

Integra Underground Coal Project

Preliminary Environmental Assessment

Integra Coal Operations Pty Ltd

June 2008

0061887 FINAL

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|--------------|--|
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| Date: | <u>3 June 2008</u> |

Environmental Resources Management Australia Pty Ltd Quality System

Integra Underground Coal Project

Preliminary Environmental Assessment

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This report has been prepared in accordance with the scope of services described in the contract or agreement between Environmental Resources Management Australia Pty Ltd ABN 12 002 773 248 (ERM) and the Client. The report relies upon data, surveys, measurements and results taken at or under the particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client and ERM accepts no responsibility for its use by other parties.

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1 INTRODUCTION

1.1 PURPOSE

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by Integra Coal Operations Pty Ltd (ICO) to prepare a Project Application under Part 3A of the *Environmental Planning and Assessment Act, 1979* (EP&A Act) for the Integra Underground Coal Project. The application seeks approval for:

1. the progressive longwall extraction of coal from the Hebden and Barrett seams;
2. cut and flit mining within areas of the Hebden, Barrett and Middle Liddell seams which are not amenable to mining by longwall methods;
3. the ongoing use of the existing surface facilities at the Underground;
4. the long-term use of the existing surface facilities at the Integra Open Cut (Camberwell Coal Handling and Preparation Plant (CHPP) and train loader and associated facilities); and
5. the replacement of current consents/approvals pertaining to the Integra Underground with a single Project Approval.

The Project Area, which is described more fully in *Section 1.4*, principally lies within the boundaries of Integra's existing mining tenements CL 382, CL 357, and MLs 1437, 1518 and 1551.

This preliminary assessment report has been prepared to:

- provide a background and description of the Project with particular emphasis on items 1, 2 and 4 above; outline the legislative framework under which the proposal will be assessed; provide an overview of the proposed stakeholder engagement process; and identify and provide a preliminary assessment of key environmental issues; and
- assist in the provision of the Director-General's Environmental Assessment Requirements in accordance with the requirements of Section 75F of the EP&A Act.

1.2 BACKGROUND

The Integra Coal project was formed in August 2006 through the integration of the former Glennies Creek and Camberwell joint ventures. ICO is one management company responsible for the operation of the former Glennies Creek Colliery and Camberwell Coal Mine, now referred to as the Integra Underground and Integra Open Cut respectively.

The participants of the Integra Joint Venture include Vale Australia Pty Ltd, an Australian subsidiary of CVRD, a Brazilian company which ranks as the second largest mining company in the world; Toyota Tsusho, a trading arm of the Toyota group (28%); NS Glennies Creek Pty Ltd, a subsidiary of Nippon Steel (3.6%), POS-GC Pty Ltd, a subsidiary of POSCO (3.6%), JS Glennies Creek and JFE Steel Pty Ltd, both subsidiaries of Japan Steel (3.6%) . Vale, NS Glennies Creek, POS-GC, JS Glennies Creek and JFE Steel compose the Glennies Creek Joint Venture participants.

Notwithstanding the formation of the Integra Joint Venture, the ownership of the underlying mining tenements and assets in the Glennies Creek Colliery and Camberwell Open Cut remain under the ownership of individual Joint Ventures.

The Integra Underground mine currently operates under development consent DA 105/90 (as modified) and PA 06_0057, with a further major project application (MP 06_0213) under consideration by the Department of Planning. These approvals /application do/will permit coal extraction from the Middle Liddell, Hebden and Barrett seams within the boundary of CL382, and the use of the CHPP and rail despatch facilities at the adjoining Integra Open Cut and surface facilities at the Underground. It is noted, however, that the existing approval for the CHPP, train loader and associated facilities in the DA86/2889 area expires in March 2011.

To date, underground mining within the Project Area has been confined to the Middle Liddell seam and has involved:

- the development of the North-West Mains;
- the progressive development of the gateroads which delineate individual longwall panels;
- the completion of Longwall 1 to Longwall 7 extraction; and
- partial extraction of Longwall 8.

Each of these operations has followed receipt of s138 approvals under the *Coal Mine Regulations Act, 1982*. ICO obtained Subsidence Management Plan (SMP) and s138 approvals for extraction of Longwalls 7 to 9 within the Middle Liddell seam in March and April 2006 respectively. Following completion of mining in Longwall 9, and subject to the approval of MP 06_0213, ICO will undertake coal extraction in Longwalls 10 to 17 within the Middle Liddell seam.

1.3

PROPOSAL OVERVIEW

ICO seeks a single Project Approval from the Minister for Planning for:

- ongoing underground mining within the Middle Liddell seam as approved;
- extraction of an additional 70 million tonnes (Mt) (approximately) of Run of Mine (ROM) coal at a rate of up to 4.5 million tonnes per annum (Mtpa) over a total period of approximately 25 years;
- first workings and secondary extraction within the area defined by Longwall Panels 1 to 15 in the Hebden seam and Longwall Panels 1 to 7 in the Barrett seam;
- cut and flit mining to the south of the existing Middle Liddell seam North-West Mains;
- mains and gateroad development in Hebden and Barrett seams;
- cut and flit mining within both the Hebden and Barrett seams;
- establishment of limited infrastructure in the final void of the North Open Cut mine for access to Barrett Seam (ie supplies storage and maintenance facilities, subject to receipt of planning approval). Development of the North Open Cut comprises a separate Part 3A application currently under review by the DoP;
- continued use of existing surface infrastructure and development of new surface infrastructure including the installation and operation of a number of gas drainage boreholes for pre-mining and post-mining gas drainage;
- the potential construction and operation of a new vent shaft and fan and associated downcast shaft; and
- long-term transportation of ROM coal to the CHPP and use of the CHPP, train loader and related infrastructure and facilities for the processing and dispatching of all coal from the Integra Coal operation. Although no changes to these currently approved activities are proposed, the proposal will address all relevant issues and residual environmental impacts that arise as a consequence of this extended use, eg long term reject management.

1.4

PROJECT AREA

1.4.1

Overview

The Project Area is located in the Hunter Coalfield of the Sydney Basin, approximately 12km north-west of Singleton within the Singleton Local Government Area. The main access to the colliery is from Middle Falbrook

Road, which is accessed from the New England Highway via Bridgman Road and Stony Creek Road (*Figure 1.1*).

The Project Area incorporates:

- all areas of proposed underground mining and direct mining-related surface impact (referred to herein as the Proposed Mining Area) and comprises the Hebden, Barrett and Middle Liddell seam mining areas. Sections of the Hebden seam proposed for longwall mining lie below areas of Middle Liddell seam longwall mining. The seams above the proposed Barrett seam mining area have not been subject to prior longwall mining;
- the Glennies Creek Surface Facilities Project Site identified in PA 05_0057;
- areas of previously approved underground mining and areas pending approval; and
- the Development Application Area identified in DA86/2889.

Additionally, for administrative purposes, the Project Area incorporates the access corridor between the DA 86/2889 boundary and Bridgman Road.

The Proposed Mining Area has been defined to factor in possible mine plan amendments resulting from further planning and economic assessment. Whilst mine plans presented in this assessment are conceptual only and subject to refinement, any future amendments to mine layout will be such that the currently Proposed Mining Area will not be expanded.

Figures 1.2 and 1.3 provide a conceptual layout of the mine plan based on current knowledge and existing operations.

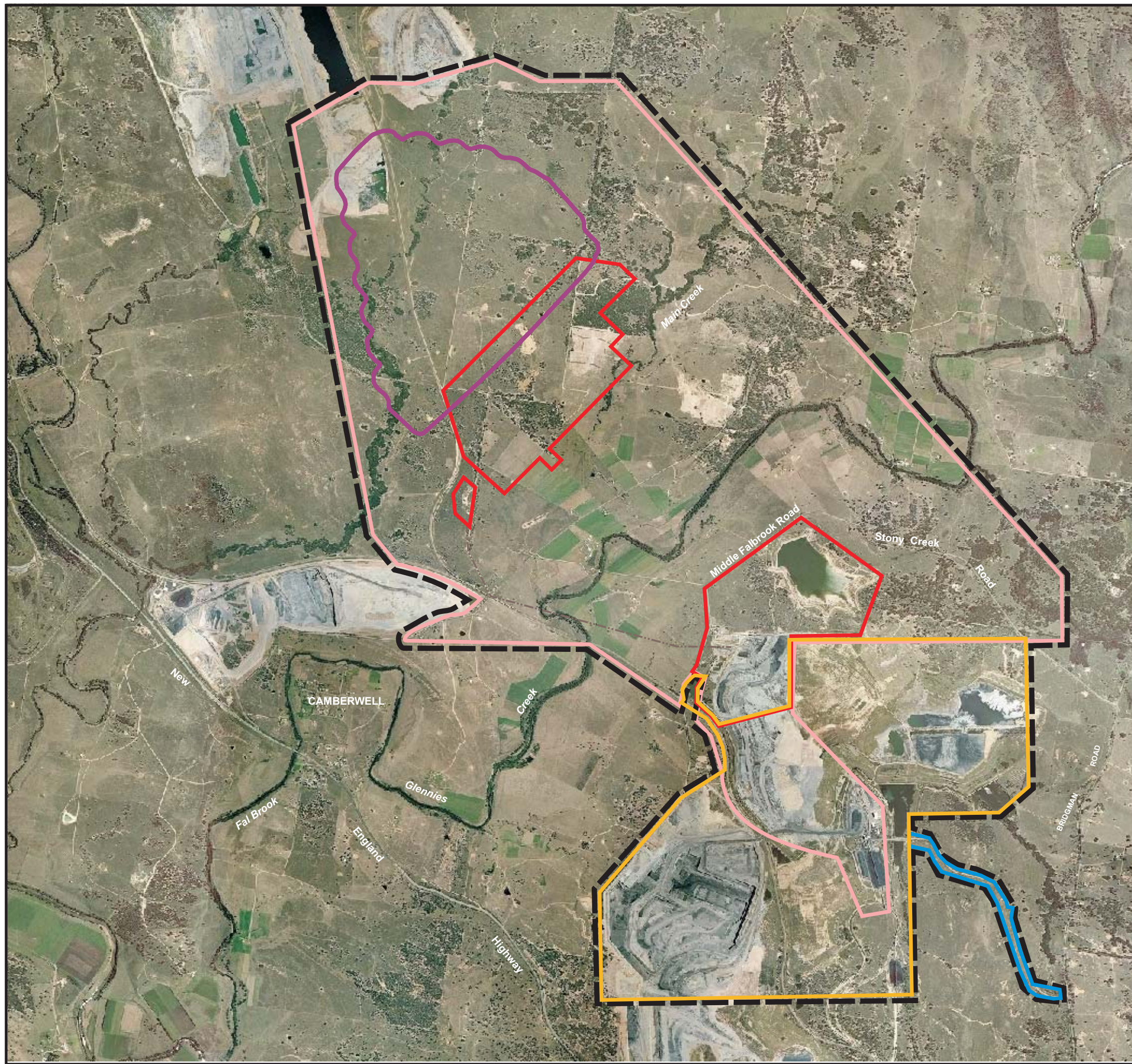
The proposed Mining Area is gently undulating with elevations ranging from 85 m to 130 m Australian Height Datum (AHD). Glennies Creek runs from the south west between the Hebden and Barrett seam mining areas. The ephemeral Bettys Creek and associated alluvial flats and the ephemeral Main Creek are located within the northern, western and central portions of the Hebden seam mining area respectively (*Figure 1.1*). Some minor gullies and small ephemeral drainage lines are also present. Mine planning has ensured that Glennies Creek and its associated alluvium lie outside the subsidence impact zone from proposed mining. Any future mine plan amendments will similarly ensure that neither Glennies Creek nor its associated alluvium will be impacted by mining induced subsidence.

The Proposed Mining Area is traversed by the privately owned Mount Owen Rail Spur that branches from the Main Northern Line north-west of the Glennies Creek Road railway crossing and provides rail access to the adjoining Mount Owen Mine.

1.4.2

Hebden Seam and Middle Liddell Seam Mining Areas

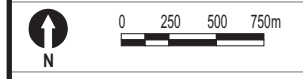
The land above the proposed Hebden seam and Middle Liddell seam mining areas is dominated by grazing pasture, with small areas of crops and open



- Legend**
- Surface Facilities Project Area (06-0057)
 - LW 10 - 17 Project Area (MP 06 - 0213)
 - Camberwell Development Application Area (DA 86/2889)
 - Hebden, Barrett and Middle Liddell Seams Area
 - Access Road
 - Underground Coal Project Area

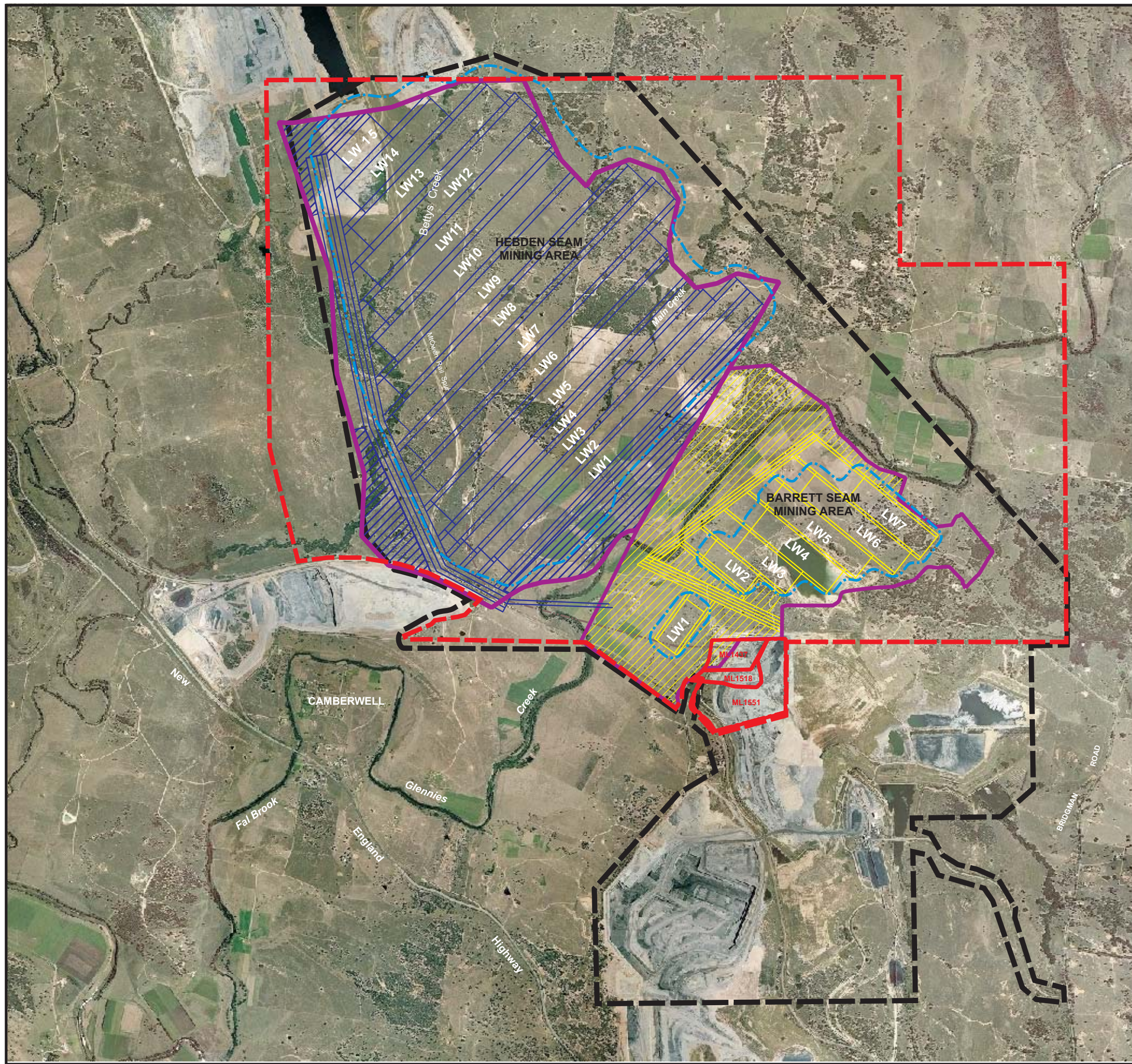
Figure 1.1
Locality Plan and Project Area

| | | |
|-------------|---|------------------|
| Client: | Integra Coal Operations Pty Ltd | |
| Project: | Integra Underground Coal Project Preliminary Assessment | |
| Drawing No: | 0061887hv_PA_01 | |
| Date: | 03/06/08 | Drawing size: A3 |
| Drawn by: | SP | Reviewed by: TP |
| Source: | Integra Coal Operations Pty Ltd | |
| Scale: | Refer to Scale Bar | |



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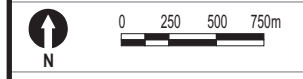


- Legend**
- Underground Coal Project Area
 - Proposed Hebden Seam Mine Workings (Mains and Gateroads)
 - Hebden Seam Cut and Flit Areas (Subsidence <20mm)
 - Proposed Barrett Seam Mine Workings (Mains and Gateroads)
 - Barrett Seam Cut and Flit Areas (Subsidence <20mm)
 - Coal Lease (CL) 382
 - Subsidence Impact Zone
 - Resource Limit

Notes:
Statutory barriers will apply as required.

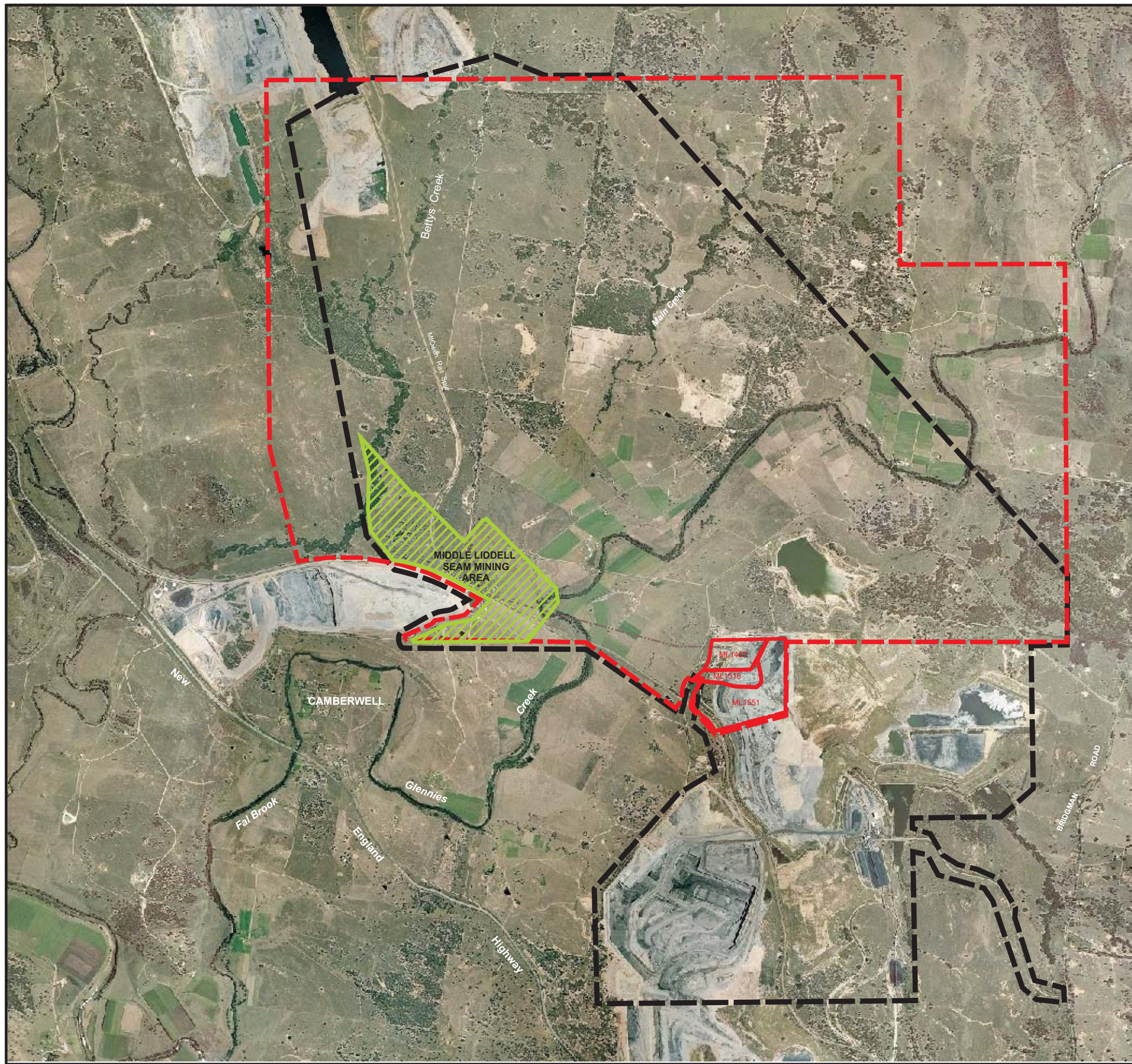
Figure 1.2
Conceptual Mine Layout Hebden and Barrett Seams

| | | |
|-------------|---|------------------|
| Client: | Integra Coal Operations Pty Ltd | |
| Project: | Integra Underground Coal Project Preliminary Assessment | |
| Drawing No: | 0061887hv_PA_02 | |
| Date: | 03/06/08 | Drawing size: A3 |
| Drawn by: | SP | Reviewed by: TP |
| Source: | Integra Coal Operations Pty Ltd | |
| Scale: | Refer to Scale Bar | |



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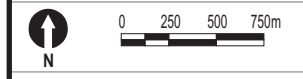


- Legend**
- Underground Coal Project Area
 - Coal Lease (CL) 382
 - Middle Liddell Seam Mining Area (Subsidence <20mm)

Notes:
Statutory barriers will apply as required.

Figure 1.3
Conceptual Mine Layout Middle Liddell Seam

| | | | |
|-------------|---|---------------|----|
| Client: | Integra Coal Operations Pty Ltd | | |
| Project: | Integra Underground Coal Project Preliminary Assessment | | |
| Drawing No: | 0061887hv_PA_03 | | |
| Date: | 03/06/08 | Drawing size: | A3 |
| Drawn by: | SP | Reviewed by: | TP |
| Source: | Integra Coal Operations Pty Ltd | | |
| Scale: | Refer to Scale Bar | | |



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forest. Sections of the surface are also used for mining and mining-related purposes, including open cut mining, overburden placement and coal transport (via road and the Mount Owen Rail Spur). Limited infrastructure associated with mining and agriculture (ie powerlines, pipelines, dams and sheds), and surface features including a small number of residences are located within these components of the Project Area. Preliminary investigations indicate that two mine-owned residences and one privately-owned residence are located within the predicted Hebden seam subsidence footprint (these numbers will be confirmed in the Environmental Assessment). No subsidence will occur above the proposed Middle Liddell seam mining area.

1.4.3 Barrett Seam Area

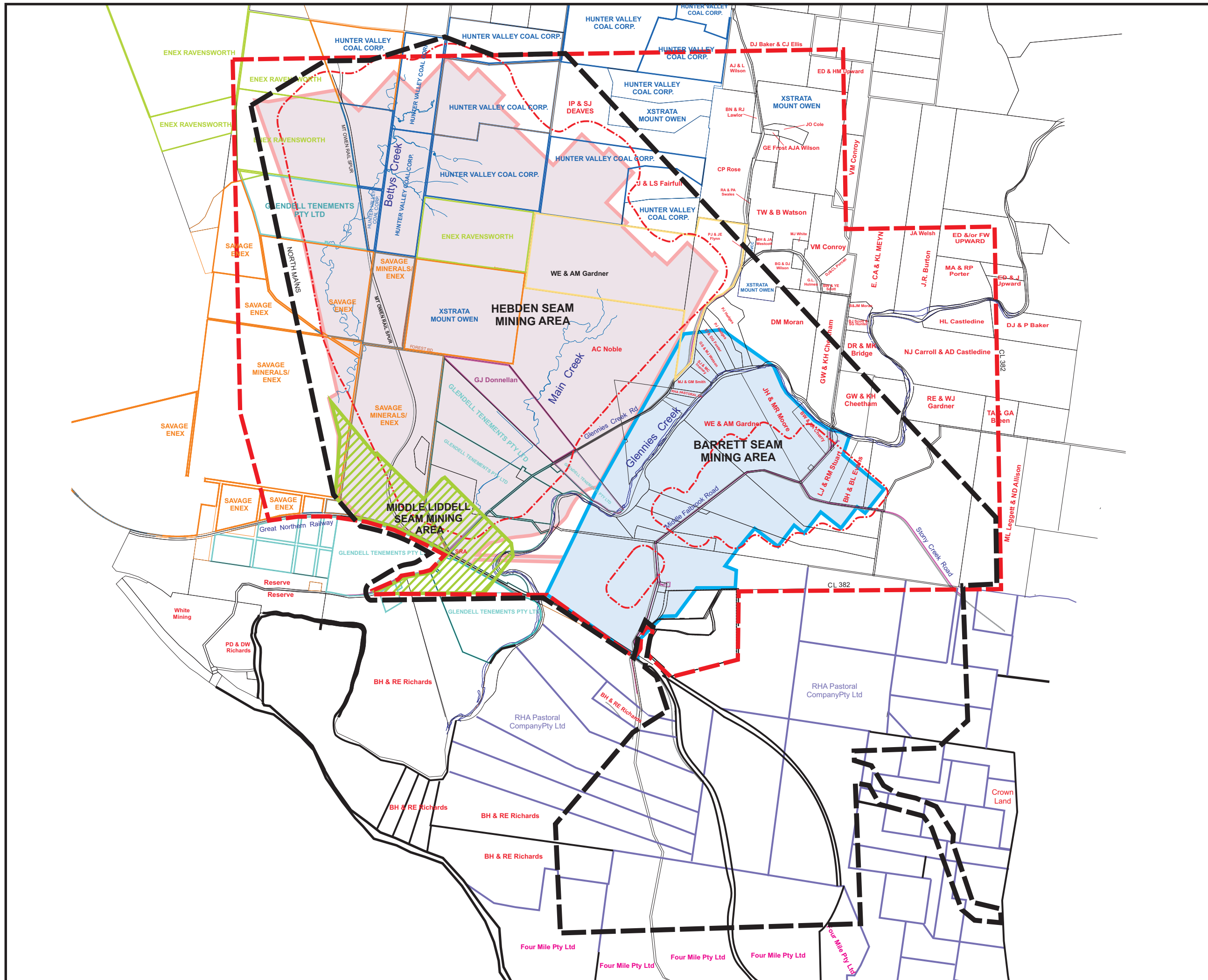
The surface area above the proposed Barrett seam mining area is dominated by cattle grazing and mining-related facilities, such as the Integra underground surface facilities, water management structures, the Envirogen (Oakly) Pty Ltd gas-fired power station and associated infrastructure. Preliminary investigations indicate that there are three privately-owned residences within the predicted Barrett seam subsidence footprint (this number to be confirmed in the Environmental Assessment).

1.5 LAND OWNERSHIP

The majority of surface land overlying the Hebden seam and Middle Liddell seam mining areas is owned by subsidiaries of the mining company Xstrata, including Glendell Tenements Pty Ltd, Savage Minerals Ltd & Enex Foydel Ltd, Enex Ravensworth Pty Ltd and Xstrata Mount Owen (XMO). The remaining land is owned by private landholders. ICO has previously consulted with landholders AC Noble, WE and AM Gardiner and GJ Donnellan as well as Xstrata, in relation to subsidence impacts from mining activities, and acknowledges the need for similar consultation and formulation of agreements with affected landholders in regard to this proposal. A total of four privately-owned and four mine-owned residences lie above the Hebden and Middle Liddell mining areas (this number to be confirmed in the Environmental Assessment).

The majority of land overlying the Barrett seam on the eastern side of Glennies Creek is owned by ICO.

Isolated blocks of land within the Proposed Mining Area are owned by individual landholders. There are two Company-owned residences and five privately owned residences in this area. ICO is currently in negotiations over the purchase of two of these private residences. The land overlying the proposed Barrett seam mining area to the west of Glennies Creek is owned by Xstrata and a number of private owners and includes eight privately owned residences (this number to be confirmed in the Environmental Assessment). A summary of land parcels within the Project Area is provided in *Table 1.1* and ownership status is illustrated in *Figure 1.4*. The operating Mount Owen Mine



- Legend**
- Coal Lease (CL) 382
 - Project Area
 - Subsidence Impact Zone
 - Hebdon Seam Mining Area
 - Barrett Seam Mining Area
 - Middle Liddell Seam Mining Area
- Land Holdings**
- WE & AM Gardner
 - GJ Donnellan
 - Glendell Tenements Pty Ltd
 - Savage Minerals/Enex Foydell
 - Enex Ravensworth Pty Ltd
 - Hunter Valley Coal Corporation
 - RHA Pastoral Company Pty Limited

Notes:
Statutory barriers will apply as required.

Figure 1.4
Land Ownership

| | | |
|-------------|---|------------------|
| Client: | Integra Coal Operations Pty Ltd | |
| Project: | Integra Underground Coal Project Preliminary Assessment | |
| Drawing No: | 0061887hv_PA_03 | |
| Date: | 03/06/08 | Drawing size: A3 |
| Drawn by: | SP | Reviewed by: TP |
| Source: | Integra Coal | |
| Scale: | Refer to Scale Bar | |



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and Ravensworth East mines and the approved Glendell Mine (all owned by Xstrata), lie in the vicinity of, or encroach upon, the Project Area.

Table 1.1 *Project Area Property Ownership Details*

| Lot Number | Deposited Plan Number | Landowner |
|-------------------|------------------------------|---------------------------------------|
| 8 | 6830 | Savage Minerals Ltd & Enex Foydel Ltd |
| 10 | 6830 | Hunter Valley Coal Corporation |
| 11 | 6830 | Enex Ravensworth Pty Ltd |
| 12 | 6830 | AC Noble |
| 13 | 6830 | WE & AM Gardner |
| 17 | 6830 | XMO |
| 21 | 6830 | XMO |
| 791 | 580967 | Glennies Creek ¹ |
| 792 | 586255 | Glennies Creek ¹ |
| 1 | 600327 | JH & MR Moore |
| 2 | 600327 | BW & RA Cherry |
| 3 | 600327 | LJ & RS Stuart |
| 4 | 600327 | BH & BL Evans |
| 1 | 606344 | Glennies Creek ¹ |
| 2 | 606344 | Glennies Creek ¹ |
| 3 | 606344 | Glennies Creek ¹ |
| 4 | 606344 | Glennies Creek ¹ |
| 710 | 624852 | Glennies Creek ¹ |
| 71 | 625171 | Savage Minerals Ltd & Enex Foydel Ltd |
| 1 | 626854 | XMO |
| 100 | 633743 | Glennies Creek ¹ |
| 1 | 655758 | Glendell Tenements Pty Ltd |
| 1 | 701939 | RHA Pastoral Company |
| 2 | 701939 | AC Noble |
| 3 | 701939 | AC Noble |
| PT79 | 752442 | WE & AM Gardner |
| 2 | 752450 | RHA Pastoral Company |
| 10 | 752450 | RHA Pastoral Company |
| 62 | 752499 | GW Cheetham |
| 65 | 752499 | GW Cheetham |
| 66 | 752499 | GW Cheetham |
| 1 | 770733 | AC Noble |
| 2 | 770733 | AC Noble |
| 2 | 780607 | Glendell Tenements Pty Ltd |
| 1 | 781057 | GJ Donellan |
| 1 | 783398 | Glennies Creek ¹ |
| 532 | 788015 | XMO |
| 1 | 799154 | Glennies Creek ¹ |
| 332 | 832646 | CP Rose |
| 12 | 835203 | Glendell Tenements Pty Ltd |
| 921 | 844642 | XMO |
| 922 | 844642 | J & L Fairfull |
| 923 | 844642 | XMO |
| 111 | 850054 | Glendell Tenements Pty Ltd |

| Lot Number | Deposited Plan Number | Landowner |
|--------------------------------|-----------------------|---------------------------------------|
| 112 | 850054 | Glendell Tenements Pty Ltd |
| 1 | 851867 | WE & AM Gardner |
| 2 | 851867 | MJ & GM Smith |
| 3 | 851867 | SJ McInerney |
| 4 | 851867 | GS & MJ Watson |
| 5 | 851867 | ET & DG Foster |
| 6 | 851867 | PJ Hedges |
| 7 | 851867 | PJ Hedges |
| 8 | 851867 | DM Moran |
| 2 | 859544 | Enex Ravensworth Pty Ltd |
| 5 | 859544 | XMO |
| 6 | 859544 | XMO |
| 7 | 859544 | XMO |
| 8 | 859544 | XMO |
| 924 | 862883 | IP & SJ Deaves |
| 925 | 862883 | XMO |
| 1 | 865784 | Glendell Tenements Pty Ltd |
| Pt1 | 940619 | Savage Minerals Ltd & Enex Foydel Ltd |
| 1 | 998045 | Glendell Tenements Pty Ltd |
| 1 | 1009231 | Glendell Tenements Pty Ltd |
| 123 | 1067863 | ML Leggett & ND Allison |
| 1 | 1083482 | RHA Pastoral Company |
| and various roads and reserves | | |
| Camberwell (DA 86/2889) | | |
| G | 37613 | IM Tisdell |
| 1 | 246434 | RHA Pastoral Company |
| 2 | 246434 | RHA Pastoral Company |
| 4 | 246434 | RHA Pastoral Company |
| 5 | 246434 | RHA Pastoral Company |
| 6 | 246434 | RHA Pastoral Company |
| 5 | 264089 | RHA Pastoral Company |
| 1 | 597205 | RHA Pastoral Company |
| 2 | 597205 | RHA Pastoral Company |
| 1 | 628652 | RHA Pastoral Company |
| 2 | 628652 | RHA Pastoral Company |
| 1 | 725247 | RHA Pastoral Company |
| 174 | 729917 | RHA Pastoral Company |
| 22 | 752442 | RHA Pastoral Company |
| 91 | 752442 | RHA Pastoral Company |
| 92 | 752442 | RHA Pastoral Company |
| 2 | 752450 | RHA Pastoral Company |
| 6 | 752450 | RHA Pastoral Company |
| 10 | 752450 | RHA Pastoral Company |
| 120 | 752450 | RHA Pastoral Company |
| 43 | 752455 | RHA Pastoral Company |
| 75 | 752455 | RHA Pastoral Company |
| 77 | 752455 | RHA Pastoral Company |
| 78 | 752455 | RHA Pastoral Company |

| Lot Number | Deposited Plan Number | Landowner |
|-------------------|------------------------------|----------------------|
| 98 | 752455 | RHA Pastoral Company |
| 1 | 802596 | RHA Pastoral Company |
| 2 | 802596 | RHA Pastoral Company |
| 1 | 810309 | RHA Pastoral Company |
| 233 | 829334 | RHA Pastoral Company |
| 235 | 829334 | RHA Pastoral Company |
| 237 | 829334 | RHA Pastoral Company |
| 239 | 829334 | Four Mile Pty Ltd |
| 240 | 829334 | RHA Pastoral Company |
| 12 | 855251 | IM Tisdell |
| 2 | 873260 | RHA Pastoral Company |
| 7 | 1075078 | RHA Pastoral Company |
| 1 | 1083482 | RHA Pastoral Company |
| 2 | 1083482 | RHA Pastoral Company |
| 1 | 1111102 | RHA Pastoral Company |
| 2 | 1111102 | RHA Pastoral Company |
| 3 | 1111102 | RHA Pastoral Company |
| Access Road | | |
| 32 | 752455 | RHA Pastoral Company |
| 45 | 752455 | RHA Pastoral Company |
| 73 | 752455 | RHA Pastoral Company |
| 74 | 752455 | RHA Pastoral Company |
| 75 | 752455 | RHA Pastoral Company |
| 76 | 752455 | RHA Pastoral Company |
| 78 | 752455 | RHA Pastoral Company |
| 86 | 752455 | RHA Pastoral Company |
| 95 | 752455 | RHA Pastoral Company |

1. Glennies Creek Joint Venture participants.

The Mount Owen Mine (owned by Xstrata) has approval for open cut mining across part of the surface area (above the proposed Hebden seam mining area) covered by this proposal. This mining has resulted in significant changes to the existing environment, including the realignment of Bettys Creek.

The Glendell Mine (owned by Xstrata) also has approval for overburden emplacement across part of the surface area above the proposed Hebden seam mining area. Information on the proposed mining operations within the Project Area has been obtained from the Glendell Mine Operations 2007 s75W application and Xstrata. Consultation between Xstrata and ICO will be ongoing.

Given the layout of the Proposed Mining Area and surrounds, timing of mining activities, and depth of extraction ranging from 270 to 570 m, it is anticipated that neither Xstrata's open cut mining operations nor associated overburden placement activities will be directly impacted by this proposal. Similarly, this proposal would not be impacted by the Xstrata's operations. ICO and Xstrata have agreed in writing to co-operate with each other as 'best neighbours' in order to facilitate future mining applications and activities for both parties.

2 PROPOSAL DESCRIPTION

2.1 EXISTING OPERATIONS

To allow for the replacement of existing consents/approvals with a single Project Approval, this proposal seeks approval for the continuation of all approved operational and environmental activities at Integra Underground. Table 2.1 provides a summary of current and pending approvals applying to the Integra Underground operation. No change to the activities summarised will result from the proposal.

Table 2.1 *Summary of Existing and Pending Approvals*

| Approval | Issue date | Consent Authority | Summary |
|-------------------------|-----------------|-----------------------|---|
| DA 105/90 (as modified) | 1 November 1991 | Minister for Planning | Underground coal extraction and associated facilities, transport, use of Camberwell CHPP and train loader. |
| DA 06_0057 | 31 January 2007 | Minister for Planning | Construction and use of surface facilities associated with the Glennies Creek Coal Mine (now Integra Underground), ie. Pit Top Area, Gas Drainage Borehole Area and Forest Road Ventilation Shaft Area. |
| MP 06_0213 | Pending | Minister for Planning | Underground coal mining within the Middle Liddell seam LW 10-17 area and associated infrastructure (ie. gas drainage boreholes) |

2.2 ADDITIONAL ACTIVITIES

The proposed mining operation will represent a progression from the current first workings and longwall extraction in the Middle Liddell seam. This proposal entails:

- cut and flit mining within an area of approximately 148 hectares to the south of the existing North-West Mains within the Middle Liddell seam that will be undertaken concurrently with Middle Liddell seam longwall mining and will produce up to 2.2 Mt of ROM coal. The cut and flit mining method, a method of bord and pillar mining, would not result in any surface subsidence;
- mining of the Hebden and Barrett seams once mining in the Middle Liddell seam is completed. Mining within the Hebden and Barrett seams will utilise the current system of extraction, ie continuous miners for

development (first workings) and retreating longwall mining for secondary extraction to recover approximately 65.3 Mt of ROM coal. Longwall extraction is the preferred method of bulk coal extraction in this location as it has a proven history of safety, high level of resource recovery and economic efficiency. Cut and flit mining will also be undertaken within an isolated section of the planned Hebden and Barrett seam mining areas which are not amenable to mining by longwall methods. Some surface facilities will be required to complement the underground workings.

The mine layout used for this assessment is based upon current mine plans. However, in the course of operational implementation, alternative mine plans may be utilised. Should this be the case, the nature of the impacts described in this assessment would remain relevant, albeit the area affected by these impacts may be reduced. That is, impacts from the mining operation as it is currently planned, or as it may be planned in the future, will lie within the area affected by this application and be of a magnitude consistent with or less than that assessed;

- transportation of ROM coal to the CHPP and use of the CHPP and associated facilities for the processing and dispatching of the coal. Over the life of the Underground, the ROM coal will be transported to the CHPP by haul trucks and, post 2012, primarily by overland conveyor. The coarse and fine reject materials removed as wastes during the coal preparation process will initially be managed in the same or similar manner as that produced from the processing of coal from Integra's existing underground and open cut operations. However, following the closure of the Integra Open Cut, the rejects will likely be placed in that void.

A summary of key project information is provided in *Table 2.2*, with a description of key aspects and activities following.

Table 2.2 Key Project Information

| Project Component | Summary |
|------------------------------|---|
| Proponent | <ul style="list-style-type: none"> • Integra Coal Operations Pty Ltd |
| Tenement Status | <ul style="list-style-type: none"> • CL382 covers Middle Liddell seam and proposed Hebden and Barrett seam mining areas. • CL 357 incorporates the DA86/2889 area. • ML1437 covers mine portal and surface facility areas (part transfer of CL357). • ML1518 covers mine portal surface facilities (part transfer of CL357). • ML1551 covers mine portal surface facilities (part transfer of CL357). • ML1525 and sublease of MPL 343 cover Forest Road vent shaft. |
| Infrastructure | <ul style="list-style-type: none"> • Minor infrastructure in final void of planned North Open Cut mine to provide access to Barrett seam (ie supplies storage, air compressors, power supply equipment and maintenance facilities). • Surface conveyor systems to connect Barrett seam entries to approved overland conveyor to Integra's CHPP. • Interseam drift access from Middle Liddell seam to Hebden seam. • Potential additional upcast ventilation shaft and main fans for Hebden seam mining. • Potential upcast ventilation shaft and main fans for Barrett seam operations. • Gas drainage boreholes over Hebden and Barrett seam mining areas. |
| Mining | <ul style="list-style-type: none"> • Ongoing underground mining within the Middle Liddell seam as currently approved. • Extraction of approximately 70 Mt of ROM coal at a rate of up to 4.5 Mtpa (from the activities identified below). • Cut and flit mining to the south of the existing Middle Liddell seam North-West Mains. • First workings and secondary extraction in the area defined by Longwall Panels 1 to 15 in the Hebden seam and Longwall Panels 1 to 7 in the Barrett seam. • Areas of cut and flit mining within both the Hebden and Barrett seams. |
| Processing and Coal Handling | <ul style="list-style-type: none"> • Ongoing use of the CHPP, train loader and related infrastructure and facilities required for or to support the processing and dispatch of all coal from the Integra Coal operations. |
| Life of Proposed Mining | <ul style="list-style-type: none"> • Up to 25 years |
| Hours of Operation | <ul style="list-style-type: none"> • 24 hours per day, seven days per week as currently approved. |

2.2.1 *Cut and Flit – Middle Liddell Seam*

As shown on *Figure 1.3*, an area of approximately 148 hectares of Middle Liddell seam coal to the south of the existing North-West Mains has been identified as potentially amenable to cut and flit mining (this area is not amenable to mining by longwall methods). Areas of approximately 185 hectares and 290 hectares amenable to cut and flit mining have also been identified in the Hebden and Barrett mining areas respectively, as shown in *Figure 1.2*.

Cut and flit mining uses an electrically-powered continuous miner to develop a series of parallel headings and interconnecting cut-throughs and a separate roof bolting machine to secure the roof strata. Using this method, the continuous mine develops a section of roadway in one heading and then ‘flits’ to the next heading. While the miner is cutting the second heading, the roof bolting machine installs the roof supports such as roof bolts in the first heading. The two machines may change place or progress through the series of heading and cut-throughs being developed.

Pillars of coal left behind by the continuous miner are of a size sufficient to support the overlying strata. This results in a chequerboard pattern comprising areas where the coal has been mined and pillars retained.

As coal production using the cut and flit method is not delayed by roof bolting, as would be the case using conventional bord and pillar techniques, it is a more efficient way of mining multiple roadways.

2.2.2 *First Workings*

The proposed first workings will involve the development of the mains and gateroads of each of the longwalls (see *Figure 1.2*), as is the case with the Middle Liddell seam. This activity will be undertaken using wide head (single pass) or narrow head (double pass) continuous miners with integrated roof and rib bolting rigs. Shuttle cars will be used to transport the coal from the continuous miners to the conveyor system. The headings, comprising the mains and gateroads (and associated cut-throughs), will be tunnels within the coal seam approximately 5.2m wide. These headings will provide for personnel and material movement as well as mine ventilation. First workings do not result in surface subsidence.

2.2.3 *Secondary Extraction (Longwall Mining)*

Secondary extraction of the Hebden and Barrett seams will use the retreating longwall method, the method currently used in the Middle Liddell seam. The longwall extraction plan has been designed to maximise resource recovery whilst giving consideration to the geological and hydrological constraints. The current longwall equipment is capable of operating in the height range of 1.8 to 3.1m and of negotiating the expected geological conditions, including any sandstone channels.

Consequently, the majority of the coal seam (which range from 1.95 to 3.35m thick in the Hebden seam and 1.8 to 3.7m within the Barrett seam) will be able to be extracted in each longwall panel.

The conceptual layout of the longwalls is shown in *Figure 1.2*.

Longwalls 1 to 15 in the Hebden seam are proposed to be 126 to 251m wide (rib to rib) and from 507m (Longwall H15) to 3685m long (Longwall H2) (*Table 2.3*). The chain pillars separating the adjacent panels will range from approximately 40 to 60m wide (rib to rib) with cut-throughs nominally at 115m centres.

Longwalls 1 to 7 in the Barrett seam are proposed to be 200 to 250m wide (rib to rib) and from 476m (Longwall B1) to 1254m long (Longwall B6) (*Table 2.3*). The chain pillars separating the adjacent panels will be approximately 25m wide (rib to rib) with cut-throughs nominally at 100m centres.

Table 2.3 *Conceptual Dimensions of Longwall Panels 1 to 15 Hebden (H1-H15), and 1 to 7 Barrett (B1-B7) Seam*

| Longwall Panel | Panel Width* (rib to rib) | Panel Length* |
|----------------|---------------------------|---------------|
| H1 | 163 | 3640 |
| H2 | 136 | 3690 |
| H3 | 134 | 3430 |
| H4 | 126 | 3450 |
| H5 | 251 | 3350 |
| H6 | 251 | 3290 |
| H7 | 251 | 3590 |
| H8 | 251 | 3390 |
| H9 | 251 | 2760 |
| H10 | 251 | 2550 |
| H11 | 251 | 2390 |
| H12 | 251 | 2300 |
| H13 | 251 | 1950 |
| H14 | 251 | 1260 |
| H15 | 251 | 510 |
| B1 | 216 | 480 |
| B2 | 200 | 550 |
| B3 | 250 | 660 |
| B4 | 250 | 980 |
| B5 | 250 | 1160 |
| B6 | 250 | 1250 |
| B7 | 250 | 1000 |

* to nearest 10 metres

2.2.4 *Barrett Seam Portal Infrastructure*

The Barrett seam operation will require the establishment of limited infrastructure in the final void of the planned ICO North Open Cut (currently being assessed under separate approval) including supplies storage, air compressors, power supply equipment and maintenance facilities, and surface conveyor systems to connect the Barrett seam workings to the approved but as yet to be constructed overland conveyor to the CHPP.

2.2.5 *Gas Drainage Boreholes and Pre-Mining and Post-Mining Gas Drainage*

Development of the project will necessitate the installation of gas drainage boreholes that connect the mine working to the surface for both pre- and post-mining gas drainage. Gas drainage is required to reduce the coal seam's insitu gas content to a level below the outburst threshold as well as to maintain an atmosphere within the workings that is safe for the workforce and does not adversely impact on operations. The specific number and locations of these boreholes is yet to be determined.

In the case of pre-mining drainage, the holes will be drilled to connect existing roadways to the surface to allow gas that is pre-drained from the coal seam (via in-seam gas drainage holes) to be removed from the mine safely. The post-mining gas drainage holes will be drilled in advance of the longwall face, and, upon undermining by the longwall, will allow gas from the goaf to be drained to the surface.

Subject to access agreements between Envirogen and the individual landowners, and any required approvals, it is envisaged that gas produced from the boreholes will be reticulated to the plant rather than venting to the atmosphere. As is currently the case, this gas will then be used to generate electricity and fed into the grid. Any approvals or landholder agreements required by Envirogen are the responsibility of that Company and do not form part of this application.

2.2.6 *Ventilation Shaft and Downcast Shaft*

Future mine planning may require the installation of an enhanced ventilation system for the Hebden seam workings. This may require the installation of a downcast shaft in one location and a ventilation fan and shaft in another location together (both yet to be determined) with associated facilities. The Environmental Assessment will capture the potential impacts associated with the construction and operation of the shafts.

2.3 *SCHEDULE*

Based on the current rate of mining, it is anticipated that longwall and cut and flit extraction in the Middle Liddell seam will be completed early in 2014, with longwall mining effort to be directly transferred to mining the Hebden seam. To enable mining in the Hebden seam in 2014, development of the drifts and seam pre-drainage will be required to commence in late 2009. Mining in the

Hebden seam is expected to take a further 15 years, with mining of the Barrett seam to follow this for an expected four to six years. This being the case, extraction of the two seams is expected to be completed around 2031 with post-mining rehabilitation of any remaining areas of surface disturbance then to be undertaken. Approval will therefore be sought for a period of some 25 years. Mine scheduling, however, can be influenced by a number of variables. As these dates are indicative only, achievement of the nominated milestones may occur before or extend beyond this period. No works will be undertaken beyond the consent period unless otherwise approved.

2.4

WORKFORCE

Mining the Hebden seam will provide continued full time employment for up to approximately 220 people. Given the nature of the Barrett seam, it is possible that production may be achievable with a reduced workforce, however, this is yet to be determined.

3 STATUTORY CONTEXT

3.1 INTRODUCTION

The following section provides an overview of the statutory framework under which the proposal will be assessed.

3.2 COMMONWEALTH LEGISLATION

3.2.1 *Environment Protection and Biodiversity Conservation Act, 1999*

The *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) requires the approval of the Commonwealth Minister for the Environment for actions that may have a significant impact on matters of national environmental significance. The EPBC Act also requires Commonwealth approval for certain actions on Commonwealth land. Matters of national environmental significance under the Act include:

- World Heritage Areas;
- National Heritage Places;
- Ramsar wetlands of international importance;
- threatened species or ecological communities listed in the EPBC Act;
- migratory species listed in the EPBC Act;
- Commonwealth marine environment; and
- nuclear actions.

There are no World Heritage Areas, national heritage places, Ramsar wetlands or Commonwealth marine areas on or near the Project Area. The proposal does not involve a nuclear action. The proposed longwall mining is not expected to have a significant affect upon the health and viability of any threatened or migratory species listed under the provisions of the Act. Accordingly a referral under EPBC Act is not required.

3.3 NEW SOUTH WALES LEGISLATION

3.3.1 *Environmental Planning and Assessment Act 1979*

Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) details the approval of major infrastructure and other significant 'projects'. It applies to:

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

(a) by a State environmental planning policy, or

(b) by order of the Minister published in the Gazette" (Section 75(b)).

State Environmental Planning Policy Major Projects (SEPP MP) 2005 defines certain developments that are major projects under Part 3A of the EP&A Act and to be determined by the Minister for Planning. The proposal is referred to as a Major Project in SEPP MP and therefore Part 3A applies.

Under Section 75(R) of the EP&A Act, environmental planning instruments other than State environmental planning policies do not apply to a 'Major Project'. A discussion of the State Environmental Planning Policies (SEPPs) applicable to the proposed development is presented in *Section 3.3.6*.

The Environmental Assessment Report, which will assess the likely impact of a project on the environment, will be prepared in accordance with Section 75(F) of the EP&A Act.

Pursuant to Section 75V, authorisation of a mining lease under the *Mining Act 1992* or an environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997* (for any of the purposes referred to in section 43 of that Act) cannot be refused if it is necessary for carrying out an approved project and is to be substantially consistent with the approval under Part 3A of the EP&A Act.

3.3.2 *Protection of the Environment Operations Act, 1997*

An environment protection licence (No. 7622) under the *Protection of the Environment Operations Act, 1997* (PoEO Act) is held for Glennies Creek Colliery and relates to "coal mining". This licence will be modified (if necessary) to reflect changes to the operation resulting from this proposal.

3.3.3 *Mining Act, 1992 and Coal Mines Regulation Act, 1982*

A Subsidence Management Plan (SMP) will be submitted to the Department of Primary Industries (DPI) prior to the requisite application under section 138 of the *Coal Mines Regulation Act, 1982*. The proposal involves the continuation of an existing approved mining operation covered by mining lease (CL 382) under the *Mining Act, 1992*.

3.3.4 *Threatened Species and Conservation Act, 1995*

Schedules 1, 1A and 2 of the *Threatened Species Conservation Act* list species, populations and ecological communities of native flora and fauna considered to be threatened in New South Wales.

The presence of threatened fauna species and endangered ecological communities will be investigated as part of the Environmental Assessment.

3.3.5 *Energy Administration Amendment (Water and Energy Savings) Act, 2005*

Glennies Creek and Camberwell Coal are each identified under the *Energy Administration Amendment Act 2005* as a designated energy user, as specified in the Energy Savings Order 2005. As a requirement of this Order, ICO has prepared an Energy Savings Action Plan for the Integra Underground.

3.3.6 *State Environmental Planning Policies*

State Environmental Planning Policy (Major Projects) 2005

State Environmental Planning Policy (Major Projects) 2005 identifies development to which the development assessment and approval process of Part 3A of the EP&A Act applies. The Policy establishes the Minister for Planning as the approval authority for any development classified as a 'Major Project'.

Clause 6(1) of the Major Projects SEPP identifies Part 3A projects as those, that in the opinion of the Minister, are described in either Schedule 1, 2, 3 or 5 of the Policy. Schedule 1 refers to "development for the purpose of mining that...is coal mining", hence this application is subject to Part 3A (Major Infrastructure and Other Projects) of the *Environmental Planning and Assessment Act 1979*.

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

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 aims to provide for the proper management and development of mines for the social and economic welfare of the State, while encouraging ecologically sustainable development. A detailed assessment of the proposed impacts of the proposal on surrounding land uses and natural resources will be undertaken in the Environmental Assessment.

State Environmental Planning Policy No 33

State Environmental Planning Policy No. 33 - Hazardous and Offensive Development (SEPP 33) provides definitions for 'hazardous industry', 'hazardous storage establishments', 'offensive industry' and 'offensive storage establishment'. The definitions enable decisions to approve or refuse a development to be based on the merit of a proposal.

SEPP 33 may apply to the proposal and will be considered during the assessment process. The approval authority must consider the specifics of the proposal, 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 preliminary hazard assessment screening test will be undertaken for the project. It is not expected, however, that a detailed assessment will be required.

3.4 OTHER PLANS

The following plans apply to the site but, pursuant to Section 75R of the EP&A Act, do not limit development in a Part 3A application.

3.5 HUNTER REGIONAL ENVIRONMENTAL PLAN 1989

The Hunter Regional Environmental Plan 1989 (HREP) provides a regional environmental planning framework for the Hunter Region's development. The HREP aims to promote balanced development in the Hunter Region, encourage orderly and economic development and bring about optimum use of land and other resources consistent with the needs and aspirations of the local community.

As the project will be determined under Part 3A of the EP&A Act, the requirements of HREP are not directly applicable. However, the proposed continuation of mining is generally consistent with the objectives of HREP 1989.

3.6 SINGLETON LEP 1996

The site is zoned 1(a) Rural under Singleton Local Environmental Plan 1996 (LEP 1996) and the objectives for this zone are:

- (a) to protect and conserve agricultural land and 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.*

Mining is permissible with consent under the 1(a) Rural Zone. As this project will be determined under Part 3A of the EP&A Act, the requirements of LEP 1996 are not directly applicable. However, the proposed continuation of mining is generally consistent with the objectives of LEP 1996 and specifically meets objective (c) of the 1(a) Rural Zone.

As part of preparation of this report, some preliminary consultation has occurred including interviews with key stakeholders in the preparation of specialist reports and an introduction of the proposal to the wider community in a general newsletter which was circulated in August 2007.

A comprehensive community consultation plan will be devised which will gather information to assist the specialist studies and provide an opportunity for input by effected stakeholders as well as the wider community. The consultation plan will identify stakeholders on the basis of the potential direct and indirect impacts they may experience as a result of the proposal as well as their level of interest in the project.

4.1 PRELIMINARY CONSULTATION

4.1.1 Community Newsletters

In August 2007 a community newsletter was produced which outlined the proposed mining of the Hebden and Barrett seams, and the Part 3A application process. The newsletter was distributed to properties in the local area, including those along Bridgman Road, Stony Creek Road, Middle Falbrook Road, Glennies Creek Road, Thomas Lane and Nobles Lane.

The newsletter provided information on the consultation process to be carried out, as well as a contact number to which any queries could be forwarded. Follow up information will be distributed over the course of the assessment in the ICO standard newsletters. Project specific newsletters may also be distributed.

4.1.2 Key Stakeholder Interviews

A range of key stakeholder interviews have been conducted as part of the preliminary investigations conducted in preparation of this report. This included meetings with DoP, local Councils, local Aboriginal groups and heritage groups.

4.2 COMPREHENSIVE CONSULTATION PLANNING

A comprehensive stakeholder profile will be prepared using the information gathered as part of the preliminary study. The plan will identify all interest groups and recommend strategies to engage these in the future stages of the project. The consultative program will be finalised in consultation with key interest groups but is expected to include the following key components:

4.2.1 Establishment of 1800 - Number and Website

ICO and ERM have established a 1800 (free call) number to respond to enquires regarding the proposal. All calls are logged, the issues raised and

responses provided documented. A summary of enquires and responses will form part of the Environmental Assessment.

Information regarding the proposal will be incorporated into the current Integra website (www.integracoal.com.au). The website will also include an email contact to which enquires can be made throughout the assessment period. Similar to the 1800 number, enquiries and responses will be documented and a summary included within the Environmental Assessment

4.2.2 *Letter to Affected Stakeholders*

Letters outlining the proposal have been sent to all stakeholders identified in the stakeholder profile as potentially experiencing direct impacts as a result of the proposal. This group has included but not been limited to land and utility owners, special interest groups, statutory bodies etc. The letters were intended to ensure that these stakeholders are aware of the environmental assessment process and to invite them to participate actively in the process. Contact details have been provided, with face to face meetings to follow if requested.

4.2.3 *Phone Calls to Affected Stakeholders*

Phone calls were made to all affected stakeholders to inform them of the current progress of the Environmental Assessment and provide them with information on the community consultation occurring throughout the assessment phase. Phone calls were followed with a letter that was sent to all stakeholders outlining the planning process involved with the Environmental Assessment, and providing contact details (1800 number and email) for interested stakeholders.

A second phone call was also made to all affected stakeholders to follow up the original letter that was posted. The calls informed stakeholders of the delay in the availability of the PEA for public viewing. The calls also confirmed that hard copies of the PEA will be available for those stakeholders that are interested, as soon as the Project Application is registered by the DoP.

4.2.4 *Meetings with Impacted Stakeholders*

Stakeholders and landholders who may be directly impacted by the proposal have been invited to meet with representatives from ICO. These meetings will give these stakeholders an opportunity to discuss their thoughts and concerns and will take place during or following advertising of the Project Application and PEA. Meetings will be held individually or in groups dependent on the preferences of individual stakeholders. A summary of the meetings conducted will be prepared and included in the Environmental Assessment.

4.2.5 *Information Sessions*

Two community information sessions are planned which will provide general information on the project as well as inviting feedback and comment. The first of these information sessions is scheduled to occur soon after the lodgement of this Project Application. The information gathered at this session will assist the specialist studies conducted during the Environmental Assessment.

The second information session will be held towards the end of the assessment phase, and will aim to provide an opportunity for discussion of the results of the assessments completed and the adequacy of mitigation measures proposed. Any issues raised here will be addressed prior to lodgement of the final Environmental Assessment.

4.2.6 *Community Consultative Committee (CCC) Meetings*

ICO has an existing CCC which meets at intervals throughout the year. A presentation of the Environmental Assessment process and findings will be made to this group. Follow up information will be provided to the CCC on request.

5.1

INTRODUCTION

This section provides a preliminary assessment of the key environmental issues associated with the Integra Underground Coal Project and matters for further consideration, with emphasis on those components/component areas likely to be impacted by the proposed underground mining activities. The key issues relating to the proposed underground mining activities are all a direct and indirect consequence of subsidence on:

- land use and surface improvements;
- ecology;
- cultural heritage; and
- hydrology.

These issues were identified through the risk assessment process undertaken by ICO and ERM and through preliminary stakeholder consultation.

Notwithstanding the above, the Environmental Assessment will address all relevant aspects of the environment within the overall Project Area at a level consistent with the potential and magnitude of environmental impact.

Scope 1, 2 and 3 greenhouse gas emissions to be generated by, or as a consequence of, the development are also issues which will be addressed as part of the Environmental Assessment.

ERM are currently undertaking ecological and heritage studies to assess the impact of the proposed longwall mining. GeoTerra has been commissioned to undertake surface water and groundwater studies within the Proposed Mining Area and Strata Control Technology (SCT) has been engaged to prepare detailed subsidence predictions.

The Environmental Assessment will include the cumulative impacts arising from the all Integra operations and, as relevant, other operations in the vicinity. For example, the acoustic and air quality assessments will consider the noise, vibration and air quality impacts from open cut operations, haulage of ROM and product coal, CHPP operation etc and from additional activities such as gas drainage boreholes, possible vent and downcast shafts, and surface conveyor in the context of the local acoustical and air environments.

The potential subsidence impacts of mining the Middle Liddell seam (as presented in *Glennies Creek Colliery, Longwalls 10 to 17 Part 3A, ERM 2007*) have already been incorporated into subsidence predictions in this preliminary assessment. Therefore, each environmental assessment has considered the cumulative impacts resulting from all existing and proposed underground mining activities.

Detailed management of subsidence impacts for Hebden Longwalls 1 to 15 and Barrett Longwalls 1 to 7 will be addressed under the relevant Subsidence Management Plan approval process by the Department of Primary Industries.

The potential environmental issues associated with the project are addressed in the following sections. Visual impacts are not discussed, as the area has been extensively modified through mining, and no additional surface facilities apart from minimal borehole drainage facilities and a possible ventilation shaft will be constructed as part of this project.

The Environmental Assessment will assess all various impacts from the proposed activities and demonstrate to the Minister, the relevant authorities and the community that the impacts are manageable.

5.2 *SUBSIDENCE*

The extraction of longwalls in the Hebden and Barrett seams will potentially result in subsidence of all overlying strata to the surface, to a lateral extent determined by a 26.5° angle of draw from the longwall edge. Areas of the mine designated for first workings and cut and flit mining will not be subject to subsidence.

5.2.1 *Barrett Seam Subsidence Predictions*

Preliminary subsidence assessments of the Barrett seam mining area indicate a maximum subsidence of 2m to occur over the centre of each longwall panel. Subsidence over the chain pillars is likely to be in the range of 100 to 300mm.

5.2.2 *Hebden Seam Subsidence Predictions*

In areas where the Hebden seam longwalls are mined below Middle Liddell workings, additional subsidence is expected as a result of destabilising the pillars retained in the Middle Liddell seam and the interaction between the pillars in each seam and the goaf in the other seam. There is limited data available on which to estimate the subsidence in these areas, so an intentionally conservative approach has been adopted. Numerical modelling for this cumulative subsidence is currently underway and more accurate results will be presented in the Environmental Assessment. Preliminary findings are presented below.

The Hebden seam subsidence can be divided into three parts, based on the potential for seam interaction and multi-seam subsidence, these being:

- a) areas where the Hebden seam is not overlain by any Middle Liddell mine workings;
- b) areas where the Hebden seam is overlain by Middle Liddell main heading development pillars; and
- c) areas where the Hebden seam is overlain by Middle Liddell longwall panels.

In areas where the Hebden seam is not overlain by any Middle Liddell mine workings, maximum subsidence predictions of 1.3 to 1.7m are expected.

In areas where the Hebden seam is overlain by Middle Liddell seam main headings, there is potential to destabilise the main headings pillars, causing additional subsidence. Above the ends of Middle Liddell Longwalls 1-6, the total subsidence is predicted to be 2.1 to 2.4m, while the area above the ends of Middle Liddell Longwalls 7 to 9 is expected to experience maximum subsidence of 1.7 to 2.0m.

In the area where Hebden mining underlies the Middle Liddell longwall panels, maximum total subsidence of 3.5 to 4.0m is expected. These estimates factor in subsidence resulting from Middle Liddell seam mining, as well as further subsidence from Hebden seam mining. Some 0.6 to 0.9m of this subsidence has already occurred over the area of Middle Liddell Longwalls 1 to 5, resulting from mining completed in the seam to date. Subsidence of 0.6 to 1.0m has also already occurred over Middle Liddell Longwalls 6 and 7. Up to 1 to 1.5m subsidence from Middle Liddell panels is expected as subsequent longwalls are mined.

A summary of subsidence associated with mining in the Hebden seam is given in *Table 5.1*.

Table 5.1 *Summary of Subsidence Associated with Mining in Hebden seam*

| Area | Subsidence from mining Middle Liddell seam (m) | Subsidence from mining Hebden seam (m) | Total subsidence from both seams (m) |
|-------------------------------|--|--|--------------------------------------|
| No ML* seam workings below | 0 | 1.3 - 1.6 | 1.3 - 1.6 |
| Above ML Mains (LWs 1-6) | < 0.02 | 2.1 - 2.4 | 2.1 - 2.4 |
| Above ML Mains (LWs 7-17) | < 0.02 | 1.7 - 2.0 | 1.7 - 2.0 |
| Above ML Longwalls (LWs 1-5) | 0.6 - 0.9 | 2.6 - 3.4 | 3.5 - 4.0 |
| Above ML Longwalls (LWs 6-17) | 0 - 1.5** | 2.5 - 3.4 | 3.5 - 4.0 |

* ML = Middle Liddell

** Subsidence from mining in the Middle Liddell seam is currently incomplete and will continue to occur over Longwalls 8-17 as a result of ongoing mining.

The main surface improvement within the Proposed Mining Area is the Mount Owen Rail Spur and associated infrastructure (SCT, 2006). The Mount Owen Rail Spur is owned by XMO, overlies CL 382 and is likely to be affected by subsidence from mining in Middle Liddell longwall panels 8 to 17 and Hebden seam longwall panels 6 to 15. In order to enable ICO's proposed mining to proceed, Xstrata and ICO have an agreement which provides for:

- XMO/Xstrata to assume sole responsibility for, and to carry out, all mitigation and repair works on the Rail Line so as to enable mining to occur at the Integra Underground in the vicinity of the rail line. Xstrata may elect to relocate the rail line; and
- co-operation between Xstrata and Integra to prepare a Rail Line Management Plan.

The Environmental Assessment will include a risk assessment to identify potential risks of subsidence, their likelihood and consequences.

Results of these investigations will be used to devise strategies to manage the subsidence impacts from Longwalls 1 to 15 in the Hebden seam and 1 to 7 in the Barrett seam. Management will be achieved through prevention, mitigation and/or remediation of subsidence impacts as appropriate.

Further subsidence assessments are to be completed, and final findings will be presented in the Environmental Assessment, which will also address potential impacts on other surface improvements and natural features. A program of subsidence monitoring will be proposed to facilitate a better understanding of the dynamic subsidence behaviour at Integra.

5.3

LAND USE AND SURFACE IMPROVEMENTS

The dominant land use within the Proposed Mining Area is grazing. The land is predominantly owned by subsidiaries of the mining company Xstrata or its affiliates as outlined in *Section 1.5*. Underground mining is not expected to result in significant changes to existing land use. Subsidence may have some indirect impacts along Bettys Creek (which will be realigned as a result of the Mount Owen operation, and will not be in its natural state) and adjoining alluvial flats but is unlikely to affect the long term agricultural capability of the Proposed Mining Area.

The proposed longwalls will not impact on Glennies Creek, as the mine has been planned to ensure that the Glennies Creek saturated alluvium is not subsided.

The Mount Owen Rail Spur and associated infrastructure traverses the surface of the Proposed Mining Area. Supporting infrastructure located within the rail easements includes a concrete rail bridge at Bettys Creek, a maintenance road, water pipeline and buried communication cables.

Other surface improvements include Forest Road, an unsealed public road (classed as a "Rural Local 3 - Gravel Road"), private access roads, fences, a steel framed shed, farm dams, and a disused underground telephone line and overhead powerline.

Elsewhere in the Project Area, mining or mining-related activities constitute the principle land use.

5.4 *ECOLOGY*

The environment along Bettys Creek and within the areas proposed for open cut mining by XMO is not expected to be intact by the time underground mining commences in the Hebden and Barrett seams. The habitats present within the remaining portions of the Project Area will either not be impacted or not be significantly impacted by this underground mining proposal.

5.4.1 *Dominant Vegetation Types*

The Project Area has been extensively disturbed by open cut mining and/or land clearing and grazing and most has been cleared of native forest. Six remnant vegetation communities have been identified within the Proposed Mining Area including spotted gum/grey box/ironbark woodland; bull oak woodland; ironbark/redgum/*Angophora* woodland; riparian vegetation; grassland and regenerating vegetation.

5.4.2 *Habitat Features*

Three broad habitat types occur within the Proposed Mining Area, namely small areas of open forest and Casuarina woodland, with the majority being pasture. Both the open forest and Casuarina woodland habitats are well represented in the nearby Ravensworth State Forest, with the myrtaceous tree species providing a seasonal foraging resource for nectivorous birds and mammals. The variety of tree species provides suitable feeding/foraging resources for foliage dependant fauna species and insectivorous birds. The grasses and sedges within the groundcover across the entire site provide seeds and stems for granivorous and herbivorous species.

Bettys Creek, Main Creek, small unnamed tributaries of Glennies Creek and several dams provide habitat for aquatic birds and amphibians. These aquatic habitat resources vary from permanent to ephemeral and provide habitat for a large number of species.

5.4.3 *Threatened Species*

No threatened flora species listed under TSC Act were recorded within the Proposed Mining Area during the flora surveys in February and December 2005, and January 2006 and April 2007, although potential habitat is available for *Diuris tricolour* (tricolour diuris), *Eucalyptus glaucina* (slaty redgum) and *Thesium australe* (austral toadflax). *Ozothamnus tessellatus* is also reported to occur in the northern remnant of Ravensworth State Forest to the north of the site. The proposed mining of the Hebden and Barrett seams is unlikely to impact any of these species.

Bothriochloa biloba was recorded in the vicinity of the Forest Road Ventilation Shaft site during previous surveys (Umwelt, 2003A; Geoff Cunningham Natural Resource Consultants 2001a, 2001b). This species is no longer listed as a vulnerable species under Schedule 2 of the TSC Act and the known distribution and abundance of *B. biloba* is such that it is not likely to become endangered. This species is however, listed as vulnerable under the EPBC Act

and has therefore still been assessed as a threatened species. The exact location of the gas drainage boreholes will be determined in the field in consultation with an ecologist to avoid clearance of this species. The possible installation of a vent shaft and downcast shaft for the Hebden seam will take threatened species into consideration, with an impact assessment completed and included in the Environmental Assessment if necessary.

During the 2005 survey period (ERM, 2006b), only one threatened fauna species, *Pomatostomus temporalis* (grey-crowned babbler), was directly observed within the survey site. Five individuals were observed foraging within the fallen timber in an area of open forest at the northern end of the Middle Liddell Seam Longwall 11. Further surveys in 2006 and 2007 recorded this species across the majority of the Project Area. In addition, Grey-crowned babblers were sighted during targeted surveys conducted for the Integra North Open Cut Environmental Assessment (2007). Sightings occurred in the forested south-eastern corner of the current Proposed Mining Area.

A review of relevant studies including the Environmental Impact Statement for the Mount Owen operation indicates that the eastern freetail bat is also reported to occur within the Proposed Mining Area, with an additional four threatened species listed in the Schedules of the TSC Act (squirrel glider, grey-headed flying-fox, brown treecreeper and speckled warbler) being recorded in the regenerating woodland within 500m to the north-east. Flora and fauna surveys conducted for the Integra North Open Cut Environmental Assessment (2007) covered part of the south-eastern corner of the current Proposed Mining Area. Five threatened species were recorded in the area, including the grey-crowned babbler, eastern freetail-bat, eastern bentwing-bat, brush-tailed phascogale and the grey-headed flying fox.

A review of the Department of the Environment and Climate Change (DECC) and Department of the Environment and Heritage (DEH) databases, identified a number of threatened fauna species that have been recorded within the Proposed Mining Area or are known to occur within the locality (approx 5km):

- *Tyto novaehollandiae* (masked owl);
- *Ninox connivens* (barking owl);
- *Ninox strenua* (powerful owl);
- *Melithreptus gularis gularis* (black-chinned honeyeater);
- *Turnix maculosa* (red-backed button-quail);
- *Erythrotriorchis radiatus* (red goshawk);
- *Climacteris picumnus* (brown treecreeper);
- *Stagonopleura guttata* (diamond firetail);
- *Pyrrholaemus sagittatus* (speckled warbler);

- *Melanodryas cucullata cucullata* (hooded robin (south-eastern form));
- *Lathamus discolor* (swift parrot);
- *Pomatostomus temporalis* (grey-crowned babbler);
- *Ephippiorhynchus asiaticus* (black-necked stork);
- *Miniopterus schreibersii oceanensis* (eastern bentwing-bat);
- *Saccolaimus flaviventris* (yellow-bellied sheath-tail bat);
- *Myotis adversus* (large footed myotis);
- *Mormopterus norfolkensis* (eastern freetail-bat);
- *Petaurus norfolcensis* (squirrel glider);
- *Dasyurus maculatus* (spotted-tail quoll);
- *Phascolarctos cinereus* (koala);
- *Pteropus poliocephalus* (grey-headed flying-fox); and
- *Litoria aurea* (green and golden bell frog).

No endangered populations have been recorded within the Proposed Mining Area and at present, there is no critical habitat listed in the locality. It is highly unlikely that the underground proposal will significantly affect current disturbance regimes including fire. The proposed modification will not fragment or isolate currently interconnecting or proximate areas of habitat. Some of the threatened species recorded on the DECC and DEH databases as occurring in the Proposed Mining Area or within the locality may be at the western or eastern limits of their distribution in the Hunter Valley and this issue will be fully addressed in the Environmental Assessment.

Based on studies to date, the proposal is not expected to significantly impact any threatened species or endangered ecological communities. A more detailed assessment of expected impacts on threatened species habitat will be included in the Environmental Assessment.

5.5

CULTURAL HERITAGE

Preliminary investigations have been undertaken to assess the possible impacts on cultural heritage within the Proposed Mining Area. Cultural heritage refers to both Aboriginal and historical cultural heritage and includes sites, artefacts and structures. The discussion below is preliminary and will be expanded once further investigation and fieldwork has been completed in areas of potential direct disturbance.

5.5.1 *Aboriginal Heritage*

Review of previous investigations

Archaeological investigations (AMBS 1997; ERM 2005, 2006, 2007; HLA 2007; Umwelt 2003, 2004a, 2004b) have recently been conducted within portions of the area overlying the proposed mining activities.

The predominant archaeological site types within the Proposed Mining Area and surrounds are artefact scatters, and isolated artefacts. The review of previous archaeological studies in the Project Area and surrounding region indicates that there is a consistent low density scatter of artefacts, with a wide diversity of raw material types. Discrete higher concentrations of artefacts are present in the areas surrounding creek lines. The area within 30 m of Bettys Creek has higher archaeological sensitivity than the surrounding areas although the Mount Owen operations have resulted in the realignment of Bettys Creek. The distribution of artefacts away from creek lines is far more dispersed, and sloping landforms in particular appear to contain limited evidence of human activity.

Potential impacts on Aboriginal heritage

All sites so far recorded within the Proposed Mining Area are stone artefact scatters or isolated finds. These are durable site types and are not expected to be significantly impacted by the proposal. Potential impacts from subsidence include cracking, ponding, changes to watercourse morphology, and impacts from remediation. However, the overall impact of subsidence is unlikely to be significant. Further specialist investigations may identify specific areas along Bettys and Main Creeks that may be impacted by increased erosion or ponding associated with subsidence although some of these areas have already been impacted by Mount Owen's realignment of Bettys Creek.

5.5.2 *Historical Heritage*

European settlement of the lower Hunter Valley is believed to have commenced in 1813 (Perry 1963). Historical land use of the Project Area has entailed agricultural activities including grazing and farming, with a gradual shift towards industrial activities since the discovery of coal deposits in the 1820s. Since the late 1960s, the coal mining industry has been the economic base of the area.

Previous historical heritage studies conducted in the locality have identified several historical heritage sites. Some of these sites have been disturbed or destroyed by previous mining in the area. Features of sites previously found in the vicinity of the Proposed Mining Area include fence posts, gate posts and building stumps.

An assessment of the proposal's impact on historical heritage will be presented in the Environmental Assessment.

5.6

NOISE

Mining techniques used in the Middle Liddell seam will be adopted for the proposed mining of the Hebden and Barrett seams and the proposal includes no change in transport or processing. Therefore, operational noise levels will generally remain unchanged and consistent with those currently approved.

Underground mining operations result in minimal noise impacts compared to open cut methods. Adjacent mines will be utilising open cut mining methods simultaneously with the ICO mining, and the area will already be subject to industrial noise impacts. Generally, the contribution from Integra underground activities will be negligible.

Noise from the planned gas drainage boreholes will be limited to the short-term noise of drilling for installation, and from the gas-fuelled generators (should the prepared boreholes not be linked to the Envirogen plant). Free venting boreholes are not a source of noise.

There is a possibility of the proposed Hebden seam mining requiring an additional downcast shaft and vent shaft to maintain adequate air flow and air quality within the mine. An acoustic assessment of such installations will be included in the Environmental Assessment including the cumulative impacts of the proposed additional activities: the ongoing use of the CHPP, train loader and related infrastructure and facilities for the processing and dispatch of coal from the Integra's operations and local mining activities.

Potential noise impacts resulting from the proposal and mitigation measures to manage these potential impacts will be included in the Environmental Assessment.

5.7

AIR QUALITY

There will be minimal change in the existing air quality as a result of this proposal as the existing gas drainage system, coal handling, preparation and transport facilities will remain essentially the same. However, as the proposal is seeking the ongoing use of these facilities and activities, cumulative impacts will be captured in the Environmental Assessment.

It is envisaged that the gas from the boreholes will be preferentially reticulated to the Envirogen plant rather than venting or exhausting to the atmosphere. This presents an opportunity to reduce emissions of greenhouse gases by using waste coal mine gas to generate electricity. When fully operational, the Envirogen plant could potentially divert over 300,000 tonnes of greenhouse gas from the atmosphere each year. The potential for utilising this facility will be further discussed in the Environmental Assessment.

ICO is registered as a member of Greenhouse Challenge Plus. This is an initiative established to enable Australian companies to form working partnerships with the Australian Government to improve energy efficiency and reduce greenhouse gas emissions. Similarly, ICO as part of the Vale

Australia group of companies, will be a participant in the Energy Efficiency Opportunities programme commencing March 2009.

This Federal Government programme encourages large energy-using businesses to improve their energy efficiency. It does this by requiring businesses to identify, evaluate and report publicly on cost effective energy savings opportunities.

Additionally, ICO has prepared an Energy Savings Action Plan for the Integra Underground as required under the *Energy Administration Amendment (Water and Energy Savings) Act, 2005*. Actions that have been identified under the Plan and are either being undertaken currently, or will be undertaken in the future, include:

- equipment - the less diesel used, the less greenhouse gas emitted during combustion;
- electrical efficiency will be considered in assessments of new mobile and fixed equipment - the less electricity used, the lower the emitted greenhouse gas per tonne of coal produced;
- energy audits will be held when practicable to ensure that the mine is using best practice techniques to minimise energy use and is operating at optimum energy levels;
- equipment will be maintained to retain high levels of energy efficiency;
- greenhouse awareness training will be held at staff inductions to make employees aware of the science of global warming and detailed efforts to minimise emissions;
- an inventory of emissions and sinks will be developed and maintained; and
- emissions and abatement strategies will be reported annually.

Existing greenhouse mitigation and monitoring programs will be continued throughout the remaining life of the Integra Underground, including the proposed mining of the Hebden and Barrett seams.

On site greenhouse gas emissions and the principles of ecologically sustainable development will be assessed as part of the Environmental Assessment.

5.8 *HYDROLOGY*

5.8.1 *Surface Water*

Bettys Creek is a fourth order ephemeral Schedule 2 stream (Department of Land and Water Conservation (DLWC), 2000) and traverses the Proposed Mining Area over Hebden Longwalls 9 to 14.

It extends from the confluence of Bowmans Creek and Swamp Creek in the south, to north of the Ravensworth State Forest. In its current state it exhibits prolonged periods without flow with small permanent and semi-permanent water holes. Bettys Creek flows into Bowmans Creek approximately 5.9km upstream of the confluence of Bowmans Creek and the Hunter River. The catchment and riparian zone over the Proposed Mining Area has been extensively modified through clearing for mining, logging and grazing, with the channel exhibiting extensive areas of bank erosion and limited riparian vegetation. The catchment area slopes vary from 3 to 4% in the south to 20% on the upper slopes in the north (GeoTerra, 2005). Diversions of Bettys Creek have been approved as part of Mount Owen operations, with approximately the upper third of the catchment approved to be diverted to Main Creek which flows into the Glennies Creek system. Glendell Mine Operations have also gained approval to construct an out of catchment diversion of Bettys Creek into Main Creek via a 240 ML dam, and an in catchment diversion around proposed mine works (approximately 2750m long).

Main Creek is located to the south east of the Proposed Mining Area over Hebden Longwalls 1 to 4 and is a fourth order Schedule 2 stream (DLWC, 2000). Main Creek is ephemeral, has a catchment area of approximately 1750 hectares, and flows into Glennies Creek approximately 3.5km upstream of the Glennies Creek/Hunter River confluence. Significant headwall erosion is lengthening its channel upstream. Lesser order Schedule 1 ephemeral gullies and small creeks also traverse the Proposed Mining Area (DWLC, 2000).

Flowing to the southeast of the Hebden longwalls and the northwest of the Barrett longwalls is Glennies Creek. This is a perennial creek with flow being maintained by regular releases from Lake St Clair. The width of the creek varies between about 3m and 7m. The 1990 Environmental Impact Statement for the Glennies Creek Colliery included an undertaking to limit mining beneath Glennies Creek to development works only. The current mine plan, and any future amendments to this plan, will commit to this prior undertaking, thereby avoiding impacts on Glennies Creek. The current longwall layout for the Barrett seam reflects a 30^o angle of draw from the Glennies Creek alluvials.

Potential impacts of the proposal on the local and regional surface water systems will be assessed as part of the Environmental Assessment.

5.8.2 *Groundwater*

Unconsolidated alluvium aquifer systems are associated with Bettys Creek, Main Creek, Glennies Creek and other minor drainage paths. There are no registered groundwater bores in either the alluvial or basement coal measure (bedrock) aquifers within the Proposed Mining Area.

Groundwater quality in the coal measures is poor due to terrestrial salts. Based on monitoring data, there are no beneficial aquifers in the Project Area, with highly brackish to saline water contained in the low permeability sandstone or coal seams. It is important locally only for use in coal washeries.

The existing open cut mines within the locality have already had a significant impact on the local and regional groundwater. Groundwater level and quality monitoring in the Integra piezometers will enable an assessment of subsidence effects within the vicinity of the Proposed Mining Area prior to mining.

Potential impacts from the proposal on the local and regional groundwater systems, including the quantification of expected groundwater extraction, will be assessed as part of the Environmental Assessment.

5.8.3 *On Site Water Management*

The existing on site mine water management system, including mine water storage, clean and mine affected water separation, clean water release and runoff control will continue and will service any operations associated with the proposed underground mining activities.

Both clean and mine affected surface runoff within the combined Integra Underground surface facilities and portal areas, and any mine affected water pumped from the underground workings is managed through the existing integrated Glennies Creek/Camberwell water management system. This system has evolved to reflect the physical, operational and management links between both operations. The system has been designed with consideration to the total containment of all mine affected water, rainfall and evaporation, water exports in coal and export to neighbouring mines. The impact, if any, of the proposed mining activities on this system will be addressed in the Environmental Assessment.

5.9 *TRAFFIC*

No changes to the local or regional road network are anticipated from the proposal as the number of personnel employed at Integra will not increase as a result of the proposal. No coal is or will be dispatched off-site using the public road network.

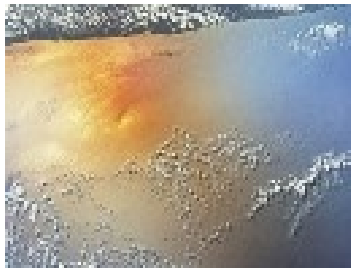
CONCLUSION

The proposal includes the extraction of approximately 70 Mt of ROM coal from longwall and cut and flit mining in the Hebden and Barrett seams and cut and flit mining in an area of approximately 148 hectares of the Middle Liddell seam. In addition, the proposal includes the ongoing use of existing surface facilities at the Integra Underground and of the CHPP, train loader and related infrastructure and facilities for the processing and dispatch of all product coal Integra's operations. Additional proposed surface activities are limited to gas drainage boreholes, the possible installation of an additional vent shaft and associated downcast shaft for the Hebden seam workings and surface conveyor systems to connect the Barrett seam workings to the overland conveyor to the CHPP. The proposed underground mining will result in a maximum subsidence of up to 4m resulting from Hebden seam mining, and 2m as a result of Barrett seam mining. Accordingly, key assessment areas (apart from greenhouse gas generation) relate to the predicted subsidence and its impacts on land use, surface improvements, ecology, cultural heritage and hydrology. The Environmental Assessment report will include mitigation and monitoring measures to manage or negate potential adverse impacts.

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