM Hedley
251 RJ & JA Evans
252 RJ & JS Wenham
253 RJ & KT Bridge
254 RJ Algie
255 RJ Farley & SJ Oldham
256 RJ Peel
257 RM Spencer
258 Roman Catholic Church
259 RP & L Newman
260 RW & HA Davis
261 RW & MA Cupitt
262 RW Moses
263 Saxonvale Coal Pty Ltd
264 School of Arts
265 SD Edwards & T Howard & JV Clifton
266 Singleton Council
267 SJ & L Pringle
268 SM & TA Gaunt
269 SM Franks & RA Harris
270 SM Gee
271 SPP & SJ Tamplin
272 TA & SA Mills
273 TC & SG Jackson
274 TE & BG Harrison
275 Telstra Corporation
276 TG Gale
277 The State of NSW
278 TJ Bennett
279 TJ BL Holstein
280 TP & S Mitchell
281 TR & SN & ML Cole
282 Transgrid
283 VE Gee
284 W Rienstra
285 W Riley
286 WB Harris & BL Guy
287 WG Barnett
288 WL & P Slaney
289 WT Clark
290 Wyoming Holsteins
291 YC Van Den Berg
292 D & JM Vikas
293 CA Dyson
294 CBS Explosives
295 Ian Headley
296 Singleton Shire Council
297 State Rail Authority
298 D & C Russell
299 C Russell
300 K Isaac
301 Pastures Protection Board
302 DB & P Stuart
303 R Thrift & Co
304 W Bowman, G Elder & A Bowman
305 Canravo Pty Ltd
306 Keith Heuston Pty Ltd
307 B New & A Knodler
308 N & E Riley
309 W & L Barry
310 HD & DR Hobden
311 HD Hobden
312 F & J Ventra
313 W & H Welsh
314 C & L Slade
315 L & R Gatt
316 RW Kannar
317 DM Clemson

Source: Co-Resources Pty Ltd and WCPL (2003)

PROPOSED ALTERATIONS TO WAMBO DEVELOPMENT PROJECT RAIL AND TRAIN LOADING INFRASTRUCTURE SEE

ATTACHMENT 1b
Landholder Key
(Current as at 24 April 2003)

ResourceStrategies

WAMBO COAL PTY LIMITED