REPORT

Preliminary Environmental Assessment

Integra Open Cut Project

Prepared for

Integra Coal Operations Pty Ltd

30 May 2008

43177507

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Date:	30 May 2008
Reference:	43177507
Status:	Final Report

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Executive Summary

This Preliminary Environmental Assessment (PEA) Report for the Integra Open Cut Project has been prepared under the provisions of Part 3A of the *Environmental Planning and Assessment (EP&A) Act 1979* and relates primarily to the proposed north-westerly extension of the existing Integra Open Cut located approximately 10km to the north-west of Singleton, NSW. In addition to the proposed Extension, the Integra Open Cut Project seeks to replace DA 86/2889 and PA 06_0073 through the provision of a project approval. A single project approval covering all Integra Open Cut activities would provide administrative and regulatory benefits to both the Government and Integra. The purpose of this document is to provide sufficient information on the Project (in particular the Extension) and its potential environmental impacts to allow the NSW Department of Planning to issue environmental assessment requirements for a project approval.

The proponent is Integra Coal Operations Pty Ltd (Integra) on behalf of the Integra Joint Venture participants. Integra is the management company responsible for the operation of the Integra Open Cut (formerly known as the Camberwell Coal Mine) and the Integra Underground (formerly known as the Glennies Creek Colliery).

The Extension proposal follows detailed geological investigations and, under current economic circumstances, represents an opportunity to extend the life of the existing approved mine by up to nine years and provide ongoing employment for the workforce.

The Open Cut Project Area, covering approximately 1800ha, incorporates all areas of disturbance and activities associated with the Extension and the areas relating to DA 86/2889 and PA 06_0073, the access corridor to the DA 86/2889 area and the area north of the PA 06_0073 boundary south of the Middle Fallbrook and Stony Creek Roads, the latter two areas included for administrative or practical purposes only. The proposed coal extraction activities associated with the Open Cut Extension will be undertaken within an area of approximately 161 ha to the north-west of the existing approved South Pit. Projected ROM coal production is currently estimated at approximately 2.3 to 4.2 Mtpa. However, approval is to be sought for ROM coal production up to a maximum of 4.5 Mtpa.

Section 1 Introduction

1.1 Introduction and Scope

Integra Coal Operations Pty Ltd (Integra) is the management company responsible for operations at the existing approved Integra Open Cut (formerly known as the Camberwell Coal Mine) and the Integra Underground (formerly known as the Glennies Creek Colliery) located approximately 10km north-west of Singleton, NSW (**Figure 1.1**). Integra is proposing to extend the open cut, which has operated continuously since 11 March 1991, in a north-westerly direction. The objective of this proposed development, hereafter referred to as the "Extension", is to maximise resource utilisation within and above CL357, thereby extending the open cut's economic life by up to approximately nine years and providing ongoing employment for a workforce of approximately 250 persons. Should an approval not be granted, the coal resource would be potentially sterilised and mining activities at the existing approved Integra Open Cut would cease in late 2009.

In addition to the Extension, and as part of the Integra Open Cut Project, this application also seeks approval for the long-term use of the Coal Handling and Preparation Plant (CHPP), train loader, infrastructure and facilities required for or to support mining and processing and despatch of coal from the Integra Open Cut Project, and to replace DA 86/2889 (the existing Integra Open Cut Development approval) and PA 06_0073 (the Glennies Creek Open Cut Approval (pending)) through the provision of a consolidated project approval. The Integra Open Cut Project is considered to be a 'Major Project' as defined by *State Environmental Planning Policy (Major Projects) 2005* and, as such, requires a project approval from the Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The proposed development area (the "Project Area") encompasses:

- all areas of disturbance and activities associated with the Extension (the "Open Cut Extension Area") including clearance of land; open cut mining and related activities such as overburden and soil placement; installation of water management structures and rehabilitation; coal haulage to and processing within the existing approved CHPP;
- the Glennies Creek Open Cut Project Site identified in PA 06_0073; and
- the Development Application Area identified in DA86/2889

Additionally, for administrative or practical purposes, the Project Area also incorporates the access road corridor between the Development Application Area boundary and Bridgman Road and the area to the north of the PA 06_0073 Project Site boundary and south of Middle Falbrook and Stony Creek Roads. The Project area is shown in **Figure 1.2**.

This Preliminary Environmental Assessment (PEA) has been prepared by URS Australia Pty Ltd (URS) on behalf of Integra. As the matters identified in the application are, with the exception of the Extension, primarily of an administrative nature with no or minimal consequential impacts, the principle purpose of this document is to provide information on the Extension and its potential environmental impacts so as to allow the Director-General NSW Department of Planning (DoP) to issue appropriately targetted environmental assessment requirements for a project approval. This document, therefore, also acts as a formal request for the environmental assessment requirements.

This document has been prepared taking into consideration:

- Part 3A of the EP&A Act;
- Part 1A of the *Environmental Planning and Assessment Regulations 2000* (the Regulation); and
- Project Applications under Part 3A – Steps in the Process (DoP 2005).

This PEA presents an outline of the proposed Extension and a preliminary assessment of key environmental issues and includes:

- the location and a map identifying the site (Section 1);

Section 1 Introduction

- a description of the Extension and justification (Section 2);
- the statutory planning provisions applying to the Extension (Section 3); and
- a preliminary assessment identifying the likely associated key environmental issues (Section 4).

1.2 Site Location

The 1800ha Integra Open Cut Project Area, which incorporates the Open Cut Extension Area, is located approximately 10km north-west of Singleton in the Hunter Valley, NSW (**Figure 1.1**) and sits on the eastern flank of the Glennies Creek Syncline within the Vane Subgroup, Foybrook Formation, and Wittingham Coal Measures. The Open Cut Extension Area generally lies within the boundary of the existing Coal Lease (CL) 357. Coal seams are numerous, thin and interbedded with sandstone, mudstone and a lesser amount of conglomerate.

1.3 Proponent

The proponent is Integra Coal Operations Pty Ltd (Integra) on behalf of the Integra Coal Joint Venture participants, namely:

- VALE Australia Pty Ltd through subsidiary companies VALE Australia (GC) Pty Ltd and Maitland Main Collieries Pty Ltd;
- NS Glennies Creek Pty Limited;
- POS – GC Pty Ltd;
- JS Glennies Creek Pty Ltd;
- JFE Steel Pty Ltd;
- Toyota Tsusho Mining (Australia) Pty Ltd;
- Navidale Pty Ltd; and
- Toyota Tsusho Corporation (Australia) Pty Ltd.

The major shareholder, VALE Australia Pty Ltd, is a subsidiary of Companhia Vale do Rio Doce (CVRD), a Brazilian mining company which ranks as the second largest mining company in the world.

Integra is the management Company responsible for the operation of the Integra Underground (formerly known as the Glennies Creek Colliery) and the Integra Open Cut. Glennies Creek Coal Management Pty Ltd and Camberwell Coal Pty Ltd, the Operators of the individual sites, are wholly owned by Integra.

Section 2 Project Description

2.1 Project Area

2.1.1 Open Cut Extension

The 801 ha Open Cut Extension Area is shown in **Figure 2.1** and comprises four principle component areas of activity, namely:

- the 284 ha Open Cut Area, including a 161 ha Mine Area or Pit (**Figure 2.1**) which is to be subject to coal extraction. The remaining 200 ha within the Open Cut Area will remain essentially undisturbed by Project-related activities. The Open Cut Area predominantly comprises cleared agricultural land, with isolated project and non-project related buildings;
- the South Pit (247ha);
- the coal haulage corridor (13ha); and
- the CHPP Area (57ha). The CHPP Area includes the coal preparation plant, ROM and product coal stockpiles, the trainloader, the workshop, stores, water fill point, fuel farm, bath house, administration buildings and associated facilities.

The Open Cut Area, South Pit, coal haulage corridor, CHPP area and the majority of the 200ha to remain essentially undisturbed lie within CL357, with the South Pit, coal haulage corridor and CHPP area comprising areas of current mining activity.

The area to the east and south of the Open Cut Extension Area has also been substantially modified by current and past coal mining activities at the Integra Open Cut North and South Pits and the Rix's Creek Coal Mine.

The majority of the land within the Open Cut Extension Area is owned by RHA Pastoral Company Pty Ltd, a subsidiary of Camberwell Coal Pty Ltd, with the remainder owned by two private landowners, IM Tisdell and R & D Hall. The Hall property, "Dulwich", and a component of the Tisdell property lie within the footprint of the Pit. Integra is currently discussing the purchase of the two properties with the respective landowners, with Mrs Tisdell having indicated a willingness to sell subject to negotiation of a satisfactory price. In the event that the Dulwich property is not acquired or an alternative arrangement agreed, subject to the receipt of planning approval, coal extraction within the Extension will be undertaken to the limits permissible under the Mining Act 1992. The Environmental Assessment Report (EAR) will be based on the pit shell shown in red on **Figure 2.1**. This pit shell generally represents the 'worst case' scenario for the purpose of the environmental assessment reports. However, where appropriate, the EAR will also assess the impacts to the Dulwich property, should that property not be acquired.

The remainder of this PEA is based on mining to the extent of the pit shell shown on **Figure 2.1**.

2.2 Overview of Proposed Operations

2.2.1 Land Preparation

Coal extraction within the Integra Open Cut South Pit currently occurs from the 360 seam (Lemington Seam) to the 75 seam (Upper Hebden Seam). Coal extraction within the proposed Mine Area would target coal from the 360 to the 105 (Lower Barrett Seam) and, subject to further economic evaluation, may also involve total or partial extraction of the 90 to 10 plies (Upper and Lower Hebden seam).

Mining within the proposed Pit would either commence in the middle of the western side of the existing South Pit and then progress in a northerly then southerly direction, or advance the northern highwall within the South Pit operation further to the north and subsequently advance southwards, with the ultimate decision regarding the commencement location based on the ownership of the Dulwich property at the start of mining.

Section 2 Project Description

Soil stripping would be undertaken prior to mining to conserve all topsoil and subsoil identified in the areas to be disturbed which would be suitable for use in subsequent rehabilitation activities. This will be undertaken using a bulldozer, loader and truck combination. Where possible, soil will be placed directly onto previously shaped areas within the South Pit or the Mine Area awaiting rehabilitation in lieu of stockpiling. Where direct placement of soil materials is not possible, they will be stockpiled in designated stockpile areas. Subject to advice from the soils consultant, the following techniques will be used in the stripping and stockpiling of soil.

- Larger vegetation would be removed and either buried or chipped prior to stripping the topsoil, with smaller vegetation (primarily groundcover) scraped up with the topsoil.
- Topsoil and subsoil would be separately stripped using a bulldozer, scraper, loader and truck.
- Where possible, soil materials would be stripped when moist (not wet) to retain their structure.
- The movement of heavy machinery across the soil stockpiles would be limited to avoid excessive compaction.
- Soil stockpiles would be located away from active mining areas and areas susceptible to erosion.
- Topsoil and subsoil stockpiles would be sown with a cover crop to provide protection from erosion.

After collection of soil from stockpiles, the stockpile areas would be reshaped and ripped or scarified prior to reseeding.

2.2.2 Mining

It is currently envisaged that mining activities will be undertaken using the existing or similar equipment and the personnel currently deployed in the South Pit. Approval is to be sought for 24/7 operations, ie consistent with those approved for the existing Integra Open Cut operations.

As the mine is characterised by several 10-40 metre intervals of overburden/interburden across the deposit, overburden/interburden waste materials will be mined by blasting and/or ripping then loading by shovel, excavator or front end loader into haul trucks.

Coal will be ripped and pushed by dozers before loading into trucks using front-end loaders. Current geological information indicates that there are no coal seams thick enough to necessitate coal blasting.

The economics of the planned mining activities are largely driven by the number of trucks required to move the waste materials and deliver the raw coal to the CHPP. Waste materials mined will initially be placed within the boundary of South Pit and, as mining progresses, within the mined out components of the Mine Area.

The high overburden to coal stripping ratios within the Mine Area mean maximum recovery of raw coal is essential to the operation. Coal plies to a minimum mining thickness of 30cm will be recovered completely and plies in the 10-30cm thickness range will be evaluated individually to determine the economic viability of recovery: the current South Pit operation has recovered plies to a thickness of 10cm where conditions are favourable.

During the course of the planned open cut mining operations there may be opportunities to undertake mining from the final highwall or economic limit of the 75 seam using auger or highwall mining methods (where such mining would not encroach within 150m of the Station Creek or Glennies Creek alluvials), with the final extent determined by the type of mining undertaken. Neither highwall nor auger mining would result in subsidence nor occur outside the Project Area (**Figure 2.1**). Any coal extracted by these methods would be in addition to the coal to be extracted by open cut mining.

Projected ROM coal production is currently estimated at approximately 2.3 to 4.2 Mtpa while waste movement is estimated to range from approximately 12 to 26 Mbcm per annum. However, approval is to be sought for ROM coal production up to a maximum of 4.5 Mtpa. The excavation within the proposed Pit will range from approximately 100m to 250m below ground level.

2.2.3 Plant and Equipment

The current mining fleet consists of:

- 1 P&H 2800XPA 34 m^3 electric face shovel;
- 1 Hitachi EX3600 22 m^3 excavator;
- 4 Cat 994 18 m^3 front-end loaders;
- 26 Cat 789 trucks for overburden and coal movement;
- 3 Driltech 75K drills;
- 1 Driltech C40K drill;
- 5 Cat D11 dozers;
- 2 Cat D10 dozers;
- 1 Tiger/Cat 895 Rubber tyred dozer;
- 2 Cat 16G grader;
- 2 Cat 777B water carts; and
- 1 Cat 773 service tanker.

A similar mining fleet is proposed for use in the Extension with the inclusion of a Hitachi EX5500 or equivalent 30m^3 excavator likely to be the only additional plant.

2.2.4 Waste Management

The principle wastes to be generated and managed as part of the Extension comprise overburden and interburden removed to access the coal seams within the Pit and coarse and fine rejects produced within the CHPP. The coarse and fine rejects comprise a mixture of coal and non-coal materials which occur naturally within the coal seam or represent overburden or interburden materials which are incorporated with, and dilute the coal during mining.

Overburden strata within the current South Pit and within the proposed Pit are variable in nature, comprising conglomerate, sandstones, mudstones and claystones, and ranging from moderate to high strength.

Overburden / interburden and coarse reject from the CHPP will be dumped by truck into active tipping areas within the current South Pit area or in the mined-out components of the proposed Pit such that final landform within the Pit will blend with, and be consistent with, that approved within the South Pit and be to a maximum elevation of 140m AHD.

Fine reject (tailings) produced from processing the coal from the Extension will be managed in the same manner as that from the existing Integra Open Cut Operations and the Integra Underground. Given that the Integra Underground will remain in operation for some 15 years after the cessation of the Extension, the potential exists for the use of the final Mine Area void for this purpose in the longer term.

2.2.5 Mineral Processing

ROM coal will be transported to the existing CHPP. The CHPP consists of a two stage raw coal sizer (-250mm / -90mm) 80,000t capacity ROM coal stockpile; a coal washery; a 350,000t product stockpile and 4,600 tph train loadout system on a rail loop connected to the Main Northern Rail Line.

2.2.6 Rehabilitation

Rehabilitation, including earthworks, drainage and revegetation is being undertaken progressively as part of the existing South Pit operations in a manner consistent with the design provided in the Camberwell EIS, the closure criteria developed for sustainable pasture and native ecosystems and the "Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley". These activities will be extended into the areas of disturbance within the Mine Area.

The conceptual final landform will be consistent with that identified in the current South Pit Mining Operations Plan in terms of slope grade, drainage lines and the boundary landform with Rix's Creek Colliery.

The objectives of the rehabilitation planning process will be to:

- reshape all slopes to gradients which provide long term stability;
- revegetate lands disturbed by mining activities;
- return the site to a suitable land capability class;
- locate dams on natural and reformed watercourses and gullies to provide short term retention and sediment control during mining and rehabilitation, and long term stock watering and/or fauna utilization / habitat;
- prevent contaminants from leaving the site; and
- minimise dust generation during the rehabilitation process.

Rehabilitation activities and outcomes undertaken within the Open Cut Area will continue to meet or exceed the standards currently being achieved at the existing Integra Open Cut North and South Pits.

2.2.7 Project Life

At the maximum production rate sought of up to 4.5 Mt ROM coal per annum and current projected annual production rates, the proposed extension would have a life of approximately 8 to 9 years. Should the annual production rate be less than the maximum sought and/or projected for any year, the duration of the proposed mining activities would be extended. Additionally, any coal mined through highwall mining methods may increase the mine life. Notwithstanding, it is anticipated that the maximum operational life of the mine would be approximately 12 years, with the completion of rehabilitation activities extending the overall life of the Extension by up to 14 years.

2.3 Project Need and Justification

The proposed Extension, if approved, would enable Integra to maximize resource recovery as required under its mining tenements and, as such, the continuation of open cut mining operations at the Integra Open Cut and the maintenance of the human and capital resources within the project. Integra has consciously started the mining and environmental evaluation processes in parallel to ensure that there will be continuity of employment for its Open Cut workforce.

The proposed Extension is able to leverage on existing infrastructure, skills and equipment to complement coal production from Integra's underground operations as part of an integrated mining operation.

Section 3 Planning Considerations

This Project Application and Preliminary Environmental Assessment (PEA) has been prepared in order to obtain Environmental Assessment Requirements (EARs) for the proposed Integra Open Cut Project from the Department of Planning. In order to obtain approval from the Minister of Planning, and as required by Section 75F of the EP&A Act, the environmental assessment for the Project will be prepared in accordance with those EARs.

A Conceptual Project Development Plan (CPDP) for the Extension was presented to and supported by the NSW Department of Primary Industries on 27 September 2007.

The Project is subject to the legislative controls of Commonwealth, State and local planning and environmental frameworks. This section discusses the site within the context of these legislative and planning provisions.

3.1 Commonwealth Legislation

3.1.1 Environment Protection and Biodiversity Conservation Act 1999

Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) states that an action which *has, will have or is likely to have a significant impact on a matter of national environmental significance* may not be undertaken without prior approval of the Commonwealth Minister for Environment and Heritage, as provided for under the provisions of Part 9 of the EPBC Act. The Act identifies the following as matters of national environmental significance for which Ministerial approval is required.

- World Heritage properties
- National Heritage places
- Wetlands of international importance (including Ramsar wetlands)
- Listed threatened species and ecological communities
- Listed migratory species protected under international agreements (CAMBA and JAMBA)
- Protection of the environment from nuclear actions
- Commonwealth Marine Areas.

The proposed Open Cut Extension Area lies within an area of undulating topography that has been extensively cleared for grazing. Land to the east, south and west of the site has been substantially modified by former and current coal mining activities. Preliminary environmental assessment studies indicate that the Extension does not significantly impact on any of the above matters and consequently would not be a controlled action under the EPBC Act. It is expected that further studies undertaken as part of the Environmental Assessment Report will confirm this. Given that remaining components of the Project Area comprise areas of current or prior disturbance or would be physically unaffected by the Project, a similar conclusion can be reached.

3.2 NSW State Legislation

3.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (the Regulation) provide the framework for the assessment and approval of proposed developments within NSW.

Part 3A of the EP&A Act provides a process for the assessment of developments which are considered to be 'Major Projects' as declared by *State Environmental Planning Policy 2005 (SEPP) Major Projects* or by order of the Minister in the Government Gazette. The SEPP (Major Projects) 2005 describes the following development as 'Major Projects'.

Section 3 Planning Considerations

Schedule 1 Group 2: Mining, Petroleum Production, Extractive Industries and Related Industries

5. Mining

(1) Development for the purposes of mining that:

(a) is coal or mineral sands mining, or

(b) is in an environmentally sensitive area of State significance, or

(c) has a capital investment value of more than $30 million or employs 100 or more people.

As a Major Project, the proposal is subject to the provisions of Part 3A of the EP&A Act and, accordingly, it will be subject to assessment by the Director-General of the Department of Planning and determination by the Minister of Planning.

3.2.2 Environmental and Planning Legislation

While the EP&A Act provides the framework for the planning and development approvals system in NSW, there are a number of other Acts and Regulations of relevance to the proposed Project. These Acts and Regulations would be identified and considered during the environmental assessment of the Project. Key Acts of relevance are discussed below. It is noted that Part 3A of the EP&A Act removes the need to obtain some approvals under these Acts or Regulations.

Mining Act 1992

Integra Coal Operations currently holds title over all areas of proposed disturbance within the Open Cut Extension Area by virtue of CL 357, excluding the surface to a depth of 20m, and Authorisation 81 (A81). For the proposed mining activities to proceed, Integra will require a mining lease over the area of proposed activity which is subject to the surface exemption and depth restriction or covered by A81 and to submit a new Mining Operations Plan once the conditions of any planning approval are known.

Protection of the Environment Operations Act 1997

Integra currently holds Environment Protection Licence 3390 for coal mining and coal works at the Open Cut. The license covers the production of 2 Mtpa to 3.5 Mtpa of saleable coal and greater than 5 Mtpa of coal products loaded. The Project will not necessitate any amendment to the nature or scale of activities identified in EPL 3390. However, an amendment to the description of the premises may be required.

Water Act 1912

Integra currently holds a Water Licence issued under Section 12 of the *Water Act 1912* (Licence No. 20SL061410). A Water Access Licence has also been issued under Part 5 of the *Water Act 1912* (Licence No. 20BL169513). Both of these are extraction licences. Based on current knowledge, no amendment to this licence is likely to be required.

National Parks and Wildlife Act 1974

The environmental assessment will identify the presence of any known Aboriginal archaeological sites and the strategies for management and mitigation of impact. Under Section 75U(1)(d) of the EP&A Act 1979, a permit under section 87 or a consent under section 90 of the National Parks and Wildlife Act 1974 is not required for an approved project.

Threatened Species Conservation Act 1995

Under the EP&A Act, impacts on threatened species listed under the *Threatened Species Conservation Act 1995* (TSC Act) are required to be assessed. The TSC Act provides legal status for biota of conservation significance on NSW. The Act aims to 'conserve biological diversity and promote

ecologically sustainable development'. The environmental assessment will identify the presence of any threatened species and the strategies for management and mitigation of impact.

Heritage Act 1977

The *Heritage Act 1977* provides for the conservation and management of the State's built, marine, moveable and natural heritage. An item of local heritage significance (the "Dulwich" homestead) has been identified within the Open Cut Extension Area. This property will be either directly or indirectly impacted by the proposed operations depending on the final mine plan that is developed. Under Section 75U(1)(c), an approval under Part 4, or an excavation permit under section 139 of the Heritage Act 1977 is not required for an approved project: under Section 75U(2) of the EP&A Act 1979, Division 8 of Part 6 of the Heritage Act 1977 does not apply to prevent or interfere with carrying out of an approved project.

Dams Safety Act 1978

The *Dams Safety Act 1978* requires that large dams that may constitute a hazard to human life and property must be periodically reviewed by the NSW Dams Safety Committee. These dams are known as prescribed dams and are listed in Schedule 1 of the Act. Camberwell Tails 2 (TD2) at the Integra Open Cut and the Possum Skin Dam at the Integra Underground both of which lie within the Project Area but are located in excess of 3km from the proposed mining activities, are listed prescribed dams under the *Dams Safety Act 1978.*

3.2.3 State Environmental Planning Policies

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

This SEPP was gazetted in February 2007 and repeals SEPP 37- Continued Mines and Extractive Industries and SEPP 45- Permissibility of Mining. The SEPP also removed mining developments from Schedule 1 of SEPP 11- Traffic Generating Development, meaning that SEPP 11 no longer applies to mining projects.

The SEPP complements reforms made in August 2005 to improve the relationship between the *Mining Act 1992* and the EP&A Act in the assessment and approval of mines. These amendments revoked the provisions that allowed mines to expand without the need for a transparent assessment of their impacts or consent under the EP&A Act once a mining lease has been granted. The Project will be assessed under Part 3A of the EP&A Act.

State Environmental Planning Policy No. 33

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development provides definitions for 'hazardous industry', 'hazardous storage establishments', 'offensive industry' and 'offensive storage establishment'. The approval authority must consider the specifics of the proposal, and the location and intensity of the proposed activity to determine whether the proposed development may be classified as 'potentially hazardous' or 'potentially offensive' as defined in the Policy.

A licence is already held under WorkCover Authority NSW for the keeping of Dangerous Goods at the Coal Handling and Preparation Plant area.

State Environmental Planning Policy No. 44

State Environmental Planning Policy No. 44 – Koala Habitat Protection. Singleton Shire Council is listed under Schedule 1 of this SEPP. This requires that an investigation be carried out to determine if "core" or "potential" Koala habitat is present within the Project Area and is likely to be disturbed. A Koala habitat assessment will be completed as part of the ecological studies for the proposed Extension. No disturbance is proposed outside the Open Cut Extension Area.

Section 3 Planning Considerations

3.2.4 Regional Environmental Plans

The *Hunter Regional Environmental Plan 1989* (HREP 1989) provides a regional environmental planning framework for the Hunter Region's development. Part 6, Division 1 of the HREP 1989 addresses mineral resources and extractive materials. Clause 41 of the HREP 1989 identifies matters that should be considered by consent authorities when considering proposals for mining or extraction.

A large proportion of the wealth generated in the Hunter Region is a consequence of the coal mining industry. As a result, one of the main aims of the Hunter REP is to encourage the responsible development of the mining industry through the careful assessment of land with underlying coal resources.

3.2.5 Local Environmental Plan

The Project Area is zoned 1(a) Rural under the *Singleton Local Environmental Plan 1996* (LEP 1996) The objectives for this zone include:

a) to protect and conserve agricultural land to encourage continuing viable and sustainable agricultural land use,

b) to promote the protection and preservation of natural ecological systems and processes,

c) to allow mining where environmental impacts do not exceed acceptable limits and the land is satisfactorily rehabilitated after mining,

d) to maintain the scenic amenity and landscape quality of the area,

e) to provide for the proper and co-ordinated use of rivers and water catchment areas,

f) to promote provision of roads that are compatible with the nature and intensity of development and the character of the area.

Part 3 of the plan identifies that 'coal mining' on land zoned 1 (a) is permissible land use with development consent (or project approval) under the *Environmental Planning and Assessment Act 1979.*

Section 4 Summary of Key Environmental Issues

This section provides a preliminary assessment of the key environmental issues associated with the Integra Open Cut Project and matters for further consideration, with emphasis placed on the components/component areas likely to be impacted by the proposed Extension and on those features that would contribute to, or influence, the range of environmental issues to be assessed during the EA process, and/or known or potential constraints. Key environmental issues have been identified through a review of previous studies carried out on the surrounding mine sites, and preliminary desk-based and field investigations within the Extension Area. In addition, a Preliminary Project Risk Assessment and Workshop was held in July 2007 which provided the basis for identifying key issues prior to the commencement of the mine planning and preliminary environmental assessment phase of the Project.

4.1 Land Use and Ownership

The area of the proposed mining activity is bounded to the south, east and north by coal mining and related activities associated with the Rix's Creek Open Cut, the Integra Open Cut and the Integra Underground mining operations respectively. The Ashton Open Cut Mine is located approximately 3.5 km north-west of the Project Area.

Surrounding areas are primarily used as grazing land. There is limited rural-residential development to the south-west adjacent to the New England Highway, and Camberwell village is located approximately 2.5km to the north-west of the Project Area.

The majority of the land within the Project Area is owned by Integra Project through RHA Pastoral Company Ltd or the Glennies Creek Joint Venture participants. The exceptions to this are the Dulwich property (approximately 10 ha) and approximately 60 ha in the southern part of the Project Area, owned by private landholders R Hall and I Tisdell respectively. The planned area of disturbance with the Extension Area is primarily grazing land and does not include Class 1 or 2 agricultural land. Consequently, the Project will not significantly reduce the agricultural potential of the land either in the short or long term.

A 1km section of the Middle Falbrook road reserve traverses the Open Cut Area, providing access to Dulwich and Company owned land with a further 2km of Crown road reseve (awaiting closure) extending through the South Pit. Dulwich is the closest non-project residence and lies within the Mine Area pit shell. The nearest non-project-related residences external to the proposed mining activities are located approximately 500m from the western boundary.

4.2 Soils, Geology and Topography

The Project Area is underlain by Quaternary Alluvium and Singleton Coal Measures, as indicated on the Singleton 1:250 000 geological sheet (Geological Society of New South Wales, 1969). Three main soil groups are indicative of the area, namely alluvial soils (Hunter Soil Landscape) and yellow podzollic solids (Roxburgh Soil Landscape) and soloths / solodics (Sedgefield Soil Landscape).

Regionally, the site lies within an area of undulating topography that has been extensively cleared for grazing. The topography to the east, south and west of the site has been substantially modified by former and current coal mining activities.

The nature of existing soils within the Open Cut Area have already been determined through desk-based studies and field investigations. Alluvium associated with Glennies Creek and Station Creek have been identified and mapped (**Figure 4.1**) by GeoTerra Pty Ltd.

The nature of the existing soils and geology will be presented as part of the environmental assessment as will their suitability for stripping and recommendation with respect to their use in rehabilitation activities. This will be achieved through the study of previous land resource surveys; an assessment of the topography and geology; mapping of the soil types; describing the physical and chemical characteristics of the soil types and the identification of any potentially adverse soil materials. Any potentially contaminated soils or areas of high erosion potential identified will have associated management and mitigation measures recommended for their control.

Section 4 Summary of Key Environmental Issues

4.3 Surface Water and Groundwater

4.3.1 Surface Water

The Open Cut Area lies within the catchment of the ephemeral Station Creek which drains into the regulated Glennies Creek (**Figure 2.1**). Flows within Station Creek have been substantially modified as a consequence of the development of the Integra Open Cut, with flows into the Open Cut Area from areas within and upstream of the Integra Open Cut controlled by Dam C4.

The water quality within Station Creek routinely exhibits TDS levels of 200-900S/cm; electrical conductivities of 300-1400µs/cm; a near neutral pH and suspended solids levels ranging from 20 to 150mg/L. The variability in TDS and EC values is a function of climatic conditions such as rainfall and evaporation. All monitoring results to date have been shown to be similar to those prior to mining, suggesting marginal influences from mining activities.

The proximity of Station Creek to the proposed Mine Area and the potential for open cut mining activities to adversely affect the quality of water in both Station and Glennies Creeks is recognised as a key issue and will necessitate careful planning in terms of operational sequencing, stockpile positioning etc. and the design of a water management system which is integrated with the existing Integra Open Cut / Underground system and prevents discharges to the local creek system. Neither the Integra Underground nor the Integra Open Cut currently holds a licence to discharge waters off-site.

Within the Environmental Assessment Report, field, laboratory and desk based studies will be used to describe the existing hydrological and hydrogeological environment of the Project Area and investigations will be undertaken to determine and mitigate potential surface water impacts arising from the Extension during its development, operation and eventual closure.

Surface water investigations are being undertaken by hydrogeological consultants Geoterra Pty Ltd.

4.3.2 Groundwater

Groundwater investigations in the local area have identified two principal aquifer systems, namely:

- Quaternary-aged unconsolidated alluvium associated with Glennies Creek and minor drainage paths; and
- basement coal measures comprising variable aquitards and low yielding aquifers (coal seams).

Neither of these aquifer systems is listed as vulnerable under the current Aquifer Risk Assessment Report. However, they are covered by the State Groundwater Policy, Groundwater Protection Policy and Groundwater Dependent Ecosystem Policy.

Alluvium associated with Glennies Creek and Station Creek has been identified and mapped (**Section 4.2**) with the proposed Mine Area pit shell set back 150m from the edge of identified alluvium in accordance with the Department of Natural Resources' recommendations.

A primary issue for investigation is the effect that the proposed activities may have on the integrated stream flow, alluvial aquifer and groundwater systems associated with Glennies and Station Creeks. Potential impacts on the groundwater system, groundwater dependant ecosystems and groundwater users will be assessed through computer based FEFLOW modelling. Measures to manage impact to the groundwater systems will be identified and presented within the Environmental Assessment Report.

Geoterra Pty Ltd have been commissioned to undertake the required groundwater investigations.

4.4 Air Quality

Ten air monitoring locations exist in the area surrounding the Project Area including deposited dust gauges and high volume air samplers to monitor Total Suspended Particulates (TSP) and PM_{10} concentrations. Historical monitoring undertaken for the Integra Open Cut and Underground operations

Section 4 Summary of Key Environmental Issues

shows that with the exception of Dulwich, average annual dust deposition levels within the vicinity of those operations only marginally exceed those of typical rural areas in NSW and meet the NSW DECC assessment criteria. TSP levels have also been shown to satisfy the criteria except at Dulwich while the PM_{10} results also routinely show compliance. However, Dulwich lies within the zone of affectation previously identified in the EIS for the Camberwell Coal Mine.

Notwithstanding the above, from a regional perspective, air quality is recognised as a significant issue, with many areas exhibiting TSP and PM_{10} concentrations which already approach or exceed the DECC assessment criteria due to the cumulative impacts of multiple operations and local climatic conditions.

The main project components for consideration in the air quality assessment of the proposed Project include:

- mining within the proposed Open Cut Area extending westwards from the existing Integra Open Cut pit;
- overburden emplacement activities and dumps within the South Pit and Mine Area;
- continued use of Camberwell Coal Handling and Preparation Plant (CHPP), stockpiles and rail-loop; and
- associated haul roads.

It should be noted, however, that the Extension represents a lateral progression of an existing operation (using equipment and facilities currently in use) and not additional sources of air pollution.

Holmes Air Services Pty Ltd have been commissioned to undertake the required air quality investigations, which will follow the NSW DECC's "Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW" (DEC, 2005). The existing air quality of the Project Area will be assessed which will allow for project specific assessment criteria to be determined taking into account existing air quality conditions. Dust sensitive receptors will be identified, an assessment of the Project on neighbouring residences will be undertaken and recommendations relating to dust management developed. The cumulative impacts associated with neighbouring mines and other sources of dust will also be quantified.

Air quality is recognised as an issue that will require attention on a day-to-day basis through management of operational sequencing and activities, particularly during periods of concurrent south-easterly to north-easterly winds, overburden emplacement in elevated areas and blasting.

A greenhouse gas emissions inventory and assessment for the Extension will also be undertaken and the cumulative emissions from the Project identified.

4.5 Noise and Vibration

The local noise climate surrounding the Project Area is dominated by existing coal mining and related activities, with other noise sources including traffic on the New England Highway and local roads, train movements, birds and animals and wind in the trees.

A baseline noise assessment has been undertaken to determine background levels, with twelve noise loggers having been placed at a selection of residences surrounding the Project Area. Preliminary results indicate ambient levels ranging between 30dBA and 40dBA during the daytime period; 33dBA to 44dBA during the evening and 30dBA and 37dBA at night. Meteorological data has also been sourced from the Camberwell meteorological station. Although the interrogation of this data has yet to be completed, prior analyses undertaken for the Glennies Creek Open Cut (now referred to as the Integra North Open Cut) proposal indicates that winds are not a feature of the area (as defined in the INP). However, temperature inversions are a feature of the area and will require consideration during any night-time noise impact assessment.

Given the proximity of residences to the planned mining activities within the Open Cut Extension Area and the planned progression of the mine towards these residences, the absence of significant topographic shielding (from other than Camberwell village) and the extent of mining activity undertaken

locally, noise impacts from the Extension and from a cumulative perspective are recognised as constraints which may necessitate refinements to mine operational sequencing, equipment, and property acquisitions or negotiated agreements with potentially-affected parties.

The proximity of some residences will also represent a constraint on blasting operations in relation to airblast overpressure and ground vibration levels. Similarly, the proximity of the New England Highway and the potential necessity to close of the Highway for safety reasons if blasting was to be undertaken within 500m has been recognized as a constraint and reflected in the establishment of the Mine Area limits.

The noise assessment will take into consideration the above and be undertaken in accordance with the requirements of the Department of Planning Environmental Assessment Requirements (EARs) together with the NSW *Industrial Noise Policy (INP) 2000* (and associated application notes), the *NSW Environmental Criteria for Road Traffic Noise (ECRTN) 1999*, the *DEC Environmental Noise Control Manual (ENCM) 1994,* the *DEC Assessing Vibration - a Technical Guideline* 2006, and *AS 2187 Part 2 (2000) Explosives - Storage and Use - Use of Explosives.*

Heggies Pty Ltd have been commissioned to undertake both the Noise and Blasting Impact Assessment.

4.6 Ecology

The Open Cut Area and the lands to the west largely comprise grazing land interspersed with small areas of remnant or planted woodland.

Targeted flora and fauna surveys were carried out in May 2007 and November 2007 by URS Australia Pty Ltd. Methods employed were in accordance with DEC (2004) Guidelines and comprised:

- habitat identification and assessment;
- diurnal bird counts;
- harp trap and Anabat detectors for micro-bats;
- spot-lighting and stag watching;
- opportunistic observations of fauna species and searches for signs of fauna activity (e.g. tracks, scratches in bark and scats); and
- aquatic survey.

No TSC Act- or EPBC Act-listed flora species were recorded during the study, nor were suitable habitats for these species recorded. However, one herbaceous species, *Goodenia cycloptera*, a species that is not listed as threatened under any legislation, is a new record for the North Coast bioregion, extending the eastern range for this species.

Five threatened fauna species, listed as Vulnerable under the TSC Act were recorded during field surveys within the Extension Area boundary (**Figure 2.1**).

- Squirrel Glider *Petaurus norfolcensis*.
- Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis temporalis*.
- Eastern Bent-wing Bat *Miniopterus schreibersii oceanensis*.
- Eastern Freetail-bat *Mormopterus norfolkensis*.
- Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*.

A family group of seven Grey-crowned Babblers were observed foraging in vegetation screening along the eastern boundary of the proposed Open Cut Area. This community provides important habitat for the species in its dense small tree stratum. The species was also recorded by call in the southern portion of

the Extension Area which may suggest the species also occupies the Ironbark Woodland on the site, most likely in the portion to the south of the proposed Open Cut Area where there is a denser small tree stratum than in the more heavily modified Ironbark Woodland in the northern portion of the site.

Squirrel Gliders were observed during spotlight surveys in Ironbark Woodland to the south of the Open Cut Area. Three individuals were recorded which may suggest a family group is resident in this portion of the site. It is likely that the local population of the species is restricted to this area. Ironbark Woodland located in the eastern boundary of the Open Cut Area has been severely modified and other treed communities occuring are unlikely to support the species because patches are too fragmented and lack hollow-bearing trees and nectar-bearing understorey species.

Recordings were made of Eastern Bent-wing Bat, Eastern Freetail-bat and Yellow-bellied Sheathtail-bat using an ultrasonic call recording device (Anabat). However the recordings made were only identified to a certainty level of 'possible'. It is assumed for purposes of conservation that these species are utilising the site.

There are two main watercourses within the area investigated, Glennies Creek and Station Creek, which contain aquatic and riparian habitats (albeit degraded). These are utilised by a narrow selection of frog, fish and bird species, depending on the availability of water.

Impacts on flora and fauna associated with the proposed Extension are likely to be limited to removal of mature hollow-bearing trees within the Pit Area (**Figure 2.1)** and consequent loss of resources for hollow-dwelling birds and bats, and the loss of approximately 90 ha of grassland dominated by exotic pasture species which may be used for foraging primarily by bird species.

4.7 Heritage

Aboriginal Cultural Heritage

An Aboriginal cultural heritage assessment covering the proposed areas of disturbance and adjacent areas (i.e. the area lying to the west of the existing South Mine and within the Proposed Extension Area Boundary shown in **Figure 2.1**) was conducted by Navin Officer Heritage Consultants in September - November 2007 and included a literature and database review, and Aboriginal consultation and participation in field surveys. The field survey and consultation was undertaken in accordance with the DEC document "Interim Consultation Requirements for Applicants" (2005).

Extensive archaeological investigations have been conducted over the past 30 years within the Hunter Valley region and within the general vicinity of the Integra Open Cut. A previous survey conducted within the Open Cut Area identified twenty-six Aboriginal sites comprising nine artefact scatters and seventeen isolated finds.

Within the area studied, forty-seven Aboriginal archaeological sites were recorded in the course of the 2007 field survey. This total includes six previously recorded sites that have been condensed into two new site recordings.

Taking account of the previously recorded sites and the amalgamation of six previously recorded sites into two artefact scatters, there is now a total of sixty seven (67) Aboriginal sites recorded within the study area (ie twenty previously recorded sites and forty seven sites recorded in 2007). Sites comprise forty (42) artefact scatters, twenty two (22) isolated finds and three (3) possible scarred trees. Forty three sites have been identified as having moderate or high potential to be associated with subsurface deposits. Five hundred and four artefacts were noted, of which 323 were recorded.

The valley floor land unit within the Open Cut Extension Area contained the largest number of sites (27), followed by mid valley slopes (16), upper valley slopes (13), and basal valley slopes (11). Some sites were found in close proximity to each other and it is likely that these "sites" are exposures of the same occurrence across a landform. It should be noted that these results cover an area larger than that to be disturbed as part of the proposed project.

Section 4 Summary of Key Environmental Issues

Field survey results indicate that varying densities of Aboriginal objects are present throughout the area studied and that the sites recorded in this study represent typical Hunter Valley artefact sites with no uncommon qualities. Much of the proposed impact area has been assessed as having moderate to high archaeological potential.

An Aboriginal Cultural Heritage Management Plan will be prepared that will define the requirements and provide guidance in relation to cultural heritage management for the life of the Project. Wherever possible, the impact of the Extension on the Aboriginal cultural resource will be mitigated through salvage of material and data collection prior to destruction.

European Heritage

Nexus Archaeology and Heritage Consultants have been engaged to undertake an assessment of historical archaeology. A review of National, State and Local heritage lists has been undertaken and identified the 'Dulwich' Homestead as an item of local heritage significance within the Singleton LEP and the State Heritage Inventory listing. The grave of James Halliday Glennie, son of James Glennie, one of the first free settlers in the Hunter valley and the recipient of the original land grant over the Dulwich estate, lies on company owned land adjacent to the current Dulwich property boundary and is listed on the NSW Heritage Trust.

Study of the historical context of the Open Cut Extension Area has been undertaken based on:

- primary resource material, such as letters of the Colonial Secretary, part of the Ian Webb Collection, held by the Singleton Historical Society;
- Wood, A, 1972. Dawn in the Valley, The Story of Settlement in the Hunter River Valley to 1833, Wentworth Books, Sydney;
- Noble, L, no date, The Glennies Creek Story, self pub., Singleton;
- Foggo, C, 1989, Inn and Hotels1825-1900 – Some Hunter Valley Innkeepers, self pub; and
- County Durham, Parish Auckland Map, Edition 3, 1905.

Research to date has identified that the present day Dulwich Homestead is the second phase of development on the estate. Signs of development related to the Glennie era are considered to be entirely archaeological.

An inspection has been made of the present Dulwich property homestead, grounds and outbuildings. The property owners have undertaken renovation in order to make the house habitable by modern standards but have continued to restore the house to its original plan using original materials where possible. While suffering from deterioration, and awaiting restoration, the form and function of the outbuildings can still be seen.

A detailed assessment of significance will be carried out as part of the environmental assessment and will be based around further review of existing archaeological and heritage studies and reports, the archaeological and historical contexts of the Open Cut Extension Area and further investigation of the present day physical context. Recommendations will be made with regard to appropriate management of the heritage values.

4.8 Visual

The existing visual amenity of the area reflects both rural and coal mining activities, with extensive views of the existing Integra Open Cut, adjacent Rixs Creek Open Cut and other nearby open cut coal mining activities available from the New England Highway (approximately 3km to the west) and from both local and more distant rural and rural-residential vantage points.

An assessment of visual impact of the Extension will be presented in the Environmental Assessment Report which will take into account the existing landscape and visual characteristics of the location and

present an assessment of the potential impacts of the proposal on the landscape and visual amenity of the area. Visual catchments will be determined using aerial photography.

The extension of mining operations and, particularly, the extension of the mine's life by some 9 years, is recognised as a key issue which could be managed only through a programme of sympathetic final landform development and progressive rehabilitation both within the Open Cut Area and of other areas of disturbance within the proposed Project Area.

4.9 Socio-Economic

The Extension would have positive impacts on the existing social and economic environment of the local area, with the continued operation of the Integra Open Cut generating ongoing expenditure and employment opportunities for local communities. The Extension would also involve continued expenditure of a significant proportion of the estimated total project cost on local goods and services which, in turn, would continue to generate associated employment.

The assessment will include a social impact analysis of the potential effect of the proposed Extension on local and regional employment, infrastructure and demography. An economic impact assessment will be undertaken which will identify the economic attributes and benefits to the surrounding communities and region.

4.10 Stakeholder Consultation

Integra regularly communicates with key stakeholders through a variety of means including face to face meetings, newsletters, and community forums. As part of the overall Project development, community and Government Agency stakeholders will be consulted to ensure that potential issues and concerns are identified and addressed. The stakeholder consultation and communications process for the Project will ensure that all key project stakeholders have an opportunity to participate in project development.

Current and proposed consultation activities include:

- community forums to be held at Glennies Creek or Singleton Shire Council chambers;
- newsletters containing regular updates on the Project and approval status;
- Project-specific newsletters informing stakeholders of key events or milestones in the Project; and
- individual meetings with residents likely to be affected by the Project to address specific issues.

Section 5 Conclusions

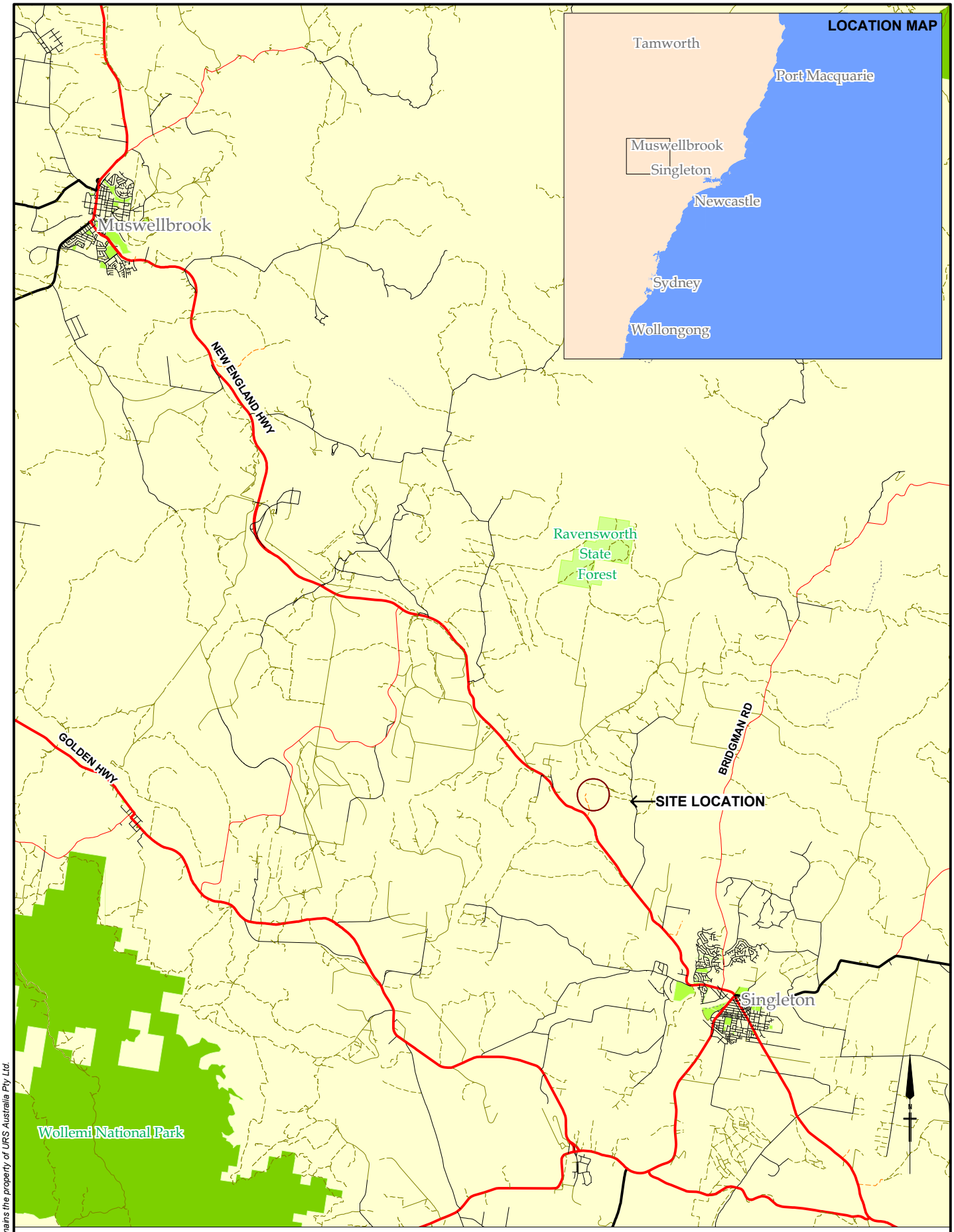
Integra Coal Operations Pty Limited is proposing to undertake an extension to the Integra Coal Open Cut mine which is located approximately 10km north-west of Singleton, NSW. The proposed activities will be undertaken within an area of approximately 284 ha, which includes a 161 ha area which is to be subject to coal extraction. Projected coal production will range from approximately 2.3 to 4.2 Mtpa. In addition to this Extension, Integra seeks to consolidate DA 86/2889 and PA 06_0073 into a single Project Approval, with the combination of all aspects referred to as the Integra Open Cut Project.

The Extension represents a continuation of activities currently underway at the adjoining South Pit and is consistent with Integra's objective of resource maximization. Continuity of operation from the existing Open Cut is also of paramount importance to maintain human and capital resources at the site.

The proposed Integra Open Cut Project is considered to be a major project as defined by *State Environmental Planning Policy (Major Projects) 2005* and, therefore, requires approval from the Minister for Planning under Part 3A of the EP&A Act.

This document acts as a formal request for the DoP to issue environmental assessment requirements for the proposal. The preliminary environmental assessment of the proposal, as presented in this document, indicates that the key issues associated with the proposal comprise potential impacts on noise, air quality, groundwater and heritage. These issues would be assessed in detail as part of the environmental assessment of the proposal. The other environmental issues will be assessed but are not considered likely to have the same level of significance.

Upon receipt of the DoP's environmental assessment requirements, Integra will prepare an environmental assessment and submit the assessment to the DoP in support of this Project Application.



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Datum: GDA94, Projection: UTM, Grid: MGA Zone 55

Client	Project	Title
INTEGRA COAL OPERATIONS PTY LTD	INTEGRA OPEN CUT PROJECT PRELIMINARY ENVIRONMENTAL ASSESSMENT	**SITE LOCATION**
URS	Drawn: AJW | Approved: WB | Date: 30/05/2008 Job No: **43177507** | File No: 43177507.017.wor	Figure: **1-1**

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Legend:

- Project Area Boundary
- Additional Area
- DA 86/2889 Area
- Existing Access Road
- Glennies Creek Open Cut Project Site Boundary
- Extension Area Boundary

Note: Project Area Boundary Offset for Clarity

N

0 250 500
metres

Source: Integra Coal

Drawn: BH	Approved: DRAFT	Date: 30/05/2008
Job No: **43177507**	File: 43177507-021.wor	

Client

INTEGRA COAL OPERATIONS PTY LTD

Project

INTEGRA OPEN CUT PROJECT
PRELIMINARY ENVIRONMENTAL ASSESSMENT

Title

PROJECT AREA AND COMPONENTS

Figure: **1-2**

URS

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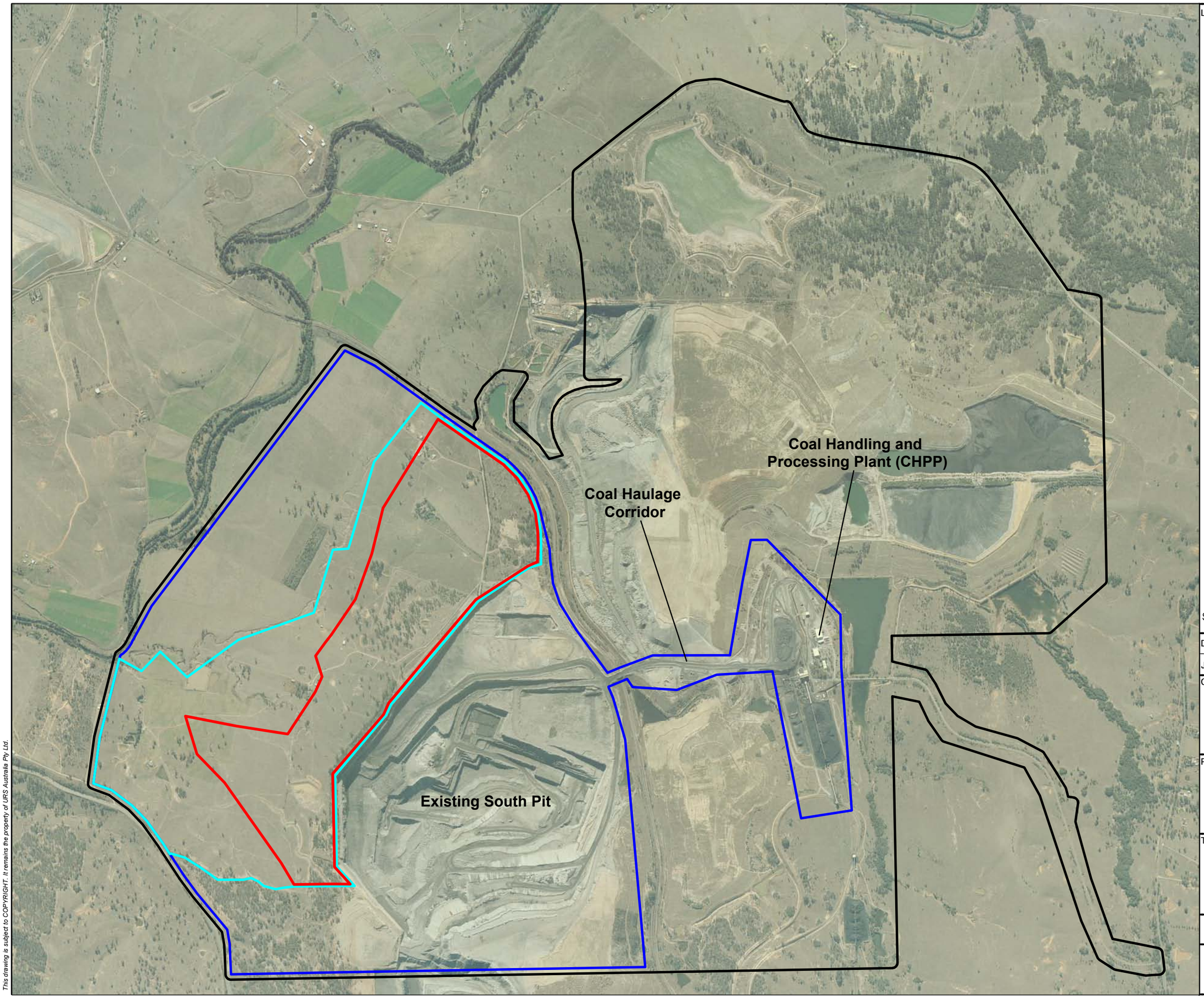

Legend:

- Project Area Boundary
- Proposed Extension Area Boundary
- Mine Area
- Open Cut Area

Note: Project Area and Mine Area offset for clarity

N

0 250 500
metres

Source: Integra Coal

Drawn: BH	Approved: DRAFT	Date: 30/05/2008
Job No: **43177507**	File: 43177507-035.wor	

Client

INTEGRA COAL OPERATIONS PTY LTD

Project

INTEGRA OPEN CUT PROJECT
ENVIRONMENTAL ASSESSMENT

Title

OPEN CUT EXTENSION AREA

Figure: **2-1**

URS

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Legend:

- Proposed Extension Area Boundary
- Mine Area
- Alluvium Associated with Glennies Creek and Station Creek

N

0 250 500
metres

Source:

Drawn: BH	Approved: DRAFT	Date: 30/05/2008
Job No: **43177507**	File: 43177507-023.wor	

Client

INTEGRA COAL OPERATIONS PTY LTD

Project

INTEGRA OPEN CUT PROJECT
PRELIMINARY ENVIRONMENTAL ASSESSMENT

Title

ALLUVIUM ASSOCIATED WITH GLENNIES CREEK AND STATION CREEK

Figure: **4-1**

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