Centennial Coal

Review of Environmental Factors
Environmental Management Plan

Inglenook Exploration Program

July 2011

Centennial Coal

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1 Introduction

The Inglenook Exploration Area is located in the Western Coalfield of NSW and represents one of the last undeveloped greenfield coal reserves in the region. It is located between the Charbon reserves to the north and the Airly reserves to the south as shown in Figure 1. The resource requires further exploration work to establish the extent, quality and viability of future extraction. The program will be staged with 28 drill sites. Drill sites will be undertaken in two stages. The first stage is drill holes on a 2 square kilometre grid. The second stage will involve infill drilling on a 2 km offset. This document provides details of the proposed staged exploration program as well as guiding principles covering environmental management provisions of the physical works associated with exploration drilling.

1.1 Background

Centennial Coal is seeking approval to undertake Category 2 exploration activities within its Exploration Licences EL 7431, EL 7432 and EL 7442 and Authorisation A414. This area is referred to as the Inglenook Project and is described in Section 1.2. This Review of Environmental Factors (REF) is submitted to the NSW Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS) under Part 5 of the Environment Planning and Assessment Act 1979 (EP&A Act) to satisfy the conditions of the exploration tenements. This REF is designed to assess and appropriately manage the environmental aspects of the proposed Stage 1 and Stage 2 exploration drilling program within the Inglenook Exploration Area and has been prepared in accordance with the requirements of NSW Resources and Energy 'Guidelines for Review of Environmental Factors (ESB-18)', 2006 (DPI-MR REF Guidelines, 2006) and the NSW Minerals Council Mineral Exploration Handbook (draft 9, September 2010). The Exploration Licenses that make up the Inglenook Project are as follows:

- Exploration licence application number 3778 now exploration licence number 7431 valid 18 December 2009 to 18 December 2014. (Ilford).
- Exploration licence application number 3779 now exploration licence number 7432 valid 18 December 2009 to 18 December 2014. (Cameron Road).
- Exploration licence application number 3780 now exploration licence number 7442 valid 12 January 2010 to 12 January 2014. (Melrose).
- Authorisation number 414 renewal took effect on and including 28 May 2009 (Cherry Tree Hill).

The total area covered by these exploration tenements is approximately 122 km^2. The exploration program will be staged with the first stage involving drilling on a 2 km^2 grid with the second stage involving infill drilling as required in order to confirm the quality and identify mining and environmental constraints. The first stage will be targeted to:

- confirm seam thickness and quality;
- identify major seam structures and intrusions;
- identify the extent of the basalt and alluvial thickness;
- investigate geotechnical properties of the rock mass; and,
- identify seam gas and potential mining conditions.

A key environmental outcome of the drilling will be the identification and characterisation of the groundwater resource. This will involve installation of a number of piezometers within the boreholes on completion of drilling. Which drill sites will have piezometers installed will be determined in consultation with land owners as these will require ongoing access for data download. Advice will also be sought from a hydrogeologist to ensure that the correct number and spacing of piezometers is achieved so that an accurate groundwater model can be developed.

1.2 Locality and Proposed Exploration Area (REF area)

Centennial Coal proposes to undertake an exploration drilling program within EL 7431, EL 7432, EL 442 and A414 in a project area referred to as Inglenook. The exploration areas are shown on Figure 2 and described below.

Ilford

The site is located west of the Great Dividing Range and comprises of approximately 3847 hectares (38.5 km^2) of rural land located east, north and south of the village of Ilford on the Castlereagh Highway approximately 50 km south-east of Mudgee.

The site is characterised by high cleared plateau country in the south and southeast with significant treed mountains and a gorge falling to cleared grazing land to the north. The northern section of the site is located on the Ilford 1:25000 map sheet while the southern part of the site is located on the Upper Turon 1:25000 map sheet.

Cameron Road

The site is located west of the Great Dividing Range and comprises of approximately 3578 hectares (35.8 km^2) of rural land located approximately 6 km south of the village of Ilford on the Castlereagh Highway approximately 50 km south-east of Mudgee.

The site may be characterised as high cleared plateau or tableland in the centre of the site with substantial timber plantations falling gradually to cleared grazing land to the south east and steep forested ridgelines and creek lines in the south west.

There are substantial areas of native vegetation throughout the site as well as existing infrastructure constraints including a state highway, powerlines and rural dwellings. The subject site is located on the Upper Turon 1:25000 map sheet.

Melrose

The site is located on the Great Dividing Range and can be described as an area of approximately 1767 hectares (17.6 km^2) of rural land located approximately 50 km north west of Lithgow on the Castlereagh Highway and approximately 15 km south east of Ilford on the same highway. The western third of the site drains to the west while the majority of the site drains to the east.

The site is characterised by high forested plateau country including state forest in the centre and to the north east and east with significant cleared grazing country to the west. The large majority of the western section of the subject site is located on the Upper Turon 1:25000 map sheet while the extreme eastern part of the site is located in the Glen Alice 1:25000 map sheet.

The vast majority of the site is located within the City of Lithgow LGA while the western most part is located in the Mid Western Regional Council LGA.

Cherry Tree Hill

The site is located west of the Great Dividing Range and comprises approximately 3,047 hectares of predominantly forested land surrounded by agricultural activities located adjacent to and directly east of the Ilford tenement, approximately 50 km south-east of Mudgee.

The site is characterised by two prominent hills known as Mount Fitzgerald and Bradleys Head which join Mount Misery to the south west. The main watercourses are Carwell Creek and its tributary Waterhole Creek which drain to the north. Cleared agricultural land occurs within the valleys and gentler slopes leading from the high forested plateau country. The northern section of the site is located on the Ilford 1:25000 mad sheet while the southern part of the site is located on the Upper Turon 1:25000 map sheet.

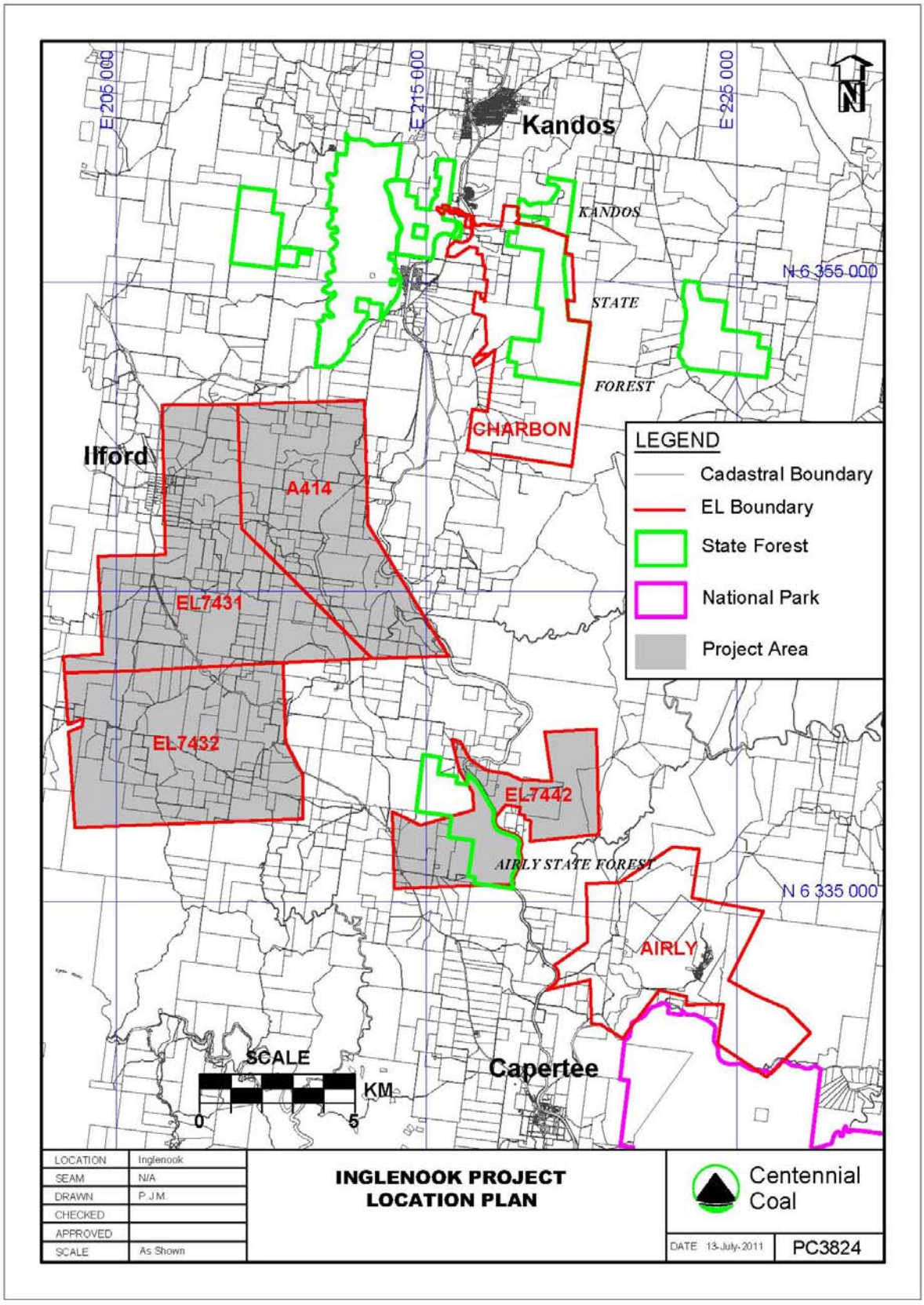

Figure 1 **Project Location**

The location of each mine tenement is provided in Figure 2, while the generalised location of the proposed boreholes is shown on Figure 3.

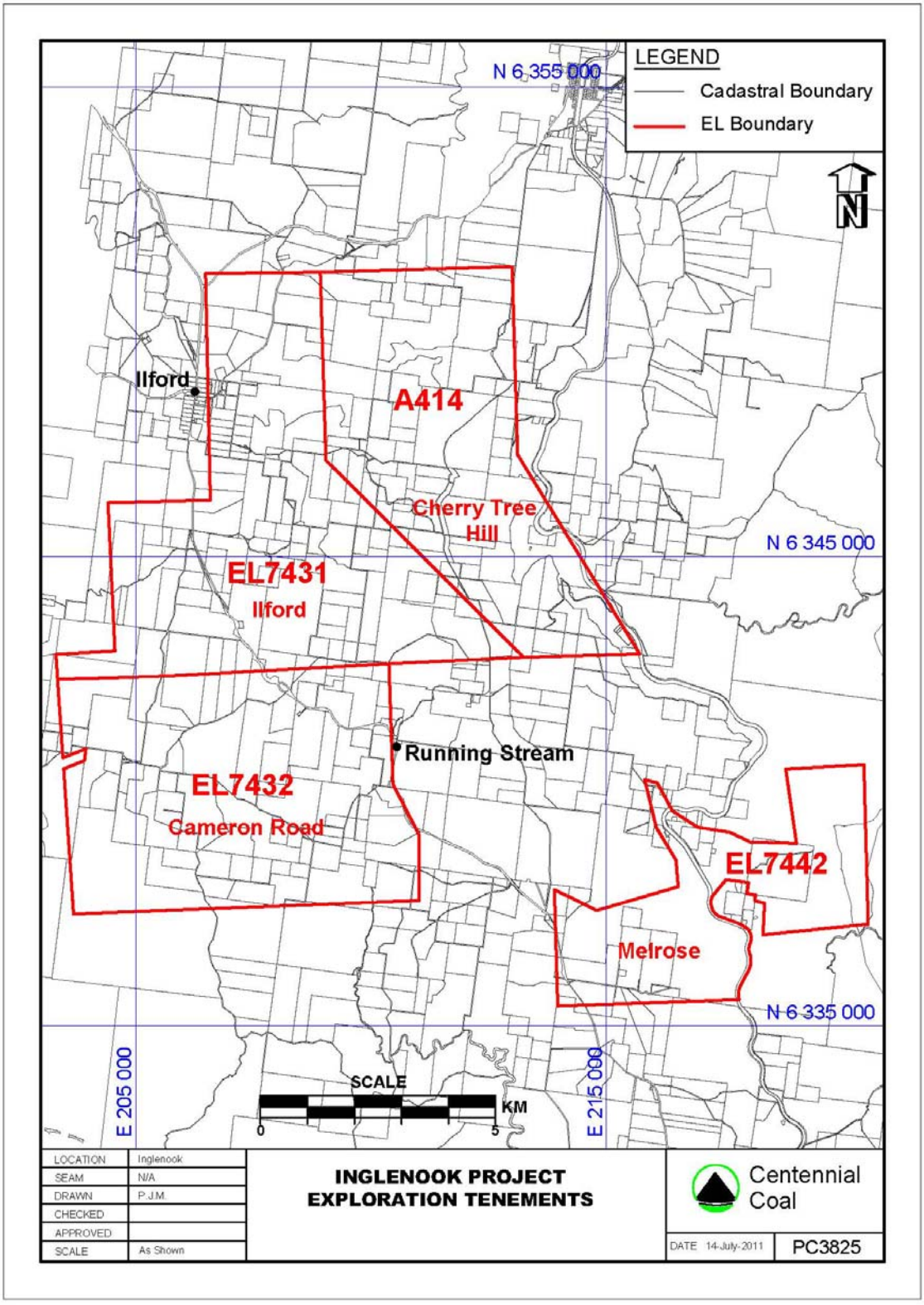

Figure 2 Inglenook Exploration Tenements

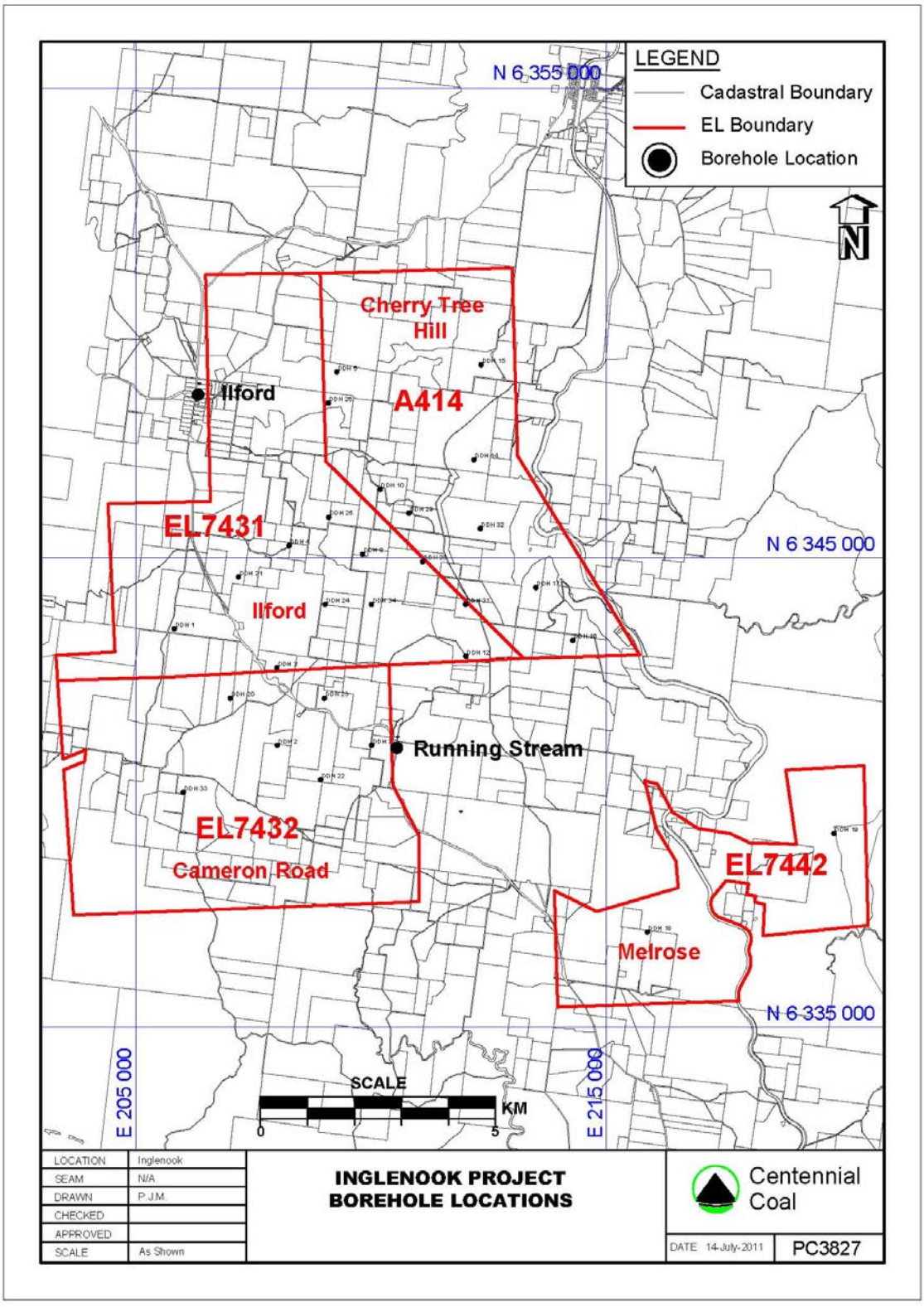

Figure 3 Borehole Locations

1.3 Exploration History

In March 2010, the Department of Industry and Investment NSW (now NSW Resources and Energy) issued Centennial the three exploration licences for the Ilford area (EL 7431), Cameron Road area (EL 7432) and Melrose area (EL 7442). The exploration licences are valid for five years. The Inglenook Exploration Project consists of these three new exploration licence areas and also includes the existing A414 which is referred to as Cherry Tree Hill which was already held by Centennial. There has been

limited exploration work undertaken by Genders Mining, Coalex and Blue Circle in the past however there is sufficient geological information to establish that a potentially significant coal resource exists within the exploration area. The purpose of this next phase is to undertake sufficient additional exploration work to better define the resource in order to prepare further engineering and mine planning studies to determine as part of a feasibility study.

Centennial commissioned an independent water census study in the area in 2010. The water census aims were to:

- Collect information on groundwater and surface water in and around Inglenook area;
- Provide understanding of the conceptual model; and
- Assist with location of exploration drilling sites to protect water sources.

The study was undertaken by taking water quality sampling from springs, bores, soaks, spring and runoff fed dams and creeks. Testing for field parameters (pH, EC, DO, redox, temperature) and lab analysis (major ions, metals, total nitrogen and phosphorous) was undertaken. Additionally water age dating (chlorofluorocarbons (CFC)) analysis by CSIRO was undertaken and water level measurement. The outcomes of the water census were provided to landholders, and technical information sessions were held to discuss the results (as described in Section 6.1). A report summarising the program and results was provided to landholders.

Centennial propose Stage 2 of the water census will involve the collection of date from groundwater monitoring bores (proposed as part of this REF) and surface water gauging.

1.4 Key Objectives of this Application and the REF

Centennial Coal seeks NSW Resources and Energy approval of this REF to satisfy the conditions of the Inglenook Exploration Tenements and to allow commencement of proposed exploration activities as detailed in this document. Specifically, the primary objectives of the exploration program is to:

- Provide sufficient geological and resource information to refine the existing geological model for the Authorisation to enable mine planning studies to progress;
- Determine coal seam roof and floor conditions;
- Locate geological structures and features within the exploration area; and
- Refine the coal resource status.

The key objectives for this REF include:

- Identification of environmental risks associated with the proposed exploration program;
- Undertaking exploration drilling in line with current best practice;
- Undertaking seismic and remote sensing techniques;
- Establishment of ongoing environmental monitoring; and
- Environmental management provisions covering the drilling works.

1.5 Environmental Management

This REF has been developed using a risk-based approach to identify significant environmental constraints and develop risk identification for the key environmental aspects associated with the exploration drilling program. Environmental management provisions have been identified for each potential risk category or environmental constraint. The entire exploration area has been assessed using this approach. This approach allows exploration drill sites to be selected with consideration to specific environmental constraints while allowing flexibility to locate or re-locate drill sites to areas of equal or lower environmental sensitivity.

Landowner requirements are integral in this approach which will involve consulting land owners on appropriate access through their properties, paddock and farm management arrangements, access to water and any specific requirements for pre-drilling preparation, during the drilling operation and post drilling cleanup and rehabilitation. All agreements made with individual landowners will be documented in the landowner access agreement.

This document also contains an Environmental Management Plan covering the proposed exploration program. The EMP contains environmental management objectives and procedures that will form part of the drilling contract and referred to in future land access agreements with land owners.

2 Exploration and Drilling

2.1 Description of the Activity

Centennial Coal proposes to undertake exploration drilling within the EL 7431, EL 7432, EL 7442 and A414. The surface exploration boreholes will be drilled to build on existing geology and coal quality information.

The program is anticipated to commence in September 2011, and be completed by end of 2012 with the anticipated assistance of a second drill rig to be brought in March 2012. A total of 28 drill holes will be established in Stage 1 and 2 of the exploration program. Standard exploration drilling operating hours will be between 7 am and 6 pm Monday to Friday. If and when required, incidental works may also be carried out on Saturday mornings between 8 am and 1 pm (after landholder approval has been obtained). The anticipated duration of drilling at each drill site is approximately two to three weeks depending on borehole depth and site conditions encountered.

2.2 Description of a Typical Drill Site

Some minor surface clearance is likely to be required to establish drilling sites (drill site footprint) and for the clearing and maintenance of access tracks to reach drilling locations in cases where access does not already exist (varies with location). Where possible, drill sites are selected as close as possible to existing roads/access tracks to minimise clearing requirements. The drilling footprint at each exploration hole will require a disturbance area of approximately 25 m x 25 m and the majority of sites are already cleared or require minimal preparation work. The general layout of a typical drill site is shown in Figure 4 below.

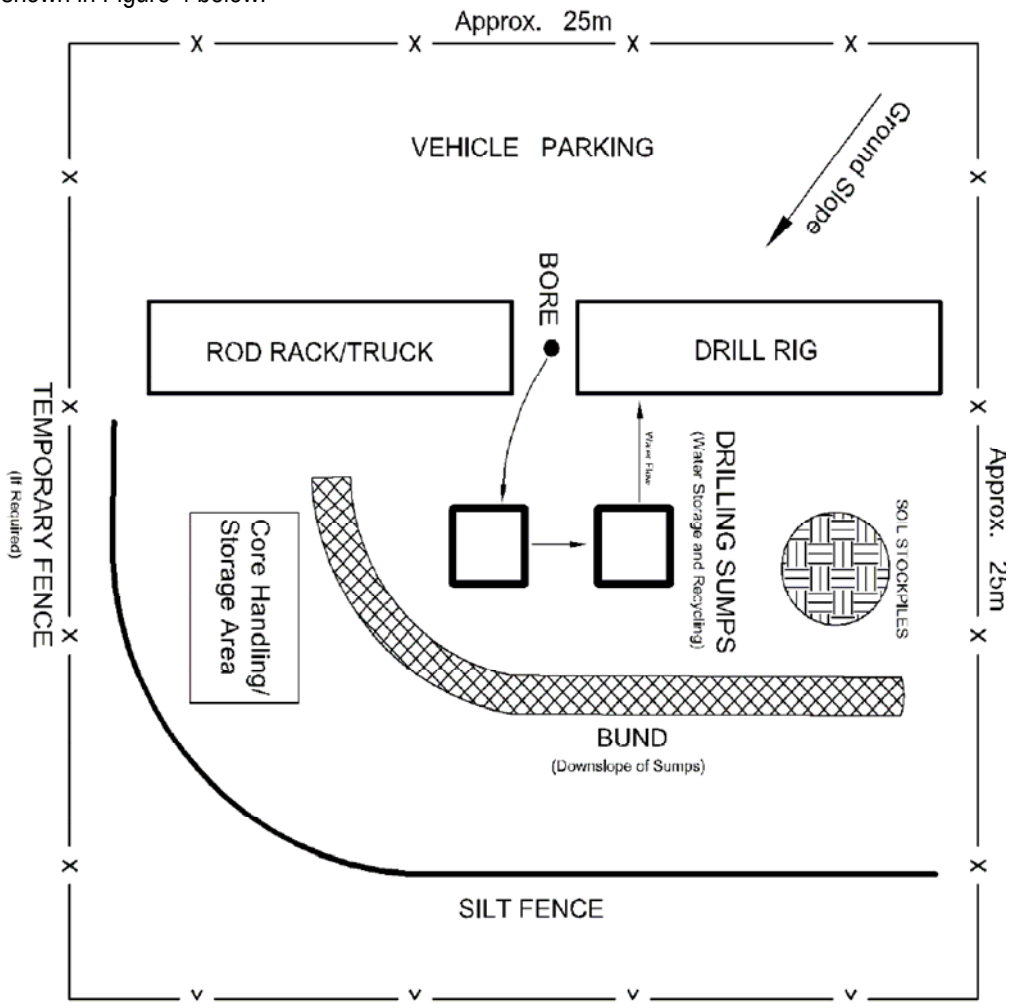

Figure 4 General Drill Site Layout

Drilling activities require the construction of collection systems to contain drill cuttings and to control and recycle drilling fluids down the borehole. The collection system will be an above ground or in ground sump. The above ground sump uses a mechanical separation using variable g-force shakers to separate material and water. Drilling cuttings are to be collected within a skip from an off take of the above ground sump.

The disposal of cuttings will be undertaken in accordance with DECCW (now Office of Environment and Heritage) Waste Classification Guidelines Part 1: Classifying Waste (2009). A range of drilling cuttings will be tested in accordance with the Guideline. In accordance with Table 1 of the Guideline waste will be disposed of as putrescible or non-putrescible in accordance with the licensing and waste transfer requirements within the *Protection of the Environment Operations Act 1999* and *Protection of the Environment Operations (Waste) Regulation 1996*. Cuttings will be collected in metal skips and transferred to a central storage location every second day, before being disposed of by a waste management contractor to an approved disposal facility.

Topsoil will be removed and stockpiled separately. Silt fencing will be installed along the down slope perimeter of the drill site as a further control for any surface water runoff from the site. A temporary security fence will be placed around the drill site if required, and where necessary stock-proof fencing will be used. Water for the drilling process will be sourced from landowners by agreement, and pumped or transported by water truck to the drill site as required.

At the completion of drilling, each borehole will be geophysically logged by a specialist contractor. This involves lowering a sensor down the hole which measures geophysical properties of all strata in the sequence. Several measurements are made of the rock strata densities, porosity and permeability. The exact location of minor water bearing horizons can be detected and with comparison with cores, can allow small variations in rock type to be determined. The logging operation will take approximately one day.

After completion of the geophysical logging, each borehole will either be fully backfilled with cement grout within one week in accordance with NSW Office of Resources and Energy guidelines EDG01 “Sealing of Surface Boreholes”, or be converted to a piezometer for ongoing groundwater monitoring purposes. The borehole location will be accurately surveyed, and the drill site will be rehabilitated as outlined in Section 8.4 of this report. Each drill site will be photographed prior to drilling, during drilling, and following rehabilitation.

In general, the drilling works will involve one day to set up, six to eight days for drilling, two days for installation of monitoring equipment, one day for geophysical logging and 2 days for borehole sealing and site cleanup. Therefore the drilling operation will take approximately three weeks to complete, with possible delays due to wet weather or to accommodate specific landowner requests or farm management activities extending site occupation for each hole to four weeks.

2.3 Piezometer Installation

In order to gain an understanding of the regional groundwater resource, a number of drill sites will be converted to piezometer monitoring sites. The drilling method will be identical however measurements of groundwater yield and quality will be undertaken at the time of drilling and excess water will be discharged from the site if suitable.

A piezometer is a pressure sensor which measures the relative height of the water column above the sensor. By knowing the depth of the piezometer, the depth of the water table can be accurately determined. The data is stored within a small computer chip which can be downloaded manually or remotely using the mobile phone network.

Vibratory wire piezometers may also be installed. These units are similar in size to the normal pressure sensors but also measure water-pore pressure as well as depth. The vibratory wire piezometers

convert water pressures to a frequency signal via a diaphragm, a tensioned steel wire, and an electromagnetic coil. The piezometer is designed so that a change in pressure on the diaphragm causes a change in tension of the wire. An electro-magnetic coil is used to excite the wire, which then vibrates at its natural frequency. The vibration of the wire in the proximity of the coil generates a frequency signal that is transmitted to the readout device. The readout or data logger stores the reading in Hertz. Calibration factors are then applied to the reading to arrive at a pressure in engineering units.

One advantage of vibrating wire piezometers is that they can be installed in fully grouted boreholes and do not require sand filter zones or slotted pipe within the borehole. This greatly simplifies the installation of multiple sensors in the same borehole. It also makes it possible to install piezometers with inclinometer casing within the same borehole.

These sites will be fully rehabilitated with the exception of a small plastic cap located above the borehole and in some instances a box containing telemetry equipment. Access will be required to piezometer sites for data download, maintenance or changing batteries with remote sensing units. Generally only walking access would be required. The installation and ongoing monitoring access will require a land access agreement to be established with the land owner.

2.4 Rehabilitation Activities

After completion of the geophysical logging, each borehole will either be fully backfilled with cement grout within approximately two weeks in accordance with NSW Office of Resources and Energy guidelines EDG01 “Sealing of Surface Boreholes”, or be converted to a piezometer for ongoing groundwater monitoring purposes. The borehole location will be accurately surveyed, and the drill site will be rehabilitated as outlined in Section 8.4 of this report. Each drill site will be photographed prior to drilling, during drilling, and following rehabilitation.

2.5 Seismic Survey Method

Although seismic surveys are not proposed within the current program, it represents a low impact method of identifying geological structures which may aid in the ongoing drilling phase and therefore may occur a later stage (dependent upon another Review of Environmental Factors). Seismic survey uses a truck mounted vibration unit to transmit vibrations into the ground as it drives along a road reserve, track or cleared land. The vibrations are reflected off individual strata layers down to the coal seam and recorded by surface geophones. The result graph is then translated into rock types showing the seam roof and floor and highlighting any variations. This is an ideal method to identify faults and igneous intrusions which are then backed up by drilling data.

Although this form of survey is non-intrusive and involves little if any land disturbance, land owner agreements involving compensation will be necessary prior to accessing any private property for the purposes of seismic survey.

2.6 Access Track Construction and Maintenance

An access track is a track negotiable by vehicles necessary for the drilling program. Where possible existing access tracks will be used with upgrading of these tracks where required. Where new access is required, the location will be determined by the prevailing conditions and property owner preferences. The location of any new tracks will be discussed with each land owner.

This REF only covers new tracks that do not involve earthworks which disturb subsoils such as cut and fill or otherwise require the construction of channels and banks. These works, if necessary, will be the subject of a separate application to NSW Office of Resources and Energy and will include the preparation of a Soil and Water Management Plan.

Minor sedimentation and erosion control measures will be installed and maintained in accordance with the principles specified in the “Managing Urban Stormwater: Soils and Construction – 4th Edition”,

Landcom 2004 (Blue Book). These are likely only to involve the erection of silt control fencing and the maintenance or repair of existing erosion controls.

If only existing access tracks are used, the guiding principle for use will be to leave the tracks in the same condition as found. Should any damage occur to existing privately owned tracks they will be fully repaired as part of the project. This condition is standard within Land Access Agreements.

2.7 Justification of the Activity

The aim of the exploration program is to provide additional information on the resource to enable the development of a feasibility study into future resource extraction. Specifically the exploration program will obtain additional information on:

- Seam thickness, coal quality and structure;
- Mechanical properties of roof and floor lithologies and overburden to allow completion of geotechnical evaluations for technique extraction of the coal resource;
- Geological anomalies; and
- Provide means to complete borehole to borehole resistivity surveys.

The program will also provide the opportunity to install a piezometer network to gather baseline data on the groundwater regime in the area and to ultimately develop a groundwater model for any future approval application.

2.8 Evaluation of Alternatives

An area-based assessment covering the entire exploration area provides an appropriate mechanism for ensuring environmental impact protection whilst maximising logistical flexibility to locate or relocate drill sites in areas of equal or lower impact. The principle behind this method is that suitable alternative drill sites will be sought where available to ensure drill sites are not located in areas presenting significant environmental risks or where there is potential for significant environmental harm. The risk-based mapping developed for this REF is intended to assist the selection of drill site location within the Inglenook Exploration Area throughout the exploration drilling program.

3 Planning Context

3.1 Commonwealth Legislation

3.1.1 Environmental Protection and Biodiversity and Conservation Act 1999

Under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act), approval of the Commonwealth Environment Minister is required for any action that is likely to have a significant impact on certain aspects of the environment that are Matters of National Environmental Significance. An assessment of the exploration drilling program on these issues is provided in Table 1 below.

Table 1. Matters of National Significance

National Environmental Significance	Project Assessment
World Heritage Properties	No World Heritage Properties will be impacted by the proposed exploration program.
Wetlands of International Importance	No items of International Importance occur with the exploration areas
Commonwealth listed Threatened Species	A number of listed Threatened Species and Ecological Endangered Communities occur with the region and may occur within the Exploration Area. By keeping the drill sites to existing cleared areas will avoid impacts on these species and communities.
Commonwealth listed Migratory Birds	A number of listed migratory birds frequent the area and are known to occur within the study area. By keeping the drill sites to existing cleared areas will avoid impacts on the habitat or transient areas of any migratory birds.
Nuclear Action	The proposed exploration program does not involve nuclear action under the definition of the EPBC Act.
Commonwealth Marine Areas	There are no Commonwealth marine areas within the exploration area that would be impacted on by the exploration program

As presented in Table 1, the proposed drilling program will not pose a risk or otherwise have a significant impact on any aspects of Matters of National Environmental Significance as defined in the EPBC Act, and therefore, approval under this act is not required.

3.2 State Legislation

3.2.1 Water Management Act 2000 (WMA)

The Water Management Act 2000 (WMA) is administered by Department of Water and Energy (DWE) and contains approval requirements for some developments to protect watercourses from any adverse effects resulting from works within or in proximity of these watercourses. A controlled activity approval under the WMA is required for undertaking workings within 40m of a watercourse. Section 39A of Water Management Regulations 1994 provides exemptions for this requirement, including where leases are held and issued under the NSW Mining Act 1992. It is considered that controlled activity approval will not be required for activities authorised under the Exploration Licences, however a licence will be sought from the NSW Office of Water for any drill holes which are proposed to be converted to groundwater monitoring sites.

3.2.2 Fisheries Management Act 1994 (FM Act)

The Fisheries Management Act 1994 (FM Act) contains approval requirements, licensing provisions, and commercial and recreational regulation of aquatic activities that may have or would likely impact in threatened aquatic life form and its habitats. As the project does not intend to disturb or impact any aquatic flora and fauna an approval under the FM Act is therefore not required for the project.

3.2.3 Heritage Act 1997 (as amended 1998)

The Heritage Act 1977 (amended in 1999 and 1998) provides protection for listed items of heritage significance and can be defined as a place, building, work, relic, moveable object or precinct. The Act includes subsurface relics and protection is afforded items of state significance listed in the State Heritage Register. Items of Local Significance are afforded protection under the EPA Act. Of note is the following provision under s139 of the Heritage Act:

"A person must not disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit"

3.2.4 National Parks and Wildlife Act 1974

The NPW Act regulates any disturbance of relics, Aboriginal places and threatened/endangered flora and fauna species and as such, a permit is required to be obtained prior to undertaking activities that may impact upon Aboriginal objects or sites, and threatened/ endangered Flora and Fauna species.

It is an offence under Part 6 of the NPW Act (1974) for any person/company to:

- ❒ Destroy, deface, damage, cause or allow the destruction/defacement to and Aboriginal object or Aboriginal place (Section 90)
- ❒ Disturb, move, excavate for the purpose of finding Aboriginal objects, or take possession of Aboriginal objects (Section 86) unless a valid permit under Section 87 of the Act has been issued by the Director General of the OEH; and
- ❒ Be aware of the location of an Aboriginal object located on and fail to report it to the OEH (Director General) within a reasonable time frame (Section 91).

3.2.5 Threatened Species Conservation Act 1995 (TSC Act)

The NSW Threatened Species Conservation Act 1995 (TSC Act) administered by OEH, requires an assessment of threatened/endangered flora and fauna species within the vicinity of the project. The Act provides for the conservation of threatened species, populations and ecological communities of animals and plants. An assessment of the area considering threatened species has been undertaken during the preparation of this REF. At this stage no threatened species are intended to be impacted by proposed works (preference is for relocation of works), and the due diligence field inspections by a suitably qualified and experienced ecologist at the actual proposed works location will ensure that this occurs or appropriate approvals obtained should works not be able to avoid such impact (preferentially avoided).

3.2.6 Indigenous Community Consultation Requirements (ICCR)

The Office of Environment and Heritage (OEH) is responsible for administering the NPW Act (1974), and is also responsible for ensuring that correct and adequate consultation has occurred for any given project. In 2005 the DECC (now OEH) released the Indigenous Community Consultation Requirements (ICCR), which are to be adhered to in the event that specific sites are located and require assessment.

3.3 State Environmental Planning Policy

The State Environment Planning Policy (SEPP) for Mining, Petroleum and Extractive Industries (released in 2007) provides descriptions of development permissible without consent which includes 'mineral

exploration'. Clause 5 of the SEPP describes its relationship to other environmental planning instruments, including with respect to situations of potential inconsistency between the SEPP and other environmental planning instruments. Clause 5(3) indicates that the SEPP takes precedence over other environmental planning instruments (including Local Government LEPs). Accordingly, Centennial Coal considers that the proposed exploration program is consistent with definitions and requirements for permissibility under the SEPP within the Inglenook Exploration Area.

3.4 Local Environment Plans

The Inglenook Exploration Area is located both in Lithgow City and Mid Western Regional. As previously noted the SEPP takes precedence over Local Government LEPs. The study area is zoned Rural and none specifically prohibit coal mining.

3.5 Existing Licences and Approvals

The existing exploration licences are the only approvals currently held that apply to the Inglenook Project. The conditions required for exploration activities within this approval have been considered and accommodated for within this exploration REF. A copy of the licences is provided in Appendix 1.

3.6 Additional Licenses and Approvals Potentially Required

The intention of the risk-based process established for drill site selection under this REF is to preferentially avoid locating drill sites in or near existing environmentally sensitive locations using a system to identify environmental risks and use these to optimise the location of each borehole in order to minimise impacts. The approach has used existing vegetation mapping, listed heritage sites, known threatened flora sites/communities and community issues such as internal property access and proximity to residences. There is the potential for some impacts on vegetation communities and should this be unavoidable, additional approvals would potentially be required for works within these areas. Details of these additional approval requirements are outlines below.

3.6.1 Aboriginal Heritage

Section 87 and/or Section 90 Permits (NSW National Parks and Wildlife Act 1974) for Heritage Impact or Investigation Disturbance are required if there is to be potential disturbance to any aboriginal site, including if further research requires excavation or collection. The OEH is responsible for ensuring that correct and adequate consultation had occurred for any given project. In 2005 the OEH released the Indigenous Community Consultation Guidelines which are to be adhered to if a Section 87 or Section 90 permit is required. These guidelines are currently under review along with other matters relating to permits required for certain types of activities on privately owned agricultural land. The project will adhere to any new or modified conditions relating to Aboriginal Heritage.

3.6.2 Ecology

A Section 91 Licence (*NSW Threatened Species Conservation Act, 1995*) is required if the drilling activity involves picking or harming threatened species, populations or ecological communities listed under the *Threatened Species Conservation Act, 1995*. In this instance a Section 91 application is required to be submitted to the NSW Department of Environment, Climate Change and Water. Although avoidance is the principle management strategy for the exploration program and it is highly unlikely that an approval will be required under the *Threatened Species Conservation Act, 1995*, an application will be made if considered necessary during the ecological audit process.

3.6.3 Exclusion and Exemption Areas

There are no known exclusion zones within the exploration tenements. There are no National Parks or reserves, which prohibit mining and the Community Conservation Area Zones 1 and 2 established under the Brigalow and Nandewar Community Conservation Act 2005 occurs outside the exploration tenement boundaries.

3.6.4 Land Access Agreements

Land Access Agreements between landowner and Centennial are required to be entered into prior to Centennial accessing any land for exploration drilling activities. Under Section 31 of the Mining Act 1992, if any principal place of residence is located within 200m of any proposed exploration drill site, occupier consent must also be obtained.

Land owner consent is also required for exploration activities located within public lands which are controlled by State or Local Government. Forests NSW have standard procedures for obtaining permits to undertake drilling in any State Forest. These largely involve adhering to State Forest policies and procedures, safety provisions, insurance requirements, ecological and heritage considerations and compensation.

Similarly, the Lands Department has specific requirements for accessing publicly owned land for the purposes of mineral exploration. These involve the same considerations as NSW State Forest and standard agreements are provided.

Road reserves within the exploration area include those managed by both State and Local Government. In each case, land owner access agreements are required. The NSW Roads and Traffic Authority require specific traffic safety and management procedures to be met and approval is often required from a separate traffic management division within the Authority. Although a Land Access Agreement is required from local government, there is no provision for a separate development application to be made.

In the event that an agreement cannot be reached, the provisions of the Mining Act will be followed. This will first involve the appointment of an Arbitrator under Section 143 of the Mining Act. If agreement is unable to be reached on the appointment of a suitable Arbitrator after 28 days, then an application to the Director-General of the Department of Industry and Investment can be made for the appointment of an Arbitrator from a Panel set up under Section 143. The Arbitration process is detailed in the Mining Act (S143 to S158). If either party is dissatisfied with the decision of the Arbitrator, an appeal can be lodged with the Land and Environment Court. The decision of the Court is final unless there has been an error of law which may give rise to an appeal.

The Land and Environment Court hearings in the case of Land Access Agreements come under the Class 8 jurisdiction. This allows for a more relaxed user friendly court environment where it is not necessary for either party to have legal representatives. It also not subject to the usual rules on costs, that is, appeals are usually on the basis of each party bears their own costs.

3.7 Consultation

Community consultation has occurred for the past 12 months and has included direct landowner discussions and group meetings in accordance with a Stakeholder Engagement Plan. This plan also involves ongoing liaison to ensure all stakeholders and potentially impacted residents are consulted throughout the exploration drilling program. Centennial maintains a landowner database to identify individual landowners and Lot and DP information within the Inglenook Exploration Area to facilitate community consultation.

Centennial was invited to a community meeting in August 2010. The community meeting included a presentation on the background of Centennial and the Inglenook project, the proposed grid method of defining drilling holes, known geology and proposed upcoming water census. A water census commenced in 2010 within the exploration area (as described in Section 1.3). Results from the census were sent directly to landholders, and an information session was held for landholders to discuss the results of the session with an independent hydrologist.

A community newsletter will be issued in July 2011 containing an update on the drilling program.

4 Environmental Aspects of the Exploration Area

The Inglenook Exploration Area comprises three separate licences, these are referred to as Cameron Road, Ilford, Melrose and Cherry Tree Hill. Each licence area is shown on Figure 5 and described separately.

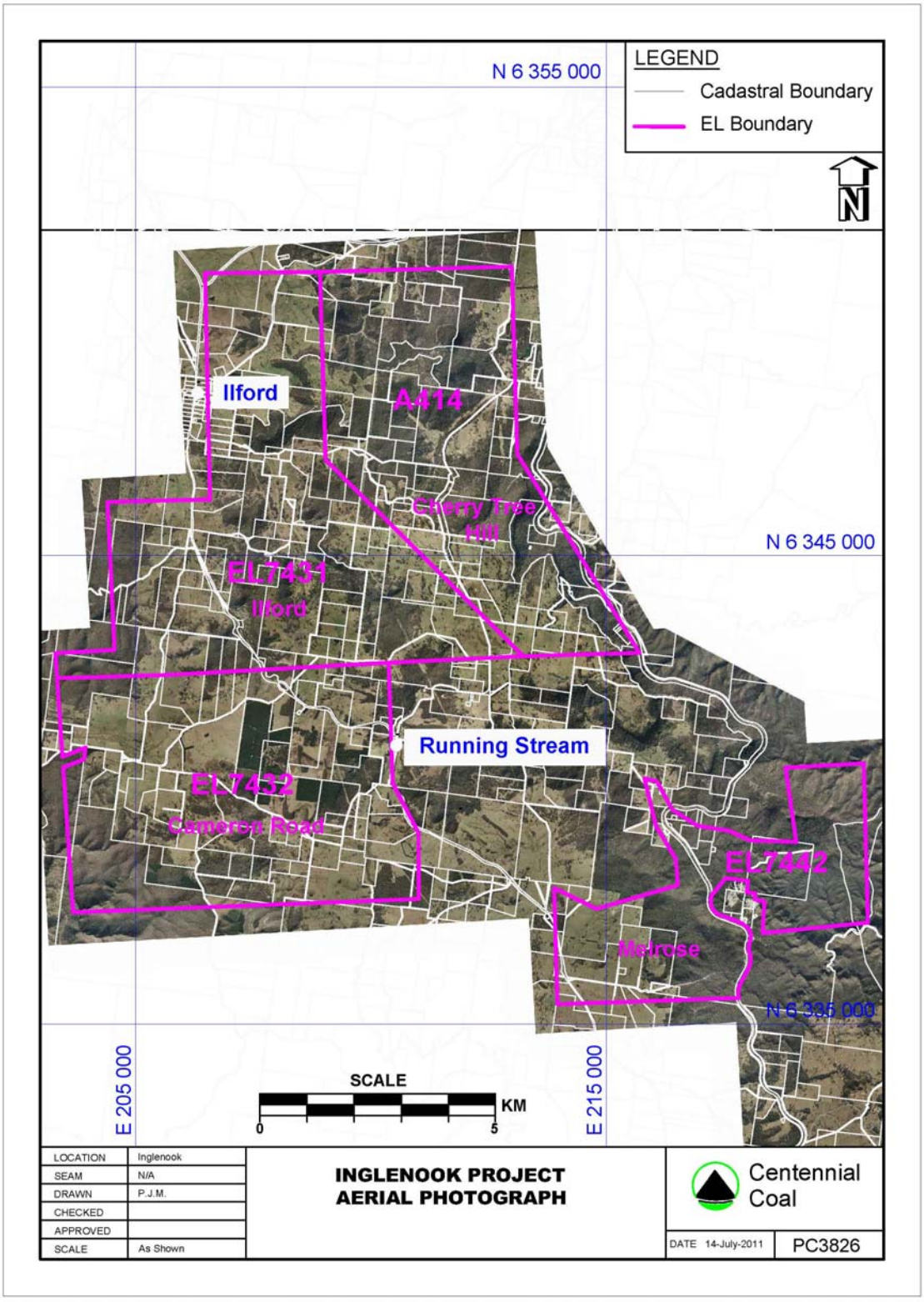

Figure 5 Inglenook Air Photo

4.1 Geology, Landforms and Topography

The Inglenook Project is situated in the western edge of the Permo-Triassic Sydney Basin and covers the Cherry Tree Hill outlier. Triassic-age Narrabeen Group strata and the underlying Permian-age Illawarra Coal Measures outcrop around the sides of the topographically-elevated Cherry Tree Hill outlier, which is capped by Tertiary-age basalt. The full stratigraphic section from the Illawarra Coal Measures extending to the Tertiary Basalt cap is preserved in several locations around the outlier. Regionally, the Illawarra Coal Measures dip 0.5 to 1 degree the northeast.

The Illawarra Coal Measures and underlying Shoalhaven Group lie unconformably on Lower Devonian shales, tuffs and limestones. The steeply dipping and folded Devonian beds outcrop immediately east of the Wallerawang-Gwabegar Railway on the eastern side of the Centennial Coal's A414.

The stratigraphy of the Illawarra Coal Measures in the Western Coalfield is summarised in Table 2. The significant coal seams are the Irondale, Lidsdale and Lithgow seams. The other seams in the stratigraphic section, the Katoomba and Upper Irondale are too thin and discontinuous or of inferior quality and are considered to have no economic potential.

4.1.1 Illawarra Coal Measures

The Illawarra Coal Measures are approximately 110 m thick and include in ascending stratigraphic order the Nile, Cullen Bullen, Charbon and Wallerawang Sub-groups. Individual subgroups vary in thickness and extent across the exploration area as briefly described below.

Nile Sub-group

The basal Nile Sub-group is composed of siltstone, claystone, sandstone and minor conglomerate with the upper section dominated by grey fissile shale. The Nile sub-group is approximately 10 m thick over most of the exploration area.

Cullen Bullen Sub-group

Overlying the Nile is the Cullen Bullen Sub-group which is composed of approximately 5 m of Marangaroo Conglomerate and the overlying Lithgow and Lidsdale coal seams. The Marangaroo Conglomerate is composed of coarse sandstone and minor conglomerate.

While the Lidsdale and Lithgow seams are converged within Ilford and Melrsose areas, their individual components are well-developed and readily recogniseable in the east of Ilford. Current interpretation shows the basal Lithgow seam thinning regionally to less than 0.5 m in the southwestern margin of the Ilford exploration licence. On the eastern ridge the Lithgow seam is 2.9 m thick and the Lidsdale seam is 1.8 m thick. On the southern ridge the Lithgow seam is 2.2 m thick and the Lidsdale Seam is 2.5 m thick.

The two seams are separated by the Blackman's Flat Conglomerate equivalent which in this area is composed of claystone, mudstone and carbonaceous mudstones up to 0.6m thick.

Charbon Sub-group

The Charbon Sub-group is approximately 70 m thick across the exploration area and contains the Long Swamp Formation, Irondale seam, Newnes Formation, Glen Davis Formation, Baal Bone Formation, Angus Place Sandstone and State Mine Creek Formation.

The Long Swamp Formation consists of an interbedded sequence of sandstone, siltstone, mudstone and claystone which exhibit a high degree of lateral and vertical variation. The sequence is approximately 10 m thick and is conformably overlain by the Irondale seam.

The Irondale seam is also known as the Wolgan seam in the Wolgan Valley area. The seam is 3.5 m in thickness and is currently selectively open cut mined at Centennial's Charbon Colliery to the north east

of the exploration area as well as other open cut operations to the south such as Cullen Valley, Invincible and Lamberts Gully mines.

The Newnes Formation conformably overlies the Irondale seam. The formation is a thinly bedded sequence of sandstone, siltstone, claystone and mudstone and averages approximately 10 m in thickness. The formation contains a thin coal seam generally known as the Middle Irondale seam which is 0.5 m thick in the exploration area.

The Glen Davis Formation conformably overlies the Newnes Formation and is composed of thin beds of mudstone, claystone, siltstone, sandstone and coal. The formation is generally 5 m thick and the thin coal seams are known as the Upper Irondale seam.

The Baal Bone Formation conformably overlies the Glen Davis Formation. It is composed of thick units of mudstone and siltstone that grade upwards into the fine grained sandstone of the Angus Place Sandstone. The two units have a combined thickness of approximately 20 m.

The State Mine Creek Formation conformably overlies the Angus Place Sandstone. The base of the formation is marked by 0.75 m of coal known as the Moolarben Coal Member. The remainder of the formation is composed of claystone, mudstone, siltstone, and fine sandstone with a combined thickness of approximately 20 m.

Wallerawang Sub-group

The Wallerawang Sub-group is composed of approximately 5 m of fine grained Gap Sandstone and 5 to 6 m of coal which are generally referred to as the Katoomba seam and Middle River Coal members. Currently there is insufficient data available to allow any confident correlations of seam plies.

4.1.2 Triassic Narrabeen Group

The Narrabeen Group is approximately 125 m thick within the exploration area. It has an unconformable contact with the underlying Wallerawang Sub-group and is unconformably overlain by Tertiary basalt over part of exploration area. The Narrabeen Group has approximately 2 m of Widden Brook Conglomerate at it base. This is overlain by the Burra-Moko Head Sandstone. This sandstone is approximately 120 m thick and exhibits well developed vertical joints which form the vertical cliff faces on the northern side of the Cherry Tree Hill outlier. It is fine to coarse grained with pebbly phases and is usually cross-bedded.

Table 2. Illawarra Coal Measures within the Exploration Area

	FORMATION	COAL SEAMS / SIGNIFICANT UNITS
NARRABEEN GROUP		
ILLAWARRA COAL MEASURES	Wallerawang Subgroup	Katoomba /Middle River Coal Member Gap Sandstone
	Charbon Subgroup	State Mine Creek Formation Moolarben Coal Member Angus Place Sandstone Baal Bone Formation Glen Davis Formation (Upper Irondale Seam) The Newnes Formation (Middle Irondale Seam) Irondale Seam Long Swamp Formation
	Cullen Bullen Subgroup	Lidsdale Seam Blackman's Flat Conglomerate Lithgow Seam Marangaroo Conglomerate
	Nile Subgroup	
SHOALHAVEN GROUP		

4.1.3 Topography

Cameron Road

Cameron Road covers some 3580 ha (35.8 km^2) of the central western part of the Cherry Tree Hill Outlier which is dominated by a steeply sided/flanked elevated plateau area which is some 950 to 1100 m above sea level.

The elevated plateau is drained to the west and southwest by Two Mile Creek and its tributaries and to the south in the southeast corner by Running Stream and Gibbons Creeks.

Ilford

The Ilford area covers the northwestern section of the Cherry Tree Hill outlier. Ilford covers some 38.5 km^2, much of it over the northwestern part of the Cherry Tree Outlier which is dominated by a steeply sided/flanked elevated plateau area which is some 950 to 1050 m above sea level. The valley floor that covers much of the area to the northwest is some 700 to 750 m above sea level.

The elevated plateau and valley to the northwest are drained to the west and northwest by Cunninghams Creek and its tributaries.

Melrose

Melrose covers some 1770 ha (17.7 km^2) including two southeast trending ridgelines of the southeastern part of the Cherry Tree Outlier. Elevations on the top of these ridgelines are 950 to 1000 m above sea level. The valley floor that covers much of the area to the south and southeast is some 700 to 750 m above sea level.

The area is drained to the southwest by Jack Halls Creek and its tributaries and to the southeast by Oaky Creek and its tributaries.

Cheery Tree Hill

The A414 area covers the northeastern part of the Cherry Tree Hill Outlier, and is dominated by a steeply sided/flanked elevated plateau area which is some 950 to 1100 m above sea level. The valley floor to the north is some 700 to 750 m above sea level.

The elevated plateau and valley to the northwest are drained to the west and northwest by Cunninghams Creek and its tributaries. The plateau and the valley to the northeast are drained by Carwelll Creek and its tributaries.

4.2 Climate

The climate of the region is characterised by warm to hot days and cool nights during summer and frosty mornings followed by cool sunny days during winter. Snow falls occasionally in the high ground. Rainfall tends to be seasonally distributed with peak falls occurring in the summer months, with thunderstorms and strong winds. The region is quite susceptible to extended periods of drought.

Meteorological data was obtained from the Australian Bureau of Meteorology synoptic station 062021 located at Mudgee (George Street). Climatic data presented is based in average monthly values recorded from 1870 to 2002.

The total mean annual rainfall is 675.7 mm with maximum falls occurring during January, February and December. The months with the lowest rainfall are March, April and May. The mean monthly number of rainy days is greater in the winter months from June to August, and lowest in spring/autumn. This trend suggests that while high volumes of rainfall are recorded in the summer months over a short number of days, they represent high intensity storms.

The annual range for mean daily maximum and minimum temperatures is 23.0 degrees Celsius and 8.3 degrees Celsius respectively. The coldest month is July with a mean daily maximum temperature or 14.4 degrees Celsius and a minimum of 1.3 degrees Celsius. The warmest months are January and February which have mean daily maximum temperatures of 31.0 degrees Celsius and 30.2 degrees Celsius respectively and mean minimum temperatures of 15.5 degrees Celsius and 15.4 degrees Celsius.

Wind speed and directional data was obtained from Nullo Mountain (Station Number 62100). Annual average wind speeds during 2000 and 2001 are 15 and 14 km/hr respectively, with ranges typically from 13-15 km/hr. Dominant wind sources are typically from the east throughout the day during the period from November to April, and during the winter and spring months the predominant winds throughout the day are from the west /northwest.

4.3 Land Ownership

Land ownership within the area includes:

- ❒ State Forest;
- ❒ Crown lands and roads; and
- ❒ Private lands; and NPWS State Conservation Areas.

The majority of land within the exploration area is privately owned and consists of grazing and light cropping with some horticultural and timber plantation activities.

4.4 Public Utilities and Infrastructure

Public and private infrastructure and utilities (non Centennial-owned) within the study area include:

Cameron road:

- Approximately 4 km of the Castlereagh Highway (managed and controlled by the Roads and Traffic Authority);
- Local roads (Razorback Road and New Olivers Road as well as numerous private farm roads);
- Approximately 5.5 km of 132 kV powerline controlled and managed by Integral Energy through the centre of the site;
- Extensive timber plantations, most likely in private ownership. These plantations are located through the centre of the site on some of the highest parts of the subject site; and
- There are a number of existing landing grounds within the site, used, it is assumed, for agricultural purposes.

Ilford:

- Approximately 4 km of the Castlereagh Highway (managed and controlled by the Roads and Traffic Authority);
- Local Roads;
- Approximately 4 km of a 330 kV power transmission line controlled and managed by TransGrid, in the eastern part of the site;
- Approximately 6.5 km of 132 kV power line controlled and managed by Integral Energy through the centre of the site;
- Integral energy also has a number of 66 kV and lower voltage domestic power lines across the site as well as an electrical substation just to the northeast of Ilford; and
- There is evidence of timber plantations along the southern boundary of the site in the vicinity of Cherry Tree Hill. NSW State Forests have advised there are no State Forests in Ilford consequently it is reasonable to assume that these existing plantations are in private ownership.

Melrose:

- Approximately 2 km of the Castlereagh Highway – managed and controlled by the RTA.
- The RTA Parkes office have advised that there are no plans for major re-alignment of the Castlereagh Highway however there are plans for minor realignments in various locations which may require 20 m wide strip acquisitions either side of the existing highway formation;
- Part of the Wallerawang to Gwabagar railway which passes through the centre of the exploration area for a distance of approximately 4.5 km;
- A number of local roads;
- Numerous private farm roads and tracks providing access to dwellings and farms;
- A 66 kV power line crosses the western part of the site from north to south;
- The site includes part of the Airly State Forest which is located in the centre of the site immediately east of the railway;
- An existing quarry located to the south of, but immediately adjacent to, the subject site; and
- An existing landing ground to the south of the site.

The Upper Turon 1:25000 mapping sheet identifies an abandoned coal mine to the north of the site.

The ARTC have advised the following that some restrictions will apply to their rail infrastructure including that no blasting is to occur within 500 m of the railway corridor without a current Blasting Agreement and prior approval. Although not relevant to the proposed exploration work, ARTC also advised that any future mine proposal would need to protect the rail corridor against the effects of mine subsidence. This would be achieved with the inclusion of a Rail Protection Zone defined by an angle of draw from the rail corridor to the seam of 35 degrees. This would form part of any future mine approval.

Cherry Tree Hill

Authorisation 414 does not contain any portion of the Castlereagh Highway and only a very short section of the Wallerawang to Gwabagar rail line. However the Authorisation includes a number of smaller rural roads including Mount Vincent Road, the upper section of Flatlands Road and Vulcan Road. The authorisation is crossed by a 500 kV transmission line, a smaller 132 kV transmission line and numerous smaller 11 kV local feed lines.

4.5 Land Zoning

The exploration areas are located in both the City of Lithgow LGA and the Mid Western Regional Council LGA. Mid-Western Regional Council is an amalgam of the former Mudgee Shire, Rylstone Shire and Merriwa Shire Councils. As a result the Mid-Western currently has three applicable Local Environmental Plans of which the Rylstone Local Environmental Plan 1996 is currently in force.

A Draft Comprehensive Land Use Strategy has been prepared for the entire Mid-Western Regional LGA. The Strategy will form part of a Comprehensive Local Environmental Plan (LEP) which will replace the three current LEPs Merriwa LEP 1992, Rylstone LEP 1996 and Mid-Western Regional Interim LEP 2008.

The Greater Lithgow City Council LGA was also extended to the north to take part of the previous Rylstone Shire during the amalgamation process. The Greater Lithgow City LGA is still controlled by the Lithgow City LEP 1994. The vast majority of the proposed exploration area is zoned Rural 1a which does not pose any restrictions on exploration activities.

4.6 Natural Resource Use

By the nature and scale of the proposed activities, the proposed exploration program is considered likely to have negligible impact on areas of significant importance such as fishing, agriculture and forestry industries within the exploration area throughout the drilling program. The only demand in resources will be requirement for water use in drilling. Water required for drilling will either be trucked in or obtained from farm dams where appropriate and with land owner approval. There may be minor clearing of areas to establish drill sites and access tracks, however use of existing roads/tracks and existing clear areas wherever possible will reduce the need for clearing and grubbing. Topsoil from clearing will be appropriately stockpiled where available and practicable. Cleared vegetation will be utilised for site rehabilitation upon completion where appropriate.

Phytophera management principles will be used within the project area to ensure the area remains unaffected. Any area in NSW with rainfall >400 mm has the potential for phytophera to enter the area successfully.

5 Environmental Impact Identification

5.1 Overview

The initial identification of issues has been based on a risk assessment process. This process has identified a range of environmental issues that form part of the Environmental Management Plan covering the exploration program. To date, the issue identification process has included:

- Risk Assessment: a risk assessment was used to assess the proposed activities associated with drilling on the surrounding environment and to make recommendations for further controls to minimise disturbance. Priority environmental aspects which will need to be managed in the project area include: noise and vibration, Aboriginal and European Heritage, ecology/flora and fauna, and erosion and sediment control.
- Review of Existing Survey Data: desktop review of existing major studies overlapping into the area.
- Baseline Data Collection/Specialist Field Survey: Noise, ecology and heritage field surveys and modelling were undertaken to assist the development of risk-based constraints and environmental sensitivity mapping.
- Constraints Analysis and Environmental Sensitivity Risk Mapping (utilising GIS): New and existing data was utilised to establish risk-based constraints and environmental sensitivity mapping. GIS layers were produced to assist ongoing management of the area by Centennial. The environmental constraints mapping included the following key aspects:
    - Aboriginal and Cultural Heritage
    - Ecology/Flora and Fauna
    - Noise
    - Surface Hydrology; and
    - Land Ownership
- Establishment of Drill Site Selection and Management Procedures: Specific procedures have been developed for the selection and management of exploration drill sites within the area based on constraints and environmental sensitivity risk mapping, controls identified in the project risk assessment, and the recommendations of specialist investigations for noise, ecology and heritage. Impact prevention and mitigation measures will be implemented generally in accordance with the recommendations of specialist studies in the REF project area where required.
- Drill Site Inspections: Final 'due-diligence' field inspections and targeted surveys will be undertaken by specialists for ecology and Aboriginal and European heritage at proposed drill site locations prior to commencement of works to ensure all potential environmental impacts are identified and minimised. Drill sites will be relocated wherever possible to ensure any impacts are minimised. The combination of environmental sensitivity risk mapping and targeted local surveys of potential drill sites provide greater flexibility in selecting the most suitable final drill hole locations with minimal impact.

The Environmental Management Plan for the drilling program is described in Chapter 6.

5.2 Identification and Prioritisation of Issues

A risk management culture has been adopted by Centennial to effectively manage any adverse effects that the proposed exploration drilling may have on the environment and the community.

In order to identify and prioritise issues relevant to the project, potential risks were identified using a transparent process as described in the following sections. The assessment process commenced during the submission of the tender for the three additional exploration licenses in early 2009. The process was continued during 2009 and early 2010 as part of team meetings and the formulation of this REF. In addition, initial community consultation as identified a number of local issues of concern, including:

- Impacts on groundwater;

- Impacts on local springs as a direct result of exploration drilling;
- Impacts on surface water systems including farm dams;
- Ecological impacts;
- Noise and dust during drilling; and
- General concern about any proposals for future coal mining activities.

There is the general perception that mining will follow the exploration program and this in turn raises a large number of concerns. Although not the subject of this REF it is worth noting that these concerns exist and will need to be addressed in any future proposal for resource extraction.

5.3 Objectives of the Risk Assessment Process

The objective is to employ a comprehensive risk assessment process of the potential environmental impacts of the exploration program and to identify the key issues for further assessment. The additional assessment would be required once land owner access agreements are in place and drill sites can be negotiated. At this point, additional studies will be required based on the potential impacts identified in this REF.

The object of the overall risk assessment process is to achieve the following goals:

- A more confident and rigorous basis for decision-making and planning;
- Better identification of opportunities and threats;
- Pro-active rather than re-active management;
- More effective allocation and use of resources;
- Improved stakeholder confidence and trust; and
- Improved compliance with relevant legislation.

5.3.1 Risk Assessment Methodology

A flow diagram of the steps taken in the risk assessment process, including the key steps of assessment of risks (analysis and evaluation) is shown in Figure 6, and further defined in the following sections.

The risk assessment procedure has been adapted from AS/NZS 4360: 2004, for risk management, which includes the following steps:

- Communicate and Consult;
- Establish the Context;
- Hazard identification (referred to as Environmental Issues);
- Risk Analysis;
- Risk Evaluation; and
- Treating Risk.

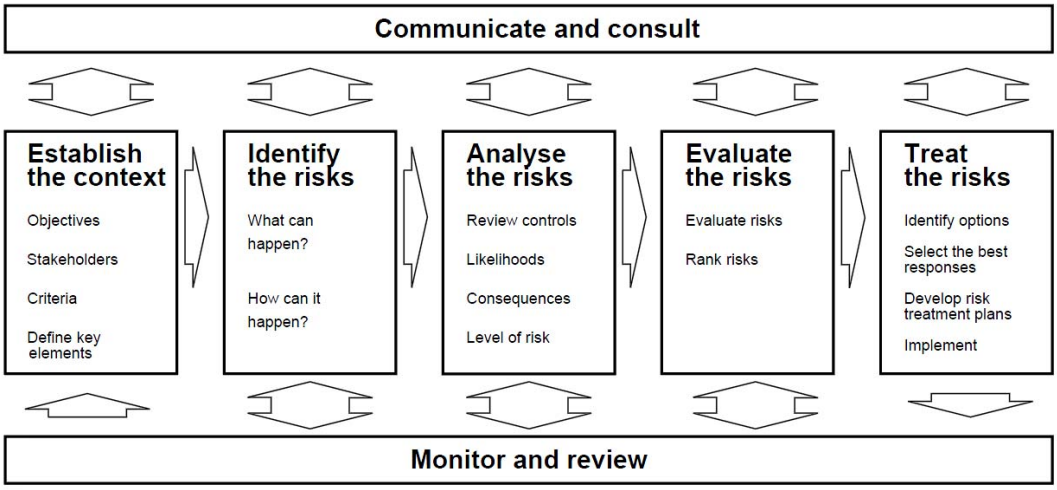

Figure 6 Risk Management Process

5.3.2 Communicate and Consult

This initial step in the risk assessment has been paramount and will continue throughout the entire project development process, and will continue into the life of the Inglenook Project should it proceed beyond the exploration phase.

5.3.3 Establish the Context

This component of the risk assessment involved identifying the relationship of the proposed Inglenook drilling program to the external environment including operational, political, social, cultural, regulatory and legal aspects and public perception. This process was facilitated by the identification of, and communication with, stakeholders to the project.

Establishing this strategic context was an important preliminary step because the objectives and perceptions of some of the external stakeholders were not always consistent with those of the project team, and have highlighted aspects of the project that required additional investigation through the planning and assessment processes.

5.3.4 Issue Identification

An environmental issue, for this purpose, was defined as follows:

"*an environmental issue is the intrinsic potential for an agent, activity or process to lead to an incident, or ongoing condition".*

An incident, or ongoing condition, was regarded as any occurrence that has the potential to result in adverse consequences to people, the environment, property, or a combination of these. Consequences can result from the development of an incident over time, either immediately after or over a period of time.

In carrying out the various risk assessments for the project, it was recognised that a single hazard may be the cause of multiple incidents and in turn, any one incident can have multiple potential consequences. The consequences may ultimately affect the ability to develop a future mine within the area.

Environmental Issue identification was the most important step in the risk assessment process for prioritisation of issues together with the identification of potential incidents. Once the environmental issues and potential incidents were identified, the assessment of the risks was carried out.

5.3.5 Risk Analysis, Evaluation and Treatment

Risk issues were defined as specific effects resulting from an incident and may be related to people, the environment, plant, or a combination of these.

Once the environmental issues and potential incidents were identified, the risk was assessed by determining:

- The severity of the potential consequences that could result from the potential incident; and
- The likelihood or probability of each consequence.

Once the level of risk involved with each potential hazard was determined, the acceptability of that risk was assessed. In cases where the level of risk was assessed as being high or extreme, steps were taken in the design of the project to reduce the risk so the effect or impact would become as low as reasonably practicable. Therefore an essential part of the assessment process is the determination of risk reduction strategies and their potential effectiveness to control, reduce or eliminate the risk. These risk reduction strategies formed the basis for the environmental management provisions in Chapter 6.

5.3.6 Monitor and Reviewing the Issues

Throughout the planning stages of the Inglenook Project the potential environmental and social issues have been under constant review. Factors that may affect the likelihood and consequences of an issue may change, which in turn may alter the risk associated with the development. This will continue to be the case throughout the life of the project, should it proceed to subsequent development phases.

Regular review of risk assessments is also important in verifying that the methodology, logic and predicted outcomes are in fact consistent with the reality of the project.

5.4 Summary of Risk Ranking and Results

Table 3 summarises the results of the risk review and the identified environmental issues and management responses. The risk analysis process undertaken acknowledges that further assessment is required prior to drilling as well as follow up management to ensure that the final outcomes of the drilling program meet the expectations of the community and Centennial management.

Table 3. Summary of Risk Analysis

Environmental Issue	Management Controls	Residual Risk
Groundwater	Isolate bores from water bearing strata by inserting sealing tubes. All bores not required for ongoing aquifer monitoring will be fully grouted.	Low
Ecology	Minimise clearing of mature vegetation. Avoid disturbance to trees with hollows. Avoid trees with active nests. Inspection of all sites by qualified ecologist. Rehabilitation of sites on completion.	Low
Archaeology	Inspection of drill sites by qualified Archaeologist prior to disturbance. Relocate drill sites if archaeological material is identified.	Low
Noise	Limit drilling to daylight hours only. No work on weekends without land owner agreement. Maximise distance between drilling rig and	Low

Environmental Issue	Management Controls	Residual Risk
	occupied dwellings.	
Dust	Limit vehicle speed on unsealed private road to less than 40 km/hr. Use water cart on unsealed roads during high winds if no alternatives are available.	Low
Agriculture	Specific landowner requests are to be documented in the access agreements and met. All gates are to be left as they are found. Selection of pasture seed in the rehabilitation program will take into account landowner requirements.	Low
Soil Erosion and sedimentation	Installation of silt control fencing downstream of all disturbed areas. All new access tracks will be constructed with appropriate drainage controls. Rehabilitation works to commence as soon as practicable following completion of works. Use of access tracks to be minimised during or following rainfall. All drilling fluids and cuttings to be contained within ponds and later removed from site. Topsoil is to be separated from any subsoil material and used in the rehabilitation works.	Low
Access Tracks	Preference to be given to existing farm tracks and access ways. All new tracks to be located in accordance with landowner requirements. All new tracks to be properly constructed, stable and drainage installed.	Low
Water Management	All drilling fluids to be contained on site within sumps or above ground tanks. Raw water to be obtained from existing farm dams with approval from the land owner or otherwise trucked to the drill site The use of on site dams will form part of the access and compensation agreement. Silt control fencing to remain until rehabilitation works are considered stable.	Low
Gates and Fencing	Any new fencing or gates are to be installed to the requirements of the landowner.	Low
Power lines	Advice from the supply authority will be sought regarding any specific access requirements or height restrictions beneath power lines.	Low
Other services	A “dial before you dig” enquiry is to be made prior to any subsurface excavation.	Low
Wastes	All disused containers, packaging or other wastes are to be removed on completion of drilling.	Low
Weed Infestation	Drill rigs and support vehicles are to be cleaned offsite prior to entering each property.	Low
Community	Landowners will be kept informed of the	Moderate

Environmental Issue	Management Controls	Residual Risk
	progress of drilling throughout the program. Dates of drilling on individual properties will be provided in advance and notification of any changes will be made promptly.	

5.5 Environmental Risk Mapping and Investigations

To date the investigations have been undertaken remotely using publicly available data bases and studies. Access to NPWS vegetation mapping and heritage site databases have been used to gain an overall appreciation of the investigation area. This information has been supplemented with areal photography and limited ground truthing. No private land has been accessed at this stage however the results of the initial studies have concluded that the identified sites have a low environmental risk. Irrespective of this, each site will need to be inspected by a qualified ecologist and archaeologist prior to confirmation and commencement of drilling.

5.6 Environmental Management

The following sections outline the environmental management principles to be followed during the exploration program. The identified key issues are:

- ❒ Community
- ❒ Groundwater
- ❒ Ecology
- ❒ Aboriginal Heritage
- ❒ European Heritage
- ❒ Noise and Air Quality
- ❒ Rehabilitation

6 Community Aspects

6.1 Stakeholder Consultation

In accordance with the conditions of each exploration licence, Centennial Coal has developed a Stakeholder Engagement Strategy for the Inglenook Exploration Program. This Stakeholder Engagement Strategy outlines the management of and mechanisms for communication and consultation with relevant stakeholders.

The purpose of the Stakeholder Engagement Strategy is to provide a consistent management framework to identify and consult with stakeholders with in interest in the Inglenook exploration activities. The objectives of the Stakeholder Engagement Strategy are to:

- ❒ Initiate and maintain open communication with landowners about the exploration drilling activities;
- ❒ Identify and proactively respond to landowner issues in relation to the exploration drilling activities; and
- ❒ Meet the requirements of the exploration licences.

Stakeholder consultation will take place throughout the duration of the project. A significant proportion of the area is privately owned. Centennial will undertake all proposed works within the area in adherence to the Stakeholder Engagement Plan to develop and maintain relationships with the surrounding community and ensure minimal impact on private landowners.

6.2 Public Safety

Public safety aspects have been included and considered in the process of assessing and managing potential risks associated with the exploration program. A certain level of security will be required to be maintained throughout the exploration drilling program at each drill site, primarily to protect stock or unauthorised access. Security and public safety measures may include local signage, temporary safety fencing or barriers to protect the drill rig equipment and the safety of the public and landowner. A security company may be employed if requested by the landowner.

6.3 Access Agreements

Access Agreements will be negotiated with landowners prior to any exploration activities occurring. An Access Agreement is essentially a contract which binds Centennial Coal to a list of conditions negotiated with the landowner. It documents all matters which Centennial Coal has agreed to with the land owner but must include as a minimum:

- ❒ Details of the proposed activities which includes all aspects of the project so the land owner knows exactly what is proposed to occur on their property;
- ❒ Hours of operation for all activities;
- ❒ Vehicle and equipment access arrangements which can include location of any new tracks, works to existing tracks, gates and fencing arrangements;
- ❒ Access to water including amount and exclusions;
- ❒ Weed and pest management;
- ❒ Stock management and arrangements;
- ❒ Rehabilitation standards and expectations;

- Compensation for all activities including access, disturbance to normal agricultural activities, water usage and incidentals. The compensation package needs to be fair and reasonable but include additional amounts should drilling works be delayed while on site;

- Dispute resolution procedures; and

- Environmental Management Procedures including inspections before, during and after completion of the works. Contact details for responsible Centennial personnel will be listed in the agreement.

The agreement will be for a set period which will be negotiated with each landowner. Some agreements will be for the drilling program only and will finish once the works have been completed and the landowner is satisfied with the rehabilitation works. Some agreements may be rolled over for an additional period particularly in the case of drill holes which will be converted to ongoing groundwater monitoring sites.

There are access agreement templates developed by the NSW Minerals Council in consultation with the Farmers Federation and Department of Industry and Investment, which will form the basis of each agreement.

6.4 Stakeholders

A range of stakeholders have been identified for inclusion in the consultation strategies. These stakeholders include Local and State Government agencies, local businesses and industries, private landholders and Centennial employees. These stakeholders have been divided into three tiers depending on their level of impact or involvement in the proposed exploration program.

Tier 1 Stakeholders

Tier 1 represents those stakeholders that are either potentially directly impacted by the exploration program or those that can be considered a high risk of being impacted by the exploration program. This can include private landowners, near neighbours or businesses and includes Government agencies that have an approval role in the project.

Tier 2 Stakeholders

Tier 2 stakeholders have been identified as those residential or organisations that are not considered Tier 1 stakeholders and that are located within the boundary of the Exploration Licence (EL6317) area. Tier 2 stakeholders also include Government agencies that may have an input into the approval process or otherwise have responsibility for activities that may be included in the drilling works.

Tier 3 Stakeholders

Tier 3 stakeholders consist of all other residents that have registered an interest in the Inglenook Exploration program, Local and State Government organisations, Local, State and Federal Members of Parliament, Local and Regional Businesses, Centennial employees and regional Non-Government Organisations (NGOs). These stakeholders will be considered when undertaking the consultation process and communicated with as necessary.

Stakeholder engagement and consultation activities are detailed in Table 4.

Table 4. Stakeholder Identification and Consultation

Tier	Contact	Method
1	Residential/Landowner – if drilling is likely to impact directly on the residence.	Face to face meeting Letter Newsletter Centennial Coal website Local newspaper

Tier	Contact	Method
1	Landowners neighbouring properties on which exploration drilling activities are being undertaken	Letter Face to face meeting (if requested)
1	Landowners/occupiers whose principal place of residence is located within 450 metres of an exploration drill site.	Letter Face to face meeting (if requested)
1	Government Agencies – Required in obtaining approvals for drilling activities.	Letter Meetings
2	Residential/Landowner – all other residents located within the Inglenook Exploration area.	Newsletter Centennial Coal website Local newspaper
2	Government Agencies – if input is required in approval process.	Letter Newsletter Meetings
3	Residential/Landowner – Residents that have an interest in the Inglenook exploration program.	Local newspaper Centennial Coal website Newsletter (if requested)
3	Government Agencies/Local Businesses/NGOs who may have an interest in the Inglenook exploration program.	Centennial Coal website Newsletter (if requested)

The timetable for implementation of the stakeholder engagement plan will depend on the overall drilling program. The project is currently listed in the Centennial Coal web page and the first Community Newsletter has been published. The web page provides an overview of the project and a project presentation.

6.5 Impact on the Community

Centennial Coal will implement a Stakeholder Engagement Plan for the project. The purpose of the Stakeholder Engagement Plan is to provide a consistent management framework to identify and consult with stakeholders with an interest in the exploration activities within the Project area. A stakeholder database has been developed which will be the repository for all communications between Centennial and stakeholders. The objectives of the Stakeholder Engagement Plan are:

- ❒ Set a process for engagement with stakeholders of interest, with clear desired outcomes for the Company and stakeholders;
- ❒ To openly communicate with stakeholders about the Inglenook Project ; and
- ❒ To provide a means of community access to the project team via a dedicated information phone line.

Access to properties will only occur in accordance with a Land Owner Access Agreement executed in accordance with the Mining Act 1992 and current Department of Industry and Investment guidelines.

6.6 Management Provisions

The following management provisions form part of the project's engagement strategy but are also set as conditions of the exploration licences.

- ❒ The Project Manager is to ensure that a Landholder Liaison Program and incidents and complaints procedure are in place (Condition 34 of the EL). This should include a contact telephone number which should be provided to the potentially impacted community members for them to call if they have any issues or concerns regarding the exploration drilling;
- ❒ Community members who will be potentially impacted by exploration activity should be made aware that operations are being undertaken; and

- A procedure should be developed for receiving and recording of community complaints/inquiries (Condition 28 of the EL).

7 Hydrology and Water Quality

7.1 Overview

Surface waters within the area have been identified and listed below.

Cameron Road

The site generally drains to the north, south and west being part of the central west catchment and includes a number of creeklines being:

- Running Stream
- Gibbons Creek
- Slowmans Creek
- Basin Creek
- Two Mile Creek
- Un-named Creek No 1
- Un-named Creek No 2

Ilford

The site generally drains from south to north being part of the central west catchment and includes a number of creeklines being:

- Cunninghams Creek
- Spring Gully
- Ryans Creek
- Dog Rock Creek
- Running Stream
- Un-named Creek No 1
- Un-named Creek No 2

Melrose

The eastern part of the site generally drains from the north to south into the Hawkesbury Nepean Catchment while the western part generally drains to the south-west being part of the Central West catchment and includes a number of creek lines being:

- Oakey Creek
- Deadmans Creek
- Jack Halls Creek
- Un-named Creek No 1

The flow lines that occur on the project area appear to be classed as Schedule 1 or 2 streams under Section 5(1) of the *Water Act 1912*. The schedule of the streams indicates the importance of the stream and allows the determination of what developments on the stream concerned require licensing or approval and from whom the consent is required. For example, the level or impact assessment on a Schedule 1 stream is lower than that required by a Schedule 2 stream.

Cherry Tree Hill

The elevated plateau and valley to the northwest are drained to the west and northwest by Cunninghams Creek and its tributaries. The plateau and the valley to the northeast are drained by Carwelll Creek and its tributaries, and Brogans Creek which flows east to the Capertee River.

7.1.1 Potential Impacts

It is considered that the potential for impact from the drilling project on the surface waters might be caused by:

- Water and land pollution due to track upgrade and drilling;
- Water and land pollution due to hydrocarbon spill; and
- Water and land pollution due to overflow of sump.

It is considered that, with the proposed mitigation controls outlined below, the project will have minimal impact on surface water quality and no significant impact on the surrounding catchment.

7.1.2 Surface Water Mitigation Measures

Effective surface water management will be implemented during the drill site selection and establishment, and maintained throughout the life of the drill project. Centennial will implement a tiered management strategy to appropriately select drill site and manage activities appropriately where in proximity to surface waters. Key measures include:

- Induction and awareness of all relevant site personnel and contractors;
- By preference, Centennial Coal will attempt to establish drill sites further than 40 m from all water courses;
- If drilling sites are required within 40 m of waterways, a core riparian zone (CRZ) buffer to the watercourse will be undertaken generally in accordance with 'Guidelines for controlled activities – Riparian Corridors' issued by NSW Department of Water and Energy (DWE) with respect to first, second and third order watercourses (refer to Table 5 below). This will be approved by the Environment Coordinator;
- Liase with the NSW DWE where drilling may be required within the CRZ areas identified in Table 5;
- Control of sediment run-off by following sediment control procedures down slope of the site disturbance (e.g. sediment fencing);
- Timely rehabilitation of drill hole locations;
- Creation of sumps and/or tanks at each drill hole to control erosion and sediment including installation of clean water diversions around drilling pad to minimise overflow or sumps; and
- Exposure and disturbance of ground surface is to be limited where possible to minimise erosion and sediment run-off.

Table 5. Recommended Minimum Disturbance Buffer Distance to Core Riparian Zone (CRZ)

Types of Watercourses	CRZ Minimum Buffer Width Required
Any first order watercourse and where there is a defined channel where water flows intermittently	10 m
Any permanently flowing first order watercourse, or any second order watercourse and where there is a defined channel where water flows intermittently or permanently	20 m
Any third order or greater watercourse and where there is a defined channel where water flows intermittently or permanently. Includes estuaries, wetlands and any parts of rivers influenced by tidal waters.	20 – 40 m

7.2 Groundwater

A key outcome of the exploration program is the establishment of a groundwater monitoring network using selected boreholes. The decision as to which boreholes will be converted to monitoring sites will be made in consultation with a hydrogeologist and landowners. Following drilling, a peizometer will be installed within the selected boreholes. This will consist of a pressure or vibratory wire sensor within the borehole which will be attached to the surface through the cap over the hole. These sites will need

to be accessed on at least a three monthly basis to enable download of the collected data. It is likely that some, if not all the monitoring sites will remain for at least two years or until such time as sufficient information has been obtained to develop a groundwater model for any future mining proposal.

Groundwater resources in the exploration area is complex however based on mining experience at Charbon Colliery, the coal seams while relatively poor, are the best aquifers within the Illawarra Coal Measure strata. Within the Project Area the coal seams are not expected to be reservoirs as they outcrop down dip to the east.

While no groundwater reservoirs are expected within the Illawarra Coal Measures it is expected that they may exist in the structurally low areas between the Triassic Narrabeen Group and overlying Tertiary basalts. These structural lows represent the topographically lower areas during the Tertiary period which the basalts flowed into. Surface exploration so far, has indicated that these areas contain unconsolidated sandstone and gravels and would be ideal groundwater reservoirs.

While exploration drilling has a low risk of impacting the existing groundwater resources, the program will incorporate mitigation and management measures to ensure that any risk of groundwater loss or cross contamination between aquifers is avoided. These issues are discussed below.

7.2.1 Mitigation and Management Measures

Where practicable, exploration boreholes will be preferentially located away from localised areas of potentially higher quality shallow alluvial aquifers typically associated with adjacent billabongs and sand lenses. Typically this will involve holes being drilled a minimum of 25 metres from known springs and water bores.

To minimise the potential for cross contamination of groundwater aquifers, a casing will be used when drilling through the alluvium or water bearing sequence creating an effect seal. The casing provides a barrier to alluvium groundwater flows and minimises the potential for contamination of groundwater sources between the alluvium and other aquifers as shown on Figure 7. To achieve this, a steel or reinforced PVC casing is lowered and seated in the Narrabeen Sandstone and few metres past the alluvials. The casing annulus at the Basalt-Alluvial and Alluvial-Narrabeen contact is then cemented to prevent potential mixing of aquifers. Once the cement has set, exploration drilling recommences.

All boreholes not required as ongoing monitoring sites will be backfilled with a cement compound (referred to as grout) to provide an effective seal in accordance with NSW Resources and Energy Guidelines EDG1 ‘Sealing of Surface Exploration Boreholes’ within seven days of completing the borehole. The seal will effectively and permanently stop interference of existing groundwater aquifers.

For boreholes which will be established as groundwater monitoring sites by installation of piezometers, the in-hole casing will be replaced with slotted pipe sections to allow for the collection of groundwater data. Water samples will be taken from each aquifer to determine any differential quality. Should there be a risk of cross contamination which may impact on the integrity of the system, the boreholes will be grouted up to the level of the target aquifer. This will differ between sites in order to gain necessary data on each and every aquifer within the system.

Some low permeability strata are also likely to be encountered during drilling. These sequences are referred to as aquitards or in the case of extremely low permeability, aquicludes. These sequences do not require separation from water bearing strata.

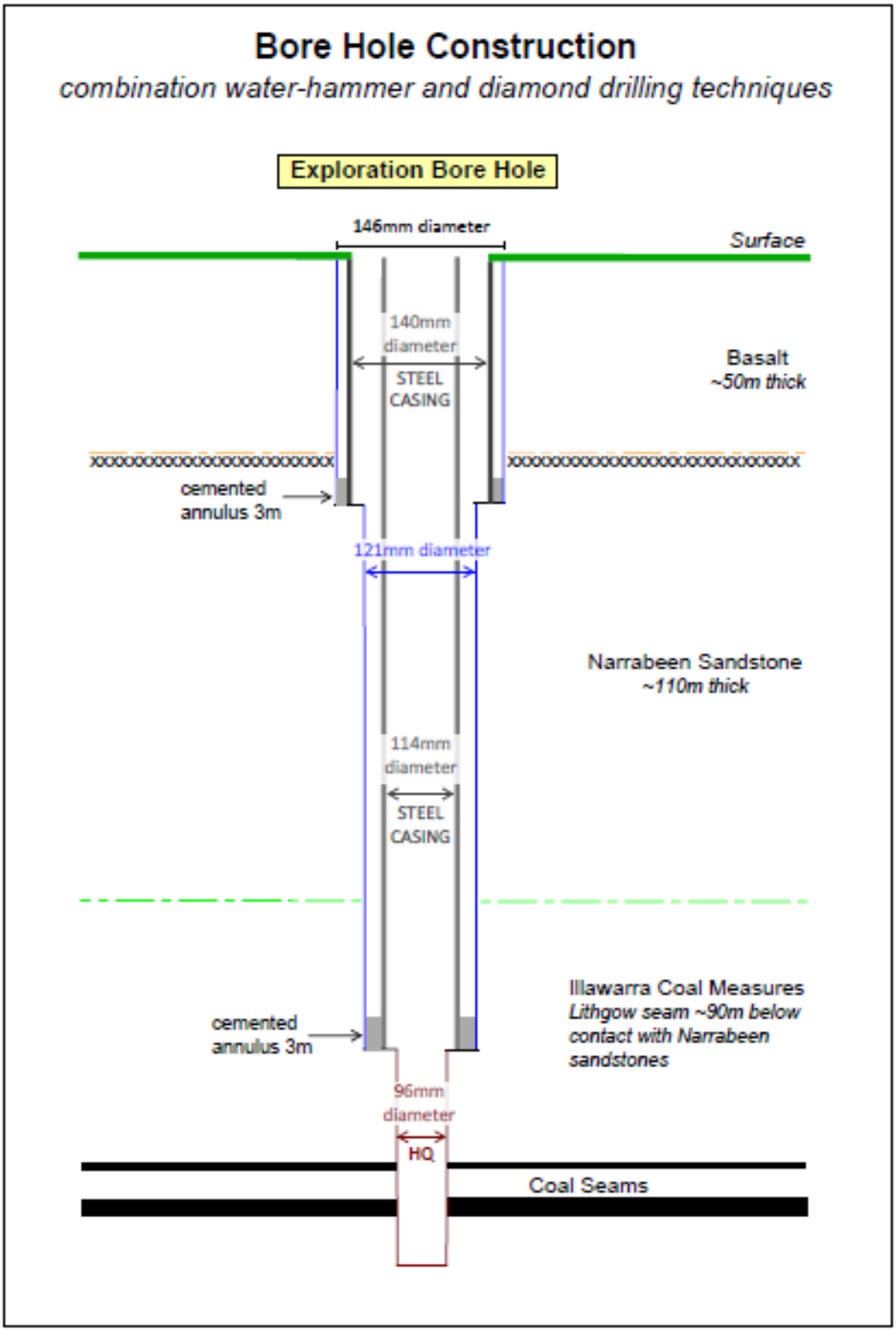

Figure 7 **Aquifer Sealing Method**

8 Ecology

8.1 Overview

The exploration area has a wide variety of ecological systems ranging from relatively undisturbed native vegetation systems within valleys and plateaux precincts, riparian systems, remnant communities through to cleared agricultural land. There is generally good access throughout the exploration area and significantly cleared areas to avoid clearing for the vast majority of the drill sites. There are a few sites which may require some minor clearing for either the drill site itself or access to the drill site.

There are a number of threatened species and Endangered Ecological communities occurring within the exploration area. These are described in the following sections, while management provisions adopted to reduce or avoid impact on these are provided in Section 8.6.

8.2 Flora

On the Cameron Road area there has been one threatened plant, *Eucalyptus cannonii* (Capertee Stringybark), recorded. A total of 9 threatened flora records have been noted within 10 km of the Cameron Road site boundary (OEH Atlas Data) all of which were either *E. cannonii* or *Prostanthera stricta*.

While no threatened flora have been recorded within the Ilford and Cherry Tree Hill, a total of 18 threatened flora records have been noted within 10 km of the area (OEH Atlas Data). These include Derwentia blakelyi, *Eucalyptus alligatrix* ssp*. miscella, Eucalyptus cannonii, Grevillea evansiana Grevillea obtusiflora* ssp*. Obtusifolia, Leionema, sympetalum, Persoonia marginata, Philotheca ericifolia, Prostanthera stricta, Pultenaea* sp. 'Olinda', *Swainsona recta,* and *Swainsona sericea.*

For Melrose there have been five species recorded have been recorded within 10 km of the Melrose site boundary (OEH Atlas Data). These are:

- Eucalyptus cannonii (Capertee Stringybark);
- Grevillea obtusiflora spp. Fecunda;
- Persoonia marginata (Clandulla Geebung);
- Prostanthera stricta; and
- Pultenaea sp. Genowlan Point (Genowlan Pultenaea)

Endangered Ecological Communities

There are two Endangered Ecological Communities (EEC) under the TSC Act 1995, that are considered to potentially occur within the exploration area which are:

- Box Gum Woodland and
- Fuzzy Box Woodlands
- Genowlan Point Allocasuarina Heathland; and
- Montane Peatlands and Swamps.

Vegetation mapping for the exploration area indicates that a community containing White Box, which is a component of Box Gum Woodlands, is present. Therefore, the potential for the Box Gum Woodland to be present within the exploration area is relatively high but further survey would be required to determine if it is actually present.

Groundwater dependent ecosystems

There is the potential for groundwater dependent ecosystems to occur within the exploration area. GDEs is a broad definition covering all ecosystems which are dependent upon groundwater either permanently or occasionally to survive (DLWC, 2002). GDEs are typically the communities which are located in drainage depression, swamps and creeklines, where groundwater comes up to the surface.

Murphy and Lawrie (1998) have mapped the several soil landscapes within the exploration area and these include Three Sisters (colluvial), Cherry Tree (colluvial), Capertee (erosional) and Turonfels (alluvial/colluvial).

The colluvial soils of Three Sisters are mapped at the higher elevations and are likely to be comprised of sandy soils which have low waterholding capacity and low fertility. The parent rock consists of sandstones, shale and coal amongst others suggesting the possibility of sedimentary rock groundwater systems occurring within this soil type.

Drill sites will avoid any drainage sensitive ecosystem which will be confirmed by a qualified ecologist prior to drilling.

8.3 Bushfire Management

The risk of Bushfire was identified as a key risk to the project through an exploration drilling risk assessment for this project. Centennial Coal is taking a pro-active approach to bushfire safety risk management.

8.3.1 Management Provisions

General controls established include, but may not be limited to, the following:

- ❒ Any specific/additional bushfire risk management requirements of land owners will be complied with for any potentially required on private/non-Centennial lands, including State Forest during project planning and prior to site establishment;
- ❒ All contractors are required to carry appropriate fire safety equipment including fire extinguishers;
- ❒ Centennial will contact the RFS and/or NSWFB to confirm the current fire threat level;
- ❒ Daily checks of current climatic conditions (including weather station if available) and predicted forecasts;
- ❒ Avoid work which presents potential fire ignition risk when fire weather is hazardous, especially on days of high wind;
- ❒ No hot work in temperatures greater than 30 degrees Celsius or on high bushfire risk days, or in areas of high fire fuel loads without prior risk assessment, appropriate controls and prior approval by the Centennial Environment Coordinator. Specifically, welding, grinding, soldering (with flame) or any open flames are prohibited by the Rural Fires Act in days of Total Fire Bans; and
- ❒ Familiarisation processes established for evacuation routes and agreed muster points.

8.4 Rehabilitation

Rehabilitation of disturbed areas will be carried out as soon as practical following completion of the drilling works. All rehabilitation works on privately owned land will be undertaken in strict compliance with landowner requirements. Any specific rehabilitation works will be listed in the Land Access Agreements. The following general activities will be undertaken, but it is stressed that these matters are all open for negotiation:

- ❒ Temporary construction tracks and associated disturbed areas not required by the land owner will be ripped, seeded and fertilised following completion of drilling or ongoing monitoring program;
- ❒ Where the access tracks are to be temporary, topsoil will be removed and stockpiled for respreading following completion of the work;
- ❒ Following completion of track construction, the area will be reinstated to its original condition in consultation with the landowner;
- ❒ Permanent access tracks are to be left in a stable condition and formed banks or fill areas to be sown in consultation with the landowner;
- ❒ Table drains are to be stable at completion of the work, and if necessary seeded and protected with jute mesh and bitumen;

- ❒ Seed and fertiliser shall be applied to all ground in the vicinity of the access track where surface grasses have been removed or bare patches are evident;
- ❒ The drill site will shaped if necessary and stockpiled topsoil respread, harrowed and sown; and
- ❒ Any sumps will be filled, shaped, topdressed and sown.

The seed mix will depend largely on landowner requirements however for the revegetation works to be successful, preference would be given to fast growing improved pasture species for the majority of cases so long as the mix is compatible with surrounding pasture. The mix can also include slower growing but more hardy grasses as well as native grasses. The following table gives a general mix, however this is to be varied to include other species or rates specific to landowner requirements.

Table 6. Generalised Seed and Fertiliser Applications

Season	Species	Rate kg/ha	Fertiliser	Rate kg/ha	Sowing
Autumn sowing/low bulk pasture	Kangaroo Rye Highlands Bent Rose Clover Red Clover	10 5 5 5	11-34-11 or 15-30-0	400	Early March to Early May May
Autumn sowing/high bulk pasture	Cereal Rye Kangaroo Rye Phalaris (Sirosa) Highlands Bent Sub Clover Fescue Lucerne	10 5 5 5 5 5 5	11-34-11 or 15-30-0	400	Early March to Early May May
Summer sowing/low bulk pasture	Couch Fescue Red Clover	5 5 5	11-34-11	400	Late December to late February
Summer sowing/high bulk pasture	Japanese Millet Phalaris Couch Rhodes Grass Cocksfoot	1 3 5 15 5	11-34-11 15-30-0	400	Late December to late February

* The mixtures in the fertiliser column refer to the percentage by weight of P205;N, and K20 in the recommended fertiliser types. Commercial fertilisers are available which contain these proportions of major nutrients (Source: Hannon, 1995).

Sowing methods can also vary depending on slope, season and existing soil seed stock. For areas of healthy pasture without weed infestation prior to disturbance, simple broadcast sowing followed by harrowing will be sufficient. For areas that have been previously treated with herbicide or have otherwise been heavily disturbed by equipment during drilling, some shaping, raking or ploughing may be necessary prior to sowing. In these cases, sowing can be done by seed drill or disc plough followed by harrowing if necessary. Should the landowner prefer to undertake this work themselves it needs to be specified in the Land Access Agreement so that appropriate and agreed compensation will be paid.

For steep slopes or areas of high erosion risk, a more active revegetation method may be employed. An effective method of achieving quick stability on steep batter slopes is to apply a spray application of straw mulch material to the ground surface immediately following the formation of exposed slopes or following topsoiling. The mulch would consist of straw, bitumen, fertiliser and seed mix. Alternatively, Curosol or a similar biodegradable binder mixed with wood fibre could be used. The primary purpose of these applications is to provide immediate surface soil stability to minimise erosion potential while at the same time sowing grass seed and fertiliser. The hay mulching also slows runoff velocities thus reducing scour potential. However, even with this surface sealing, runoff from larger storm events will have the potential to erode steeper batter slopes. The erosion will reduce once vegetation is

established. This work would only be necessary if extensive track construction is considered necessary.

The fertiliser application will likely to be either "Starter 15" or "Grower 11" at a rate of 400 kg/ha. An application of gypsum, to improve soil structure and water infiltration may be necessary. Follow-up fertilisation may be necessary in 6 to 12 months and the usual rate would be 125 kg/ha using a product such as “Aftergraze” or equivalent. This work will be specified in the Access Agreement.

8.4.1 Rehabilitation Management Provisions

In summary, the rehabilitation management provisions will include:

- On completion of drilling and testing all boreholes must be sealed, surveyed and marked in accordance with Departmental Guidelines for Borehole Sealing on Land: Coal Exploration (Condition 24 (d) of EL);
- The disturbed areas where exploration activities have been conducted will be returned to the original topography prior to site preparation;
- The topsoil which was stockpiled during site preparation will be replaced and the disturbed area seeded;
- The exploration contractor will remove all equipment and rubbish and leave the site clean and ready for rehabilitation;
- The Project Manager will arrange for any contaminated soil to be removed from the site and appropriately disposed;
- Erosion and sediment control devices will remain in place until the exploration site is fully rehabilitated; and
- The exploration site will be regularly inspected until the area has been fully rehabilitated to the satisfaction of the landowner.

8.5 Fauna

Koalas are known to occur within the exploration area. Any borehole that requires the removal or disturbance to habitat or Koala feed trees will require an assessment under SEPP 44. This means that an assessment would be required to determine if the site contains “Core Koala Habitat”. If the site is deemed to be “Core Koala Habitat”, consent for any development cannot be issued until a Plan of Management has been prepared for the site.

Threatened fauna

A number of threatened fauna species have been recorded within the exploration area. These include:

- Booroolong Frog (*Litoria booroolongensis*);
- Regent Honeyeater (*Xanthomyza phyrgia*);
- Spotted-tailed Quoll (*Dasyurus maculatus*);
- Koala (*Phascolarctos cinereus*);
- Glossy Black-cockatoo (*Calyptorhynchus lathami*);
- Barking Owl (*Ninox connivens*),
- Powerful Owl (*Ninox strenua*);
- Brown Treecreeper (*Climacteris picumnus victoriae*);
- Speckled Warbler (*Pyrrholaemus sagittatus*);
- Black-chinned Honeyeater (*Melithreptus gularis gularis*);
- Regent Honeyeater (*Xanthomyza phyrgia*);
- Hooded Robin (*Melanodryas cucullata cucullata*);
- Diamond Firetail (*Stagonopleura guttata*);
- Spotted-tailed Quoll (*Dasyurus maculatus*);
- Large-eared Pied Bat (*Chalinolobus dwyeri*); and
- Eastern Cave Bat (*Vespadelus troughtoni*).

The primary mitigation measures will be to minimise vegetation disturbance a key site selection criteria and have each site inspected by a qualified ecologist prior to site disturbance. Should rare or endangered species be present, suitable habitat or feed trees, then the drill site will either be moved or modified to avoid impacts.

8.6 Management Provisions

The following management actions will be implemented:

- Each finally selected drilling site will be inspected by a qualified ecologist prior to any land disturbance;
- Any vegetation requiring removal will be identified and tagged. No vegetation is to be removed that has not been tagged by the ecologist;
- No trees with viable nests or hollows are to be cleared;
- All trees to be cleared are to be inspected for the presence of any mammal prior to disturbance;
- Exploration sites will be relocated to avoid any impacts on identified threatened flora species;
- If impacts on threatened flora species are unavoidable, a S91 Licence under the TSC Act will be obtained;
- A suitable buffer (minimum of 100 m or as determined by qualified ecologist) is to be provided where an owl breeding hollow is found; and
- If exploration is planned within an Endangered Ecological Community (EEC) and can not be relocated, a due diligence assessment of the impact should be undertaken and the 7-part test of s5A of the NSW EP&A Act and s94 of the NSW TSC Act should be conducted. If the conclusion of the 7-part test is that there would be a significant impact then exploration should not proceed.

9 Indigenous and European Heritage

9.1 Overview

The archaeological site data was sourced from a search of the OEH AHIMS database and from a literature review of available archaeological reports pertinent to the study area. Two separate searches were undertaken 2008 and an additional survey was undertaken in August 2011, both of which cover the general extent of the exploration areas.

There have been several archaeological investigations conducted in the region of the study area. A review of the available literature associated with these investigations shows that the area was used extensively by past Aboriginal communities.

9.2 AHIMS Search of Registered Aboriginal Sites

The first AHIMS search obtained from OEH in 30 September 2008 in a search of 15 km x 15 km radius of a central point of the Ilford exploratory area (767457E, 6351768N) identified a total of 25 sites. The updated search on 19 August 2011 did not reveal any additional sites.

Table 7. AHIMS Search Ilford

Site type	Number of Sites	% of sites
Shelter with art	4	16%
Open camp site	13	52%
Isolated find	1	4%
None – AFT/ART	1	4%
None – AFT	5	20%
Potential archaeological deposit (PAD)	1	4%
TOTAL	25	100%

The second AHIMS search obtained from OEH on 30 September 2008 in a search of a 15 km x 15 km radius of a central point of the Melrose exploratory area (776380E, 6337794N) identified a total of 16 sites. The updated search on 19 August 2011 also did not reveal any additional sites.

Table 8. AHIMS Search Melrose

Site type	Number of Sites	% of sites
Shelter with art	4	25.00%
Open camp site	2	12.50%
Artifact/art sites	4	25.00%
Axe grinding grooves	3	18.75%
Bora/ceremonial site	1	6.25%
Scarred tree	1	6.25%
Shelter with art and deposit	1	6.25%
TOTAL	16	100%

A copy of the AHIMS search and a map showing the location of registered sites is provided as Appendix E. Only three sites have been recorded within the Inglenook tenements, none of which would be impacted by drilling or access track construction.

9.3 Management Provisions

- If exploration is required in an undisturbed area a due diligence inspection is to be conducted by an archaeologist to assess the suitability of the location to assist with the mitigation strategies. A

due diligence inspection involves a review of the AHIMS database against the proposed drill location and also an onsite visit to examine the area for evidence of sites,

- The disturbance required at the exploration site must be limited to the inspected area. If additional disturbances are required, then it may be necessary to conduct a due diligence inspection to ensure compliance with the NPW Act (1974);
- All machinery must access the areas via existing and/or approved access tracks that have been inspected and cleared by the archaeologist; and
- In the event that previously unidentified artifacts and skeletal remains are located, work must cease on site immediately, and the mine will need to contact the NSW police (only if skeletal remains are located) and consult with the OEH and the relevant Aboriginal community, to determine the best course of action and implement an action plan.

9.4 European Heritage

There is the potential for heritage items to exist including items associated with timber cutting, farming, mining, transport and habitation, particularly as there appear to be a number of abandoned mines in the area (Weenga, Excelsior, Vulcan, Torbane). Items may include material left behind from mining, abandoned machinery, domestic sites, stockyards, fences, bridges, graves and cemeteries.

A search of the State Heritage Register maintained by the Heritage Branch of the NSW Department of Planning show a total of six heritage items in or near the exploration area:

- Ilford Catholic Church;
- Ilford Cemetery;
- Ilford School;
- Ilford Uniting Church; and
- Crudine Cemetery.

It should be noted however that further heritage items may exist within the exploration area. An examination of Parish maps for the parish of Warrangunia note that the Turon River Goldfield, proclaimed in 31 August 1865, encompassed a large area on the borders of the parishes of Warrangunia and Stewart, approximately 4-5 km south of Ilford.

The primary mitigation strategy is avoidance. All drill sites and access tracks will avoid any built structures including ruins or equipment. Advice from the landowners will be sought regarding any sites which may contain subsurface items such as foundations of old farm structures and the like.

10 Soils and Erosion

10.1 Overview

Erosion and sediment control is required with any land disturbance but is not limited to the drill site itself but also any new tracks or use of existing tracks. The aims is to minimise the impacts of land disturbance by:

- ❒ Maximising ground cover retention;
- ❒ Maximising the use of existing access tracks;
- ❒ Avoiding creek crossings that would have undue impacts;
- ❒ Optimising the clearing of vegetation to ensure the most appropriate methods are used for the terrain;
- ❒ Specifying the range of erosion and sediment control procedures required;
- ❒ Providing a mechanism for monitoring the effectiveness of temporary erosion control measures; and
- ❒ The requirements of individual property owners will be taken into account for each drill site.

10.2 Access Tracks

An access track is a track negotiable by vehicles necessary for the drilling program. Where possible existing access tracks will be used with upgrading of these tracks where required. Where new access is required, the location will be determined by the prevailing conditions and property owner preferences. The location of any new tracks will be discussed with each land owner.

10.2.1 Categories of Access Track

Where existing tracks are available these will be used in preference to establishing new tracks. Track location will be identified in close consultation with each property owner. Where new access tracks are required, they are to be generally constructed in accordance with current best practice with the design aiming to minimise the impact of the construction on the surrounding environment, by controlling runoff and minimising soil erosion to protect water quality and limit stream sedimentation. Track work associated with the project will fall into the following categories:

(a) Upgrading of existing tracks. This will generally involve widening, draining and resurfacing. The standard of the track is to be suitable for the purpose for which it was originally constructed. In some cases, it will be necessary to import material;
(b) Tracks traversing flat plains country. These areas require grader formed tracks with the crown 300 mm above the natural ground surface and constructed with table drains on both sides;
(c) Tracks traversing flat or gently undulating open or sparsely timbered and/or rocky areas;
(d) Tracks traversing flat or gently timbered areas;
(e) Tracks traversing swampy and/or unstable soil conditions. Tracks formed in these areas could require the removal of unstable soil and replacement with hard fill and/or geotextile fabric. In such cases, the track is to be topped with approved gravel with a compacted thickness of 50 mm, leaving the track 150 mm above natural ground level;
(f) Tracks traversing heavily undulating sparsely timbered and/or rocky areas;
(g) Tracks traversing heavily undulating timbered and/or rocky areas;
(h) Tracks traversing rugged sloping timbered and/or rocky areas where the average natural grade of the slope is greater than 1:4 but less than 1:2; and
(i) Tracks traversing rugged steeply sloping areas involving large changes in elevation where the average natural grade of the slope is steeper than 1:2.

The principles on which access tracks are to be constructed are outlined below.

10.2.2 Construction Techniques And Mitigation Measures

New access tracks if required will generally follow the contour of the land (with the exception of steep country), minimising earthworks and drainage requirements or follow the top of ridges or spurs or flatter

areas and avoid steep areas with greater potential for erosion and sediment movement. In the case of cultivated land, access tracks generally follow fence lines or otherwise located in accordance with property owner requirements. If additional material is required for the construction of tracks, local material will be used.

On flat ground, tracks shall be formed with appropriate crowning or crossfall using suitable materials. To provide for rain water run-off, table drains shall be constructed with mitre drains at appropriate intervals to control the concentration of run-off.

Tracks on slopes are to be constructed with adequate crossfall drainage to reduce erosion damage and minimise maintenance needs. The finished track surface shall drain in the direction of the crossfall with the lower edge of the track being 150 – 200 mm below the top edge of the track. It is preferred that tracks slope away from the bank however, in situations where the fill batter is greater than 1.5 m in height or the fill is unconsolidated and likely to erode, then the track is to slope into the bank. To ensure effectiveness of outfall drainage, any earth windrow which develops on the down-slope side of the track shall be bladed off to prevent concentration of water from the road causing erosion. With inward sloping tracks table drains and culverts will also be required.

All cut and fill sections shall be constructed to a stable batter to minimise subsequent slumping. Stable batters are considered no steeper than 1:2 (V:H). Erosion fill areas shall be mechanically compacted using equipment on site. Where topsoil is required to stabilise batters, it shall be stockpiled for respreading after construction, or imported if required. In areas where long slopes occur above a track, cut batters should be protected by graded diversion banks or drains.

In areas where the soils are erodible or the grade of the track is such that water will run down the track rather than across it, then cross-banks will be constructed for both inward and outward sloping tracks. Cross-banks will usually be constructed at right angles to the road, however, diagonal banks may be required to obtain sufficient grade or direct water to a suitable outlet. The banks will need to be capable of allow the passage of the drill rig or other heavy equipment.

Spacing of cross-banks shall be in accordance with the guidelines, shown in Table 9 below.

Table 9. Cross Bank Spacing (m)

Road Grade	Soil Erodibility Soil Class A Low soil erodibility	Soil Class B High soil erodibility	Soil Class C Very high soil erodibility
Up to 8^0	70 - 90	60 - 70	20 - 30
8^0 to 12^0	60 - 70	50 - 60	*
12^0 to 16^0	40 - 60	*	*
16^0 to 20^0	30 - 40	*	*
20^0 to 22^0	20 - 30	*	*

* - track grade specified should not be constructed on these soil types without consultation with Soil Services
Where tracks are constructed on slopes exceeding 12^0 only light and infrequent traffic should be permitted

Soil Class A – Brown and red soils derived from finer sediments
Soil Class B – Red soils on fine granites, fine sandstones and basalts –
Soil Class C – Grey and yellow soils derived from coarse grained granites and sediments

Cross-banks are generally to be installed progressively during track construction. In some instances it may be difficult for heavy vehicles involved in drilling to traverse cross banks and in such cases the cross-banks shall be installed after the rehabilitation phase of the drilling program, but in consultation

with the landowner. Some existing tracks will be already adequately drained, and these provisions will not be altered unless otherwise requested by the landowner.

Stable and clear outlets for the cross-banks are to be constructed to enable water to discharge without the flow concentrating. Where possible, the outlet is to spill into undisturbed vegetation.
Where steep country is to be traversed, the most direct route up the slope will be taken where possible rather than constructing tracks across the slope. Diversion of run-on water will be diverted away from the new access track sites to minimise the risk of soil erosion occurring while the surface is disturbed.

10.3 Access protocols

The following access protocols will be maintained for the drilling program:

- All traffic is to be confined to access tracks as far as practicable;
- Where access is via open spaces, particularly in cultivated areas or pasture improved grazing land, care shall be exercised to ensure that minimum damage is caused to the surface by confining movement to the nominated route. Indiscriminate traffic in such areas is to be avoided. Unformed access tracks are shown on the plans provided to all drilling contractors and project personnel and usually follow fence lines;
- Access across paddocks when permitted by the landowner but not requiring constructed tracks will occur under conditions that will not result in damage to soils and vegetation within the paddocks;
- The landowner is to be contacted prior to first vehicles entering the property. The landowner is to be advised of subsequent access requirements during the site establishment and drilling phases;
- All gates to be left as found (open or closed) unless otherwise indicated by the landowner; and
- Transportation of any earthmoving equipment shall occur with the blade up unless involved in drill site preparation or access track construction.

10.4 Mitigation Measures

Soil management procedures for topsoils and subsoils will include but not be limited to:

- All work associated with the project will be undertaken in accordance with the requirements of the drill site management procedure;
- All proposed erosion and sediment control measures will be implemented in advance of, or in conjunction with clearing and drilling operations;
- Control of sediment run-off by following sediment control procedures down slope of the site disturbance (e.g. sediment fencing);
- Timely rehabilitation of drill hole locations and subsequent inspection to ensure rehabilitation has been successful;
- Creation of sumps and/or tanks at each drill hole to control erosion and sediment including installation of clean water diversions around the drilling pad to minimise overflow of sumps;
- Exposure and disturbance of ground surface is to be limited where possible to minimise erosion;
- Wherever possible native/pasture grasses and soil will not be disturbed;
- Topsoil will be stockpiled separately prior to excavation of sumps;
- Any contaminated soil will adequately be disposed of; and
- Erosion and sediment control devices will remain in place until the project area is fully rehabilitated.

11 Noise

11.1 Existing Conditions and Noise Assessment Criteria

The existing acoustic environment in the exploration area is essentially a quiet rural to semi rural setting. Background noise experienced within the majority of the area would be 30 dB(A) or less however there would be some elevated noise effects caused by the Castlereagh Highway which cross the exploration area. For the purposes of this assessment the lowest level provided under the Environmental Noise Control Manual (ENCM) of 30 dB(A) has been chosen.

11.2 Noise Criteria

Temporary noise sources such as drilling come under category of construction works. The ENCM assessment guidelines and goals for short, medium and long-term daytime construction activities are as follows:

(i) Short Term Construction Periods - for construction periods of less than 4 weeks, the OEH recommends that the average noise level from construction activities should not exceed the rating background noise level (RBL) by more than 20 dB(A) for more than 10% of the time over a 15 minute period (LA10, 15).

(ii) Medium Term Construction Periods - for construction periods extending from 4 to 26 weeks, the OEH recommends that the LA10, 15min noise level from construction activities should not exceed the RBL by more than 10 dB(A).

(iii) Long Term Construction Periods - for construction periods longer than 26 weeks, the OEH recommends that the LA10, 15min construction noise should not exceed the RBL by more than 5 dB(A).

For evening and night-time activities, the OEH normally accepts that the LA10, 15min construction noise should not exceed the background noise level by more than 5 dB(A) between 6.00 pm and 10.00 pm, and not exceed the background level between 10.00 pm and 7.00 am. For this project, no work will be undertaken during the night time period.

In setting these goals the OEH recognises that there is limited opportunity to reduce noise from construction plant and activities, and that the goals are not always satisfied. Considering the adopted RBL of 30 dB(A), the assessment goals recommended for evaluating daytime construction activities are summarised in Table 10.1 below. For assessment purposes the construction noise is assessed at a residential boundary or 30 m from a residential dwelling, if the boundary is more than 30 m from the dwelling.

Table 11.1 - Construction Noise Goals (Day) dB(A) ref: 20 × 10-6 Pa

Reference Location	Sound Pressure Level dB(A)			
	Adopted RBL	Noise Assessment Goals (LA10,15min)		
	Day	Short Term	Medium Term	Long Term
Any Residential Receiver	30	50	40	35

Although each drill site will unlikely take longer than 4 weeks at any one location, it is appropriate that the more stringent medium term criteria of 40 dB(A) be adopted for the program. This would take into account the potential for multiple drill sites to occur on a single property.

11.3 Noise Emissions and Impacts

During exploration program, noise generation will be from vehicles moving to and from various drilling sites, and machinery and vehicles engaged in the drilling activities such as water truck, drill rig, compressor and rod delivery truck. Site establishment works may also involve mobile plant to construct new tracks or prepare existing tracks, including bobcat, grader, loader and truck. Rehabilitation works would also involve a concrete truck for grouting, seed and fertiliser spreader/tractor.

Maximum noise levels from the plant items to be used during construction are outlined in Table 11.2. Noise levels provided have been obtained from readings taken on previous construction programs.

An assessment of the noise generated has been carried out for the worst-case scenario, assuming that the equipment will be used simultaneously at any one site. This is unlikely to occur given the nature of the drilling works and the staging between set up, drilling and rehabilitation.

Table 11.2 - Typical Equipment and Associated Maximum Noise Levels (at 1 m from the source)

Equipment Type	Typical Noise Level Sound Pressure Level - dB(A) at 1 m
Drill Rig	86
Small concrete delivery truck	84
Water truck	85
Delivery truck	85
Bobcat	84
Compressor	91
Peak Power Level	93 dB(A)

It is anticipated that during the exploration activities, the noise criteria will not be exceeded. At 100 m, the combined noise level will be 45 dB(A) while at 200 m the combined noise level will be 39 dB(A). At distances greater than 300 m, the combined noise level is 35 dB(A) or less which meets the longterm noise assessment criteria.

The drill sites are all proposed to be in excess of 200 m from individual residences. At this distance, the maximum combined noise level would meet the medium term noise assessment criteria of 40 dB(A).

11.4 Noise Controls and Management

All exploration activities will comply with the Interim Construction Noise Guidelines (DECCW, 2009). Where possible, it is recommended that all planned exploration sites be situated within identified zones where minimal noise control is required.

Noise control for the drilling activities will primarily be achieved through adherence to the work hours specified and through use of appropriate equipment with effective noise suppression. Work hour limits will be strictly enforced to ensure that noise does not occur outside these periods. To minimise potential noise impacts, the activities would normally be restricted to the daytime hours 7:00 am to 6:00 pm Monday to Saturday. For any other activities outside daytime hours, prior approval would be sought from the landowner. These activities may include site inspections, meetings with landowners and cleanup activities following drilling.

Any contractors used in the drilling program will be required to ensure that effective noise control equipment is fitted on all machinery used for the work. This equipment is to be operational and maintained during the project and will include normal engine mufflers compliant with road or construction guidelines. Reversing alarms if fitted shall be de-activated when on private property. Procedures will be established to address any noise complaints received from the public or landowners during the drilling program.

12 Air Quality

The principle source of dust generation will be the movement of vehicles on unsealed access tracks as well as the drill rig when operational. The following management initiatives will be implemented to reduce the potential for adverse dust impacts caused by the drilling program:

- All drill rigs are to be equipped with dust curtains around the drill head;
- Contractors and employees should ensure that all equipment is operated and maintained to meet all regulatory and industry standards;
- Activity on an exploration site including site preparation and rehabilitation is to be stopped during dry windy days when wind speed is causing adverse dust impacts on sensitive receptors (roads, houses etc); and
- Vehicle movements will be restricted to 40 km/h on unsealed roads/tracks.

Although no dust monitoring will be undertaken, dust conditions will be reported in the inspection sheets maintained for the project. The criteria to be used will be visual dust generation.

12.1 Greenhouse Gases

The project will require the use of fuel, predominantly diesel, for the drilling, site establishment and rehabilitation program. Per site, the project will use a small dozer or backhoe for site establishment, a drill rig, compressor and support vehicle during drilling and the same dozer or backhoe during the rehabilitation works. A pump and generator will be on site for use as required.

Per drill hole, it has been estimated that approximately 1,300 litres of diesel will be used. As outlined in the Greenhouse Gas Protocol Initiative, the guidelines characterise three "scopes" (scope 1, scope 2 and scope 3) of emissions for GHG accounting and reporting purposes. The scopes for accounting are defined as:

- Scope 1 - Direct emissions from sources that are owned or controlled by the company. For example, CO_2 emissions from the combustion of petroleum fuels or the combustion of fuels for on-site electricity generation;

- Scope 2 – Indirect emissions from the generation of purchase electricity consumed by the company; and

- Scope 3 – other indirect emissions as a consequence of the activities of the company, but occur from sources not owned or controlled by the company. For example, CO_2 emissions from the transport of purchased fuel.

The GHG emissions associated with the exploration drilling program are primarily from direct emissions (Scope 1), from the drilling rig and air compressor and support equipment through the combustion of diesel fuels. Additionally, Scope 3 emissions have also been accounted for to capture the Full Fuel Cycle. The Full Fuel Cycle gives the quantity of emissions released per unit of energy for the entire fuel production and consumption chain.

The total drilling program will involve 28 drill sites requiring a total of 36,400 litres of diesel. This equates to approximately 97 tonnes of CO_2 equivalent. As there will be no indirect emissions from the purchase of electricity, there will be no Scope 2 emissions. Scope 3 emissions are estimated at 7.4 tonnes of CO_2 equivalent bringing the total GHG emissions for the project to approximately 105 tonnes of CO_2 equivalent.

13 Waste Minimisation and Management

13.1 Overview

There is the potential for generation of industrial and general wastes during the drilling project. Wastes would include domestic plastics, paper wrappers and containers but may also include leaks and spills from equipment on site. Drilling fluids are also used for various purposes including lubrication, flocculation and cooling of the drill head. Inadequate management of these wastes on site may create visual and soil contamination issues as well as the potential to pollute waterways. The objective of waste management for this project will be to:

- Avoid contamination of soil and water;
- Minimise impacts to visual amenity and odour;
- Minimise impacts to native flora and fauna; and to
- Minimise health risks.

Given that the following mitigation measures are applied, there will be little risk of environmental harm to private property or the surrounding environment.

13.1.1 Management Provisions for General Wastes

All wastes are to be managed in accordance with the following procedures:

- Contractors/employees shall keep all work areas maintained and in a neat orderly manner. The use of litter bins, regular maintenance and site inductions shall prevent the accumulation of litter in site;
- Contractors/employees shall adhere to relevant waste management principles and strategies;
- Contractors/employees are trained in waste management;
- Chemicals, waste oils and lubes shall be collected for safe transport off site for reuse, recycling or disposal;
- General refuse shall be collected and transported to local council approved disposal sites; and
- On completion of each drill site all waste material shall be removed.

Site cleanliness will form part of the site inspection check list and the views and comments of the each landowner will be included.

13.2 Chemical and Hazardous Substance Management

A variety of chemicals may be required for the drilling project. Although no scheduled equipment servicing will be done on site there may be the need to undertake minor repairs and refuelling. The types of materials that may be used include fuel, lube oils, greases, drilling fluids and solvents. Potential impacts of chemicals and hazardous substances include contamination of soil and water, as well as impacts in the health and safety operators.

Chemical additives will be used during the drilling program to assist in removing fine and coarse grained drill cuttings from the hole. The drill cuttings and water, often referred to as mud, are easier to remove from the borehole when an additive is used to increase or decrease viscosity to an optimal level or to provide a foaming effect. Other additives are used to help lubricate the drill head or seal the internal walls of the bore during drilling to prevent collapse. These additives are generally non-toxic and used for drilling water bores for domestic use. A list of the chemicals to be used is provided below while Material Safety Data Sheets are available if required. Not all these chemicals will be used at each drill hole as the selected additives are designed for particular applications which will vary according to the rock types encountered, i.e., sand, clays, crystallised igneous rock etc.

Although specific brand names are listed, the chemical and physical properties are the same between brands. The list provided is simply to give the full range of the type of products which could be used.

AMC PAC-R

AMC PAC-R is polyanionic cellulose produced by chemical modification of cellulose and increases viscosity, reduces water loss and produces a thin, tough filter cake. Has a low toxicity to fish, and polysaccharides are generally not bioaccumulative and easily decomposed. Dilution rate is 2 kg per 1000 L.

BIO-VIS Xtra

Guargum, naturally occurring polysaccharide, provides excellent viscosity and eliminates mudding of aquifers which frequently occurs when using bentonite as a mud additive. Guargum is nontoxic and has a low digestibility in humans and fish species, and is commonly used as filler in food and weight-loss products. Guargum is a naturally occurring material and is susceptible to bacterial invasion and enzymatic degradation, therefore biodegradable. Dilution rate is 2 kg per 1000 L. To extend life expectancy of BIO-VIS Xtra, AMC BIOCIDE should be added to prevent fermentation.

AMC PAC R

This product Increases viscosity, reduces water loss and produces a thin, tough filter cake. It is a Polyanionic Cellulose produced by chemical modification of cellulose, the most abundant polymer in nature and a major component of wood and cotton. It has a low toxicity to fish and are generally not bioaccumulative and easily decomposed.

EP Bit Lube

Provides improved penetration rates and extends diamond-drill bit life. It is a blend of biodegradable vegetable oils and emulsifiers. Vegetable-based fatty acids have a low toxicity and minimal impact to environment. Vegetable-based emulsifiers have a low toxicity to animals. Considering its biodegradable nature, EP BIT LUBE contains preservatives in order to extend shelf life. Similar chemistry to stabilise products of this nature are used indirectly in a wide range of food, pharmaceutical, cosmetic and industrial applications. EP BIT LUBE is inherently biodegradable according to OECD 301A Readily Biodegradability test.

Pool-grade Chlorine

Used with 12% Sodium Hypochlorite, this chemical is used to breakdown the viscosity of polymer mud and destroy any wall cake that has formed on the walls of the drill hole promoting rapid and effective clean up. Chlorine if used in the correct concentrations do not pose a hazard to the environment.

CR-650

This product is used for hole cleaning. Specific application where permeable sections or poorly consolidated caving formations can be troublesome. AUS-Gel yields approximately twice the amount of standard unadulterated Bentonites. The product is a blend of high quality sodium bentonite and polyacrylamide. Bentonite is a natural occuring mineral clay and poses no harm to the environment. Anionic polyacrylamide is not considered toxic by exposure. It is not toxic by ingestion, skin contact or inhalation. It is not irritating or sensitising to skin. It is not carcinogenic, mutagenic or toxic for reproduction. The high molecular weight excludes uptake through membranes.

LPG and Compressed Oxygen

LPG and Oxygen tanks will be used for heating and soft welding as required. LPG is an extremely flammable liquefied gas while compressed oxygen is also classified as hazardous according to NOHSC criteria and classed as dangerous good. Normal occupational health and safety criteria will apply to their use.

Quick Set Cement and General Purpose Cement

Cement and cement-based products will be used for the foundations around the bore and final grouting of the borehole. The materials are classed as Hazardous and well established occupational health and safety equipment will be employed in its use.

Compressor Lubricant

A small quantity will be carried in the tool box of the compressor on site and used as required. It is a non-hazardous substance, and classified as non-dangerous goods. Any spillage will be cleaned and removed from site.

Automotive Diesel Fuel

Fuel for the drill rig, compressor and associated trucks will be contained in normal fuel tanks. No refuelling will occur on the drill site. Approximately 600 litres will be carried within the drilling equipment at any one time. Diesel is considered a hazardous substance and although biodegradable it presents an environmental hazard if spilled. Any spillage will be treated with absorbent materials and removed from site. Contaminated materials will be disposed in licensed waste disposal depots.

In the event of spillage of any chemical on site, the following actions will be taken:

- The material will be cleaned up immediately by soaking the spill up with an absorbent material and removing it to appropriate licensed disposal areas; and
- The land owner will be contacted to inspect the area.

Should the spill threaten a water way or will contaminate soils, drillers will contact Centennial Coal's Environmental Manager to undertake any necessary actions including reporting to OEH and organising cleanup measures.

Chemicals used in the drilling program are no different to those used in drilling water bores for stock and domestic usage. Some chemicals and materials are considered hazardous in their raw or undiluted state and require normal occupational health and safety standards to be met when handling. Drilling additives will either be bound with the waste mud which will be collected in above ground tanks and removed from site or are otherwise biodegradable. All wastes removed from the drill sites will be appropriately disposed of in licensed waste disposal facilities.

In the case of drill sites that will be converted to groundwater monitoring sites, groundwater will be monitored prior to the installation of a piezometer. This monitoring process will necessarily involve the discharge of groundwater from the site. This water will be tested for conductivity, pH and turbidity prior to discharge.

13.2.1 Management Provisions

With regard to chemical and hazardous substance handling, the management objectives are to avoid contamination of soil and water and to minimise risks to health and safety. Mitigation measures include:

- All proposed Chemical and Hazardous Substances/Waste control measures will be implemented in advance of, or in conjunction with, clearing and drilling operations;
- The Technical Manager is to approve chemicals being brought on site and they shall be recorded in an MSDS database;
- No hydrocarbons, except that in the fuel tanks of the drilling rig or road registered vehicles, are to left on an exploration site while the site is unattended;
- Hazardous materials shall be transported, stored and handled in accordance with the requirements of relevant legislation and industry standards;
- All personnel are to complete an induction that includes hazardous substance management and the use of spill kits;
- Hazardous material shall be transported, stored and handled in accordance with the requirements of relevant legislation and industry standards;
- Minimal fuels, lubricants and chemicals shall be stored on-site and, where practicable, handled within containment facilities (bunded areas, leak proof trays) designed to prevent the release of spilt substances into the environment;
- Equipment shall not be refuelled within 40 m of any water body watercourse or drainage line;

- Where it is necessary to refuel equipment on site, adequate spill prevention and containment measures shall be implemented and will be located upstream of installed runoff prevention controls;
- All equipment will be inspected daily for leaks;
- Provide additional sumps at nominated locations (to provide additional capacity and minimise potential for overflow);
- Drillers are to ensure all chemicals and hazardous substances are removed from the study area;
- Any contaminated soil will be appropriately disposed of;
- Contractors and employees shall keep all work areas maintained and in a neat and orderly manner. The use of litter bins and regular maintenance shall prevent the accumulation of litter in site; and
- Any soil contaminated materials introduced by the exploration activities will be removed for disposal at a licensed contaminated land facility.

All remaining refuse, chemicals, fuels and waste materials will be removed from the site following the completion of drilling activities. Chemical handling and control procedures will form part of the inspection checklist for each drill site.

14 Environmental Management and Mitigation

14.1 Project Environmental Management Plan

This REF provides a Project Environmental Management Plan (PEMP) which outlines the management and monitoring required for the exploration project. The PEMP details Centennial Coal's environmental management of the project, including an Environmental Management System, potential environmental impacts and mitigation measures, auditing of compliance, and roles and responsibilities. The PEMP for the project will be provided to the drilling contractor as well as form part of the Land Access Agreement. In this way, each land owner is provided with details of the company's expected environmental performance during the drilling works.

14.2 Environmental Management System for the Exploration Program

Centennial Coal's Environmental Management System for the exploration program will ensure that:

- ❒ All work complies with all relevant environmental statutes, regulations and standards;
- ❒ Environmental factors are taken into account for each activity;
- ❒ Regular audits are performed to confirm compliance with environmental policies and standards;
- ❒ All matters listed in each Land Access Agreement are met and verified; and
- ❒ Provisions of NSW Minerals Council Mineral Exploration Handbook are met and verified.

14.3 Environmental Compliance

To monitor the drilling contractor's compliance with all of the environmental requirements relevant to the undertaking of the project, Centennial Coal has engaged an Environmental Manager. The Environmental Manager has the responsibility to inspect the compliance of the project against environmental legislation, the conditions of approval, and the environmental management measures outlined in this REF and EMP. The Environmental Manager will have an appropriate level of environmental training and qualification to be able to perform the role effectively.

The general responsibilities of the Environmental Manager are to review all of the appropriate documentation, undertake site inspections to examine the implementation of management controls, recommend improvements and / or stop-work directions (to avoid environmental harm), and to prepare reports, including Non-Conformance notices.

14.4 Cumulative Environmental Impacts

The exploration program involves a total of 19 drill holes in Stage 1 and a further 13 in Stage 2. In total the area of drill sites will be approximately 20,000 m^2 (2ha). As a percentage of exploration area, this represents approximately 0.016 %.

It is anticipated that exploration drill sites will be chosen to utilise existing access roads wherever possible, to minimise the need for additional disturbance. As discussed in this report, all of these areas will be rehabilitated at the completion of drilling activities.

In consideration of the range of mitigating investigations and control measures established, including preliminary investigations for archaeological heritage, land status, flora and fauna and noise, the development of constraints and environmental sensitivity mapping and the implementation of drill site selection management and mitigation procedures, a significant cumulative impact on the environment is not expected. The proposed drill sites are specially selected to have minimal impact on the environment and community.

The exploration program will cause short term environmental effects within the Inglenook Exploration area which will be effectively managed using the mitigation and management measures outline within this REF. Short term impacts which will be caused by the minor disturbance from drill holes and access

tracks. Centennial is committed to managing and monitoring the impacts of its exploration activities and fully rehabilitating the areas of disturbance caused by the exploration program.

14.5 Summary of Mitigation Measures

14.5.1 Pre-exploration

- ❒ Specialist studies completed and site inspection to identify specific constraints;
- ❒ Engagement with stakeholders (e.g. landowners, community, government departments);
- ❒ Negotiation of access agreements with landowners/occupiers;
- ❒ Site inspections of exploration sites and new access tracks by suitably qualified archaeologists and ecologists for due diligence where required;
- ❒ Final selection of exploration sites and access routes will be chosen, where practical, to avoid environmental sensitivities/risks, and with landowner agreement;
- ❒ Undertake a utilities check (Dial Before You Dig) and use a cable finder especially on farm properties prior to the commencement of any earthworks if considered necessary;
- ❒ Photographs of each site will be taken prior to any disturbance activities; and
- ❒ All relevant contractors are given a site induction covering environment, community and safety requirements at the commencement of the exploration program.

14.5.2 During Exploration Program

- ❒ Exploration and associated activities are to be carried out in accordance to established Centennial management procedures;
- ❒ Use of erosion and sediment control devices (e.g. Sumps, sediment fencing);
- ❒ Topsoil stockpiled separately (where available);
- ❒ Correct storage of hazardous substances and removal of contaminated land;
- ❒ Removal of waste from exploration sites; and
- ❒ Regular inspections by the Centennial Environmental Coordinator or nominated representative.

14.5.3 Final Rehabilitation of Exploration Drilling Sites

- ❒ Drill holes will either be fully backfilled with cement as per NSW Resources and Energy guidelines on borehole sealing, or established as piezometers, generally within one (1) week of completion of drilling;
- ❒ All waste material, hazardous substances and general refuse will be collected and removed from the site;
- ❒ Boreholes must be sealed, surveyed and marked in accordance with Departmental Guidelines for Borehole Sealing on Land: Coal Exploration (Condition 24 (d) of EL);
- ❒ Where a borehole is to be left open or partially sealed for monitoring purposes the Department must be notified (Condition 26 of EL);
- ❒ Where a borehole is to be converted to a piezometer the Department and Office of Water must be notified and monitoring water bore licence must be obtained;
- ❒ Any fluid remaining in the drilling sumps will be drained and disposed of in accordance with Centennial requirements;
- ❒ Drill cuttings will be removed from site and the sumps will be backfilled with stockpiled subsoil;
- ❒ Topsoil, which was separately stockpiled during pre-work clearing, will be re-spread over the area;
- ❒ Cleared vegetation will be re-spread over the area (for stability and ground cover);
- ❒ Regular inspections of exploration sites will be undertaken until fully rehabilitated;
- ❒ Removal of erosion and sediment control devices once exploration sites are stabilised and rehabilitated; and
- ❒ Photographs of each rehabilitated site will be taken by a Centennial representative.

15 Appendices

The following appended documents form part of this REF:

- ❒ Inspection Checklist
- ❒ Ecology Pre-Inspection Checklist
- ❒ Archaeology and Heritage Pre-Inspection Checklist
- ❒ Assessment of Significance
- ❒ Archaeology Searches (AHIMS)

Centennial Coal

Appendix A – Inspection Checklist Inglenook Project

Environmental Issue	Performance Acceptable Not Acceptable Not Applicable	Action Required (Y/N)	Comment/ Action	Complete	Date/ Initial
Access Agreement ratified					
Landowner consultation					
Has the conditions of the Access Agreement been met					
Pre inspection by ecologist					
Pre inspection by archaeologist					
Dial before you dig					
Risk Assessment Preparation and implementation					
Safety Management Plan					
Workforce/ Contractor Inductions					
Initial land disturbance inspection					
Erosion controls					
Water Management Controls					
Access Track location					
Access Track Construction					
Access Track Condition					
Sump construction					
Condition of drill compound					
Storage of fuels and materials					
Condition of bunding					
Spill control kits					
Topsoil stockpiles					
Condition of gates and fencing					
Dust Issues					
Noise Issues					
Signes and barriers					
Safety system implementation					
Property Management Issues					
Vegetation Management					
Fauna Management					
Communication performance					
Bushfire management					
Photographic records					
Rehabilitation works					
Drill hole filling and capping					
Revegetation Works					
Removal of temporary erosion and sedimentation controls					
General tidiness					
Landowner satisfaction					

Completed by:
Approved by:
Date:

Appendix B – Ecology Pre Inspection Checklist

The following items will be checked by a qualified ecologist prior to site disturbance occurring.

Ecological Issue	Actions Required	Responsibility	Completion date	Initial
Pre-inspection				
Data base search				
Identify all areas of disturbance including drill sites and tracks				
Air photo interpretation				
Confirm project details with Centennial Project Manager				
Confirm access arrangements with Centennial Project Manager				
Confirm field dates with Centennial Project Manager				
Ensure site inductions are completed				
Field Inspection				
Vegetation type and condition				
Identification of vegetation disturbance				
Identification rare or endangered species				
Identification of surrounding vegetation community				
Establish present or absence of surrounding EEC				
Establish potential impact on habitat or community				
Check for presence of fauna				
Check fauna habitat				
Presence of active nests or burrows				
Presence of Koala feed trees				
Presence of scats or indicators				
Advise of any specific rehabilitation requirements				
Prepare written report following inspection				

Appendix C – Archaeology and Heritage Pre Inspection Checklist

The following items will be checked by a qualified archaeologist prior to site disturbance occurring

Heritage Issue	Actions Required	Responsibility	Completion date	Initial
Pre-inspection				
AIMS Data base search				
NSW Heritage Office Search				
Local Government Heritage Search				
Identify Native Title Claims and Registered Indigenous Groups				
Identify all areas of disturbance including drill sites and tracks				
Air photo interpretation				
Confirm project details with Centennial Project Manager				
Confirm access arrangements with Centennial Project Manager				
Confirm field dates with Centennial Project Manager				
Ensure site inductions are completed				
Field Inspection				
Identify landform elements and Archaeological potential				
Inspect for European heritage items in the impact area				
Inspect for evidence of Aboriginal relicts				
Assess potential impacts				
Prepare written report following inspection				

Proposed Exploration Program within the Inglenook Exploration Licenses
Environmental Assessment in accordance with
Department of Planning Guidelines for Part 5 Assessments

This report presents the state of existing environmental resources in the project area and assesses the likely potential impacts of the proposed Inglenook Exploration program on the environment. The methodology provided in the DOP guideline, "*Is An EIS Required?"* was used to assist in identification of environmental issues of potential relevance to the exploration program. As outlined in the guideline:

- ❒ The potential environmental issues associated with the project are identified in Table 1;
- ❒ The extent of the potential impacts is identified Table 2A;
- ❒ Table 2B analyses the extent of potential adverse impacts in sensitive locations;
- ❒ an analysis of the nature of the impacts is given in Table 2C;
- ❒ An evaluation of the likely significance of the potential impacts on the environment is provided in the final table.

Description of proposed activity	Proposed Drilling Activities within the Inglenook Exploration Area
Activity:	Centennial Inglenook proposes to undertake exploration drilling within the Inglenook Exploration Area. The activity will include drilling from the surface to the coal seam at a number of nominated sites within the exploration licences EL 743, 1 EL 7432 and EL 7442.
Objectives:	The primary objective of the activity is to obtain further geological data to enable further investigations into the feasibility of developing the resource.
Major elements including any environmental impact mitigation measures:	The works proposed including drilling on private property. The drill rig will require a disturbance area of approximately 25m x 25 m. Drilling activities require the construction of sumps and/or tanks to collect drill cuttings and to control and recycle drilling fluids down the borehole. Two tanks or one or two sumps, approximately 2m x 2m x 2m in dimension, will be excavated at each drill site. Topsoil will be removed and stockpiled separately. Each site will be located within cleared agricultural land so as to avoid potential ecological impacts. Potential impacts that require specific management and mitigation measures include: ❒ Noise and dust impacts on private residents ❒ Soil erosion and sedimentation impacts offsite ❒ Water quality impacts ❒ Weed invasion following disturbance ❒ Bushfire. The mitigation measures proposed include: ❒ Enter into land owner access agreements with each affected property owner prior to drilling. The agreements are to document all management initiatives and compensation ❒ Undertaking the drilling between 7 am and 6 pm Monday to Friday. ❒ Locate drill sites no closer than 200 m from any residence without consent of the landowner. ❒ Utilise existing farm access roads as much as practicable to reduce the need for new tracks. ❒ Locate drill sites that minimize the impact on farm management and production. ❒ Install appropriate erosion and sedimentation controls prior to land disturbance. ❒ Undertake rehabilitation works to the satisfaction of the Department of Industry and Investment and the landowners. ❒ Provide following monitoring and inspections to ensure that the rehabilitation works are successful ❒ Implement weed controls if required.

Description of proposed activity	Proposed Drilling Activities within the Inglenook Exploration Area
Any ancillary works:	Following the exploration activities, some drill sites will be converted to groundwater monitoring bores for the purposes of developing a ground water model for the area
Outline of construction of methods:	All activities will be temporary in nature, there will be no permanent structures built.
Outline of operations:	The drill rig will be located at each site for 2 to 3 weeks to allow for the drilling and geophysical logging of each hole and the installation of the peizometer or the grouting of the hole depending on its future use. Once completed, each site will be rehabilitated.
Location(s):	The exploration licences include EL 743, 1 EL 7432, EL 7442 and A414 in a project area referred to as Inglenook. The three exploration areas are shown on Figure 1 of this REF
Time frame:	Drilling is expected to commence in the forth quarter of 2010 and continue for a period of up to two years.

Table 1 – Identify the Issues

Characteristics of the activity (during construction and operation)	Potential Issues
How is the proposal likely to affect the physical aspects of the environment or introduce pollution or safety risk factors?	
1. Disturbs the topography or above or below ground features including filling, excavation, dredging, tunnelling: eg landforming, site preparation, quarrying, reclamation, creation of islands, water bodies, etc; involves the disposal of large quantities of spoil.	The work will involve stripping of topsoil in any areas be disturbed, excavation of sediment ponds to contain drilling water and drill cuttings and minor excavation to establish a stable drill site. On completion of the drilling activities each site will be rehabilitated to the satisfaction of the Department of Industry and Investment and the landowner. This will include filling the sedimentation ponds and revegetation of the sites with comparable pasture to the surrounding paddocks.
2. Affects a natural waterbody, wetland or groundwater aquifer or the natural water drainage pattern; affects the quality or quantity of water in the systems.	No wetlands or natural water bodies or creeks will be impacted by the exploration program. With landowner consent and as covered by any compensation agreement, water may be drawn from existing farm dams to supply the drill rig. Groundwater will be intersected by the drill holes. Each aquifer will be sealed off to avoid impacts on the aquifer or mixing of waters between aquifers.
3. Uses groundwater or surface water from a natural waterbody; stores water in a dam or artificial waterbody.	Water supply will be provided by either water truck or on site farm dams as required.
4. Changes the flood or tidal regimes or is affected by flooding or tides.	None
5. Uses, stores, disposes or transports hazardous substances (flammable, explosive, toxic, radioactive, carcinogenic or mutagenic substances); uses or generates pesticides, herbicides, fertilisers or other chemicals which may build up residues in the environment.	Chemicals will be used in weed control around each drill site if required, but will be used in accordance with the Pesticides Act. Fertiliser may be added during the rehabilitation works to assist in germination and pasture establishment.
6. Generates or disposes of gaseous, liquid or solid waste (industrial, medical or domestic waste, sewage, sludge or effluent, spoil or overburden); generates greenhouse gas emissions or releases chemicals which affect the ozone layer or a precursors to photochemical smog; generates or disposes of hazardous waste.	All waste generated by the exploration drilling will be removed from each site and disposed in an approved landfill. Wastes will include consumable items only. Portable toilets will be provided for the drilling operators. Some greenhouse gas emissions will be generated by diesel operated equipment. Although not anticipated, should there be any oil or diesel spills, all contaminated material will be removed to a licensed facility.
7. Emits dust, odours, noise, vibrations, blasts, electromagnetic fields or radiation in the proximity of residential areas or landuses likely to be affected.	potential for dust and noise for short periods during earthworks will be minor and will not be in the vicinity of residential dwellings.
8. Any other matters.	Erodible soils are present which will require implementation of appropriate erosion and sedimentation controls.
How is the proposal likely to affect the biological aspects of the environment?	
1. Clears or modifies (including by modifying the drainage) native vegetation (including trees, shrubs, grasses, herbs or aquatic species).	No vegetation will be removed.
2. Displaces or disturbs fauna (terrestrial or aquatic) or creates a barrier to fauna movement; clears remnant vegetation or wildlife corridors.	None
3. Introduces noxious weeds, vermin, feral species or disease or releases genetically modified organisms.	The project is not expected to introduce weeds to area. Weed management measures will include washing of the drilling equipment prior to accessing different properties to ensure that weeds are not transmitted between properties. Additional weed spraying will be undertaken if considered necessary as part of the revegetation works.
4. Undertakes activity that affects revegetation or replenishment of native species following a disturbance.	Activities on site aim to assist revegetation.
5. Introduces high bushfire risk factors or changes the fire regime.	The drilling activities represents a minor bushfire risk. Mitigation measures proposed will minimise the potential risk.
6. Any other issues.	None

Table 1 – Identify the Issues

Characteristics of the activity (during construction and operation)	Potential Issues
How is the proposal likely to affect natural or community resources?	
1. Uses or results in the use of community services or infrastructure including roads, power, water, drainage, waste management, education, medical or social services.	The only impact will be the use of local roads for transport of product and employees. This impact will be minor and well below the impact from historical operations at the site.
2. Uses or results in the use of natural resources including water (ground or surface), fuels, timber, extractive material, minerals, prime agricultural land, etc.	Activities will require fuel consumption. Water will be sourced from existing on site dams and ponds.
3. Affects future potential of commercial deposits of minerals or extractive material or areas important for fishing, agriculture or forestry.	The exploration program is designed to gather information on commercial deposits of coal within the exploration area.
4. Changes the demographics of an area.	None
5. Changes the transport requirement of an area.	None
6. Creates a new route alignment for the provision of infrastructure (eg rail, roads, power, etc).	None
7. Any other issues.	None
How is the proposal likely to affect the community?	
1. Generates population movements including influx or departure of the workforce.	Will be minor only. It is anticipated that the drilling contractor will use local accommodation during the program. The addition workforce will be no more than 6 at any one time.
2. Changes the workforce or industry structure of the area/region.	None
3. Affects employment opportunities in areas of high population densities or established development patterns.	None
4. Affects access to an area, building or items of aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, recreational, aesthetic or social significance or other special value for present or future generations.	None.
5. Affects the visual or scenic landscape (including major cuts/fills, towers, projects on escarpments, etc).	The drill sites will generally not be visible from any public place. Where they can be viewed, the drill rig will only be present for a short period. The rehabilitation of the drill sites will avoid any longterm visual impact.
6. Affects sunlight or views of another property.	None
7. Affects the amenity of publicly owned land (particularly recreational areas, national parks or reserves).	Permanent rehabilitation of the site will improve the amenity of the publicly owned land.
8. Changes surrounding land uses as a direct or indirect result of the activity; forms a barrier to movement within the community or access to existing properties; leads to a loss of housing.	Exploration activities are generally benign however there is a heightened awareness of the issues surrounding coal mining. The prospect of future mining in the local area will cause general community concern.
9. Generates significant volume of traffic (road, rail, air, pedestrian, etc).	Traffic generation will be minor and well within the capacity of local roads.
10. Generates nuisance, health or safety risks including air pollution, odour, noise or vibration, blasting, electromagnetic fields or radiation; releases diseases or genetically modified organisms; changes the bush fire regime.	There will be minor amounts of dust generated by vehicles using unsealed roads. There are no health implications from drilling activities. Some noise will be generated by onsite plant and equipment however the activities will occur during daylight hours, will only extend over 2 to 3 weeks and will be located in excess of 200 m from residences. The activities will be undertaken in accordance with a land access agreement which includes compensation for the occupation of the site during drilling
11. Any other issues.	No
How is the proposal likely to affect areas sensitive because of physical factors?	

Table 1 – Identify the Issues

Characteristics of the activity (during construction and operation)	Potential Issues
1. Coastline and dune fields, alpine areas, deserts, caves or other unique landforms.	No impact
2. Land with high agricultural capability.	Temporary impact on existing farmland which will be restored following drilling activities
3. Natural waterbodies, riparian zones, wetlands, drinking water catchments or flood prone areas.	No significant impact. Some water may be drawn from existing farm dams but no natural water bodies will be impacted
4. Groundwater recharge areas or areas with high water table.	Groundwater aquifers will be sealed when encountered during drilling to avoid loss or cross contamination
5. Erosion prone area; areas with slopes of greater than 18 degrees.	Drill sites will generally be located on flat or gently undulating terrain. Some steeper areas will be crossed to access some drill sites. Erosion and sedimentation controls will be employed regardless of erosion potential of the soil.
6. Subsidence or slip areas.	No significant impact
7. Areas with acid sulphate, sodic or highly permeable soils.	Acid sulphate or sodic soils are not anticipated
8. Areas with salinity or potential salinity problems.	No significant impact
9. Areas with degraded air quality.	No significant impact
10. Areas with degraded or contaminated soil area or degraded or contaminated water (ground or surface).	No significant impact
11. Any other sensitive areas.	None identified
How is the proposal likely to affect areas sensitive because of biological factors?	
1. Corals and seagrass beds, wetland communities (coastal, peatlands or inland), native forests, urban bushland, arid and semi-arid communities.	The primary target land use for the drill sites is cleared agricultural land. It is anticipated that few if any trees will be disturbed as a result of the project. Each drill site will be inspected by a qualified ecologist to determine specific impacts prior to drilling commencing.
2. Critical habitats or the habitats of threatened fauna or flora species, populations or ecological communities (within the meaning of the TSC Act).	No significant impact
3. Habitat of species listed under international agreements including Japan-Australia Migratory Birds Agreement (JAMBA) and China-Australia Migratory Birds Agreement (CAMBA).	No impact
4. Wildlife corridors and remnant vegetation.	No significant impact.
5. Habitat of protected aquatic species (within the meaning of Fisheries Management (General) regulation 1994) or of aquatic species having conservation status under Conference on Australian Threatened Fishes.	No impact
6. Fishing grounds and commercial fish breeding or nursery areas.	No impact
7. Bushfire prone areas.	No significant impact. Management of bushfire risks has been included in the project
8. Any other sensitive issues.	None identified
How is the proposal likely to affect areas allocated for conservation purposes?	
1. National parks and other areas reserved or dedicated under the NP&W Act.	No impact
2. Land reserved or dedicated within the meaning of the *Crown Lands Act 1989* for preservation or other environmental protection purposes.	No impact. While some Crown land or Crown Road easements may be crossed or utilised in the drilling program, no land that will be affected that has been dedicated or preserved for environmental protection purposes.
3. World heritage areas.	No impact
4. Environmental protection zones in environmental planning instruments or lands protected under SEPP 14 – Coastal Wetlands or SEPP 26 - Littoral Rainforests.	No impact

Table 1 – Identify the Issues

Characteristics of the activity (during construction and operation)	Potential Issues
5. Land identified as wilderness under the *Wilderness Act 1987* or declared as wilderness under the NP&W Act.	No impact
6. Aquatic reserves dedicated under the *Fisheries Management Act 1994*.	No impact
7. Wetlands areas dedicated under the Ramsar Wetlands Convention.	No impact
8. Heritage items identified on the Register of the National Estate, under the NSW Heritage Act or an environmental planning instrument.	No impacts to known or registered items
9. Community land under the Local Government Act (for which a plan of management has been prepared).	No impact
10. Land subject to a 'conservation agreement' under the NP&W Act.	No impact
11. Any other areas.	None identified
How is the proposal likely to affect areas sensitive because of community factors?	
1. Aboriginal communities or areas subject to land rights claims.	No impact, consultation with any registered land claimants will be undertaken prior to drilling in Crown Land or State Forests.
2. Communities with a strong sense of identity.	No impact
3. Disadvantaged communities (reduced economic, social or cultural indicators).	No impact
4. Areas with degraded amenity from noise, traffic congestion or odour.	No impact
5. Areas or items or high anthropological, archaeological, architectural, cultural, heritage, historical, recreational or scientific value.	No impact. Sites will be inspected by a qualified archaeologist to determine any specific potential impacts on items of Aboriginal Heritage
6. Areas or items of high aesthetic or scenic value.	No impact
7. Any other areas	None identified

Table 2A – Analysis of the extent of the potential impacts

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	Evaluation criteria		Ranking of potential significance of extent
		size, scope & intensity	duration	
Physical or pollution impacts (during operation and construction)				
(a) Air impacts				
1. air quality impacts (eg dust, smoke, grit, odours, precursors to photochemical smog, fumes, toxic or radioactive gaseous emissions) with economic, health, ecosystem or amenity considerations	Potential for dust and noise generation during earthworks and drilling	Very minor amounts anticipated to be generated. Land owner compensation provided. No drilling closer than 200 m from any residence	Short term impacts over a 2 to 3 week period	Low
2. air impacts with greenhouse or ozone damage considerations	none			Low
3. any other air impacts	none			Low
(b) Water impacts				Low
1. impacts from changes in surface or groundwater quantity	Potential impact of poor water quality leaving the site during high rainfall	Very low probability, installation of silt control fencing will minimise impact	If this were to occur, it would be the result of a high intensity storm and short term in duration.	Low
2. impacts from use of water	none			Low
3. impacts from changes to natural waterbodies, wetlands or runoff patterns	none	None	none	Low
4. impacts from changes to flooding or tidal regimes	None	Nil	None	Low
5. impacts from changes in water quality with economic, health, ecosystem or amenity considerations-eg salinity, colour, odour, turbidity, temperature, dissolved oxygen, nutrients, pH factors or pollutants intentional or unintentional releases of oil, fuels, toxins - including heavy metals and anti-foulants, spoil, sediment, sewage or other waste	Possible sediment movement	Minor risk	Sediment exposure following earthworks plus rehabilitation time	Low
6. any other impacts on water or from the use or storage of water	none			Low
(c) Soil and stability impacts				
1. degradation of soil quality including contamination (intentional or unintentional), salinisation or acidification	none	Rehabilitation works will generally involve filling sediment ponds and minor shaping of drill sites followed by revegetation using comparable pasture species.	Short term	Low
2. loss of soil from wind or water erosion	Surfaces may erode prior to completion of rehabilitation works	Minor potential for some erosion should high intensity storms occur after disturbance but prior to erosion control works established	No long term risks	Low
3. loss of structural integrity of the soil	none			Low
4. increased land instability with high risks from land slides or subsidence	None	None	None	Low
5. any other soil impacts	none			Low
(d) Noise and vibration impacts				

Table 2A – Analysis of the extent of the potential impacts

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	Evaluation criteria		Ranking of potential significance of extent
		size, scope & intensity	duration	
1. results in increased noise or vibrations to unacceptable levels for the surrounding communities	No unacceptable noise will be generated by the drilling activities			Low
2. affects sensitive properties (educational, hospitals, residential, heritage)	none			Low
3. any other impacts from noise, blasting or vibration	None identified	No nearby residences		Low
(e) Any other physical or pollution impacts				
Accumulation of physical or pollution impacts - Low				
Biological impacts (during operation and construction)				
(a) Fauna impacts				
1. any endangering or displacement of fauna species (including animals, birds, frogs, reptiles, insects, fish or crustaceans)	Endangering of fauna occurs in the region however vegetation clearing will be minimized or completely avoided. Short term implications may arise due to general activities such as equipment movements on properties near vegetation	Low impacts	Short term	Low
2. any reduction of critical habitat of any unique, threatened or endangered fauna (within the meaning of the NP&W Act)	No impacts	Low impacting activity	Short term	Low
3. impacts which create significant barriers to fauna movement	Required rehabilitation works will not create barriers to fauna	Low impacting activity	Short term	Low
4. any other impacts	None identified	Low impacting activity	Short term	Low
(b) Flora impacts				
1. any endangering of flora species (including trees, shrubs, grasses, herbs or aquatic plants)	Some impacts may occur to native grasses and herbs located within improved pasture. Each drill site will be inspected by an ecologist prior to disturbance	Very low, particularly with implementation of mitigation measures including revegetation of all disturbed areas	Short term	Low
2. impacts from the clearing or modifying of extensive areas of relatively undisturbed native vegetation or wetlands	No clearing of mature undisturbed native vegetation required.	none	none	Low
3. any other impacts	None identified			Low
(c) Ecological impacts				
1. any threat to the biological diversity or ecological integrity of species or communities	None	None	Short term	Low

Table 2A – Analysis of the extent of the potential impacts

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	Evaluation criteria		Ranking of potential significance of extent
		size, scope & intensity	duration	
2. any barrier to the normal replenishment or revegetation of existing species following disturbance	None			Low
3. impacts from the introduction of noxious weeds, vermin, feral species or diseases or releases of genetically modified organisms	Potential for minor impacts due to weeds	Very low, particularly with implementation of mitigation measures	Medium to long term	Low
4. impacts from the uses of pesticides, herbicides, fertilisers or other chemicals which may build up residues in the environment	None			Low
5. high bushfire risk impacts	None			Low
6. any other impacts	None identified			Low
Accumulation of biological impacts - Low				
Resource use impacts (during operation and construction)				
(a) Community resources				
1. any significant increase in the demand for services and infrastructure resources including roads, power, water supply and drainage, waste including sewage management, education, medical and social services	No			Low
2. any significant resource recycling or reuse schemes to reduce resource usage	No			Low
3. any diversion of resources to the detriment of other communities or natural systems	No			
4. any degradation of infrastructure such as roads, bridges	No			Low
5. any other impacts	No			Low
(b) Natural resources				Low
1. any disruption or destruction of natural resources (eg fish habitat or fish species) with impacts on industries based on these resources	No			Low
2. any disruption of existing activities (or reduction of options for future options) because of the natural resource demands of the proposal	No			Low
3. any use which results in the wasteful use of large amounts of natural resources	No			Low
4. any use which results in the substantial depletion of natural resources	No			Low
5. any use which results in the degradation of any area reserved for conservation purposes	No			Low
6. any other impacts	No			Low
Accumulation of resource use impacts - Low				
Community impacts (during operation and construction)				
(a) Social factors				
1. any impacts which result in a change in the community's demographic structure	No			Low
2. any environmental impact that may cause substantial change or disruption to the community (loss of neighbourhood cohesion, access to facilities, links to other communities, community identity or cultural character)	No, but the project may be linked to future mining in the area which is generally considered to be socially disruptive			Moderate
3. any impacts which result in some individuals or communities being significantly disadvantaged	No			Low
4. any impacts on the health, safety, security, privacy or welfare of individuals or communities because of factors such as:	No			Low
i) air pollution or odour				
ii) noise, vibration, blasting, electromagnetic fields or radiation				

Table 2A – Analysis of the extent of the potential impacts

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	Evaluation criteria		Ranking of potential significance of extent
		size, scope & intensity	duration	
iii) release of disease or genetically modified organisms				
iv) lighting, overshadowing or visual impacts				
5. any impacts that result in a change in the level of demand for community resources (eg facilities, services and labour force)	No			Low
6. any other social impacts	No			Low
(b) Economic factors (including impacts on employment, industry and property value)				
1. any impacts which result in a decrease to net economic welfare	No			Low
2. any impacts that result in a direct cost to the community or individuals	No			Low
3. any impacts that result in a decrease in the community's economic stability	No			Low
4. any impacts which result in a change to the public sector revenue or expenditure base	No			Low
5. any other economic impacts	No			Low
(c) Heritage, aesthetic and cultural impacts				
1. any impacts on a locality, place, building or natural landmark having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, recreational, scenic or social significance or other special value for present or future generations	None known			Low
2. any impacts from new lighting, glare or shadows	None			
3. any other heritage, aesthetic or cultural impacts	None known and unlikely	Low impact	Long term	Low
(d) Land use impacts				Low
1. any major changes in land use	None			Low
2. any curtailment of other beneficial use	None			Low
3. any property value impacts with land use implications	None			Low
4. any other land use impacts	None			Low
(e) Transportation Impacts (during construction and operation)				
1. substantial impacts on existing transportation systems (rail, water, road, air or pedestrian – both public and private), altering present patterns of circulation, modal split or movement of people and/or goods	None			Low
2. directly or indirectly encouraging additional traffic:	No			Low
i) during construction				
ii) during operation				
3. increased demand for parking (off and on street including residential areas)	No			Low
4. any other impacts on transport or traffic	No			Low
Accumulation of community impacts - Low				

Table 2B – Analysis of the extent of the potential adverse impacts in sensitive locations

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	Evaluation criteria		Ranking of potential significance of extent
		size, scope & intensity	duration	
On areas sensitive because of physical factors				
1. coastline and dune fields, alpine areas, deserts, caves or other unique landforms	None			
2. land with high agricultural capability	None			
3. natural waterbodies, riparian zones, wetlands, drinking water catchments or flood prone areas	None	Negative impacts unlikely, activities proposed have been undertaken successfully before. Drilling and subsequent rehabilitation will not negatively affect any water supply catchment.	Short term	Low
4. groundwater recharge areas or areas with high water table	None			Low
5. erosion prone areas; areas with slopes of greater than 18 degrees	None			Low
6. subsidence or slip areas	None			Low
7. areas with acid sulfate, sodic or highly permeable soils	None			Low
8. areas with salinity or potential salinity problems	None			Low
9. areas with degraded air quality	None			Low
10. areas with degraded or contaminated soil area or degraded or contaminated water (ground or surface)	None			Low
11. any other factors	None identified			
Accumulation of impacts: Low				
On areas sensitive because of biological factors				
1. corals and seagrass beds, wetland communities (coastal, peatlands or inland), native forests, urban bushland, arid and semi-arid communities	None			Low
2. habitat of endangered terrestrial or aquatic fauna species and of species listed under international agreements including Japan-Australia Migratory Birds Agreement (JAMBA) and China-Australia Migratory Birds Agreement (CAMBA)				Low
3. habitat/wildlife corridors and remnant vegetation	No significant impact	Rehabilitation works will return area to previous condition	Short term	Low
4. protected, rare or threatened plant species or inadequately reserved plant communities	No significant impact	Local native species will be used in rehabilitation in forested areas	Short term	Low
5. bushfire prone areas	No impact			Low
6. fishing grounds and fish breeding or nursery areas	No impact			Low
Accumulation of impacts - Low				
On areas sensitive because of conservation factors				
1. National Parks and other areas reserved or dedicated under the *National Parks and Wildlife Act 1974*	None			Low
2. land reserved or dedicated within the meaning of the *Crown Lands Act 1989* for reservation or other environmental protection purposes	None			Low
3. World Heritage areas	None			Low
4. environmental protection zones in environmental planning instruments or lands protected under SEPP 14 - *Coastal Wetlands* or SEPP 26 - *Littoral Rainforest*	None			Low

Table 2B – Analysis of the extent of the potential adverse impacts in sensitive locations

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	Evaluation criteria		Ranking of potential significance of extent
		size, scope & intensity	duration	
5. land identified as wilderness under the *Wilderness Act 1987* or declared as wilderness under the *National Parks and Wildlife Act 1974*	None			Low
6. aquatic reserves dedicated under the *Fisheries Management Act 1994*	None			Low
7. wetlands areas dedicated under the Ramsar Wetlands Convention	None			Low
8. heritage items identified on the Register of the National Estate, under the *Heritage Act 1977* (NSW) or an environmental planning instrument	None			Low
9. community land under the *Local Government Act 1993* (for which a plan of management has been prepared)	None			Low
10. land subject to a 'conservation agreement' under the *National Parks and Wildlife Act 1974*	None			Low
11. any other factors	None identified			Low
Accumulation of impacts: Low				
On areas sensitive because of community factors				
1. Aboriginal communities or areas subject to land rights claims	Minor		Short	Low
2. communities with a strong sense of identity	Yes	Strong community presence and general opposition to mining related activities	Ongoing throughout project	Moderate
3. disadvantaged communities (reduced economic, social or cultural indicators)	None			Low
4. areas with degraded amenity from noise, traffic congestion or odour	None			Low
5. areas or items of high anthropological, archaeological, architectural, cultural, heritage, historical, recreational or scientific value	None			Low
6. areas or items of high aesthetic or scenic value	None			Low
7. any other factors	None			Low
Accumulation of impacts: Low				

Table 2C - Analysis of the Nature of the Potential Impacts

	Evaluation Criteria							
Characteristics of potential impacts (adverse & beneficial)	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impact be reversed?	How well can the impacts be mitigated?	Do the impacts comply with plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	Ranking of potential significance
Physical impacts or pollution impacts (during operation and construction)								
(a) Air impacts								
1. air quality impacts (eg dust, smoke, grit, odours, precursors to photo- chemical smog, fumes, toxic or radioactive gaseous emissions) with economic, health, ecosystem or amenity considerations	High	Highly	Yes	Highly due to distance from local residences	Yes	low	No	Low
2. air impacts with green- house or ozone damage consideration	High	Highly	Yes	Highly	Yes	low	No	Low
3. any other air impacts	None identified							
(b) Water impacts								
1. impacts from changes in surface or ground water quantity	Moderate	Moderately	Yes	Adequately through sealing of aquifers	Yes	High	Not at this stage, program will provide further data on groundwater	Moderate
2. impacts from use of water	High	Moderately	Yes	N/a	Yes	Low	No	Low
3. impacts from changes to natural waterbodies, wetlands or runoff patterns	High	Moderately	Yes	Adequately through sealing of aquifers	Yes	Low	No	Low
4. impacts from changes to flooding or tidal regimes	High	Moderately	Yes	None required	Yes	Low	No	Low
5. impacts from changes in water quality with economic, health, ecosystem or amenity considerations – eg salinity, colour, odour, turbidity, temperature, dissolved oxygen, nutrients, pH factors or pollutants (intentional or unintentional releases of oil, fuels, toxins including heavy metals, and anti-foulants), spoil, sediment, sewage or other waste	High	Highly	Yes	Adequately, though rehabilitation and proposed erosion controls	Yes	Moderate	No	Low
6. any other impacts on water or from the use or storage of water	None Identified	N/A	N/A	N/A	N/A	N/A	N/A	Low
(c) Soil and stability impacts								
1. degradation of soil quality including contamination (intentional or unintentional), salinisation or acidification	High	Moderately	Yes	Highly	Yes	Low	No	Low
2. loss of soil from wind or water erosion	High	Highly	Yes	Adequately with erosion controls	Yes	Low	No	Low

Table 2C - Analysis of the Nature of the Potential Impacts

	Evaluation Criteria							
Characteristics of potential impacts (adverse & beneficial)	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impact be reversed?	How well can the impacts be mitigated?	Do the impacts comply with plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	Ranking of potential significance
3. loss of structural integrity of the soil	High	Highly	No	Adequately through rehabilitation	Yes	Low	No	Low
4. increased land instability with high risks from land slides or subsidence	Moderately	Highly	Yes	Adequately through rehabilitation	Yes	Low	No	Low
5. any other soil impacts	N/a							Low
(d) Noise and vibration impacts								
1. results in increased noise or vibrations to unacceptable levels for the surrounding communities	High	Highly	Yes	Highly due to distance from local residences	Yes	Low	No	Low
2. affects sensitive properties (educational, hospitals, residential, heritage)	High	Highly	Yes	Highly due to distance	Yes	Low	No	Low
3. any other impacts from noise, blasting or vibrations	High	Highly	Yes	Highly due to distance	Yes	Low	No	Low
(e) Any other physical or pollution impacts								
Accumulation of physical or pollution impacts - Low								
Biological impacts (during operation and construction)								
(a) Fauna impacts								
1. any endangering or displacement of fauna species (including animals, birds, frogs, reptiles, insects, fish or crustaceans)	High	Moderately	Yes, displace-ment temporary	Adequately through rehabilitation	Yes	Moderate	Yes, ongoing assessment by environmental professionals	Low
2. any reduction of critical habitat of any unique, threatened or endangered fauna (within the meaning of the NP&W Act)	High	Moderately	Yes, through rehabilitation	Adequately through rehabilitation	Yes	Moderate	Yes, ongoing assessment by environmental professionals	Low
3. impacts which create significant barriers to fauna movement	High	Highly	Yes, through rehabilitation	Adequately through rehabilitation	Yes	Moderate	Yes, ongoing assessment by environmental professionals	Low
4. any other impacts	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Low
(b) Flora impacts								
1. any endangering of flora species including trees, shrubs, grasses, herbs or aquatic plants	High	Highly	Potential but controlled by further assessment	Adequately through rehabilitation	Yes	Moderate	Yes, ongoing assessment by environmental professionals	Low

Table 2C - Analysis of the Nature of the Potential Impacts

	Evaluation Criteria							
Characteristics of potential impacts (adverse & beneficial)	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impact be reversed?	How well can the impacts be mitigated?	Do the impacts comply with plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	Ranking of potential significance
2. impacts from the clearing or modifying of extensive areas of relatively undisturbed native vegetation or wetlands	Moderate	Highly	Yes, through rehabilitation	Adequately through rehabilitation	Yes	Moderate	Yes, ongoing assessment by environmental professionals	Low
3. any other impacts	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Low
(c) Ecological impacts								
1. any threat to the biological diversity or ecological integrity of species or communities	High	Highly	Yes	Well	Yes	Moderate	Yes, ongoing assessment by environmental professionals	Moderate
2. any barrier to the normal replenishment or revegetation of existing species following disturbance	High	Moderately	Yes	Well	YEs	Moderate	Yes, ongoing assessment by environmental professionals	Moderate
3. impacts from the introduction of noxious weeds, vermin, feral species or diseases or releases of genetically modified organisms	High	Mitigation measures required to ensure spread of weeds is minimised	no	Well	Yes	High	Yes, ongoing assessment by environmental professionals	Low
4. impacts from the uses of pesticides, herbicides, fertilisers or other chemicals which may build up residues in the environment	High	Highly	No	If used according to labels they have minimal undesirable impact	Yes	High	No	Low
5. high bushfire risk impacts	High	Highly	Yes	N/a	Yes	Low	No	Low
6. any other impacts	High	Highly	Yes	N/a	Yes	Low	No	Low
Resource use impacts (during operation and construction)								
(a) Community resources								
1. any significant increase in the demand for services and infrastructure resources including roads, power, water supply and drainage, waste (including sewage) management, education, medical and social services	High	Highly	Yes	N/a	Yes	Low	No	Low
2. any significant resource recycling or reuse schemes to reduce resource usage	High	Highly	Yes	N/a	Yes	Low	No	Low
3. any diversion of resources to the detriment of other communities or natural systems	High	Highly	Yes	N/a	Yes	Low	No	Low

Table 2C - Analysis of the Nature of the Potential Impacts

	Evaluation Criteria							
Characteristics of potential impacts (adverse & beneficial)	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impact be reversed?	How well can the impacts be mitigated?	Do the impacts comply with plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	Ranking of potential significance
4. any degradation of infrastructure such as roads, bridges	High	Highly	Yes	N/a	Yes	Low	No	Low
5. any other impacts	High	Highly	Yes	N/a	Yes	Low	No	Low
(b) Natural resources								
1. any disruption or destruction of natural resources (eg fish habitat or fish species) with impacts on industries based on these resources	High	Highly	Yes	N/a	Yes	Low	No	Low
2. any disruption of existing activities (or reduction of options for future options) because of the natural resource demands of the proposal	High	Highly	Yes	N/a	Yes	Low	No	Low
3. any use which results in the wasteful use of large amounts of natural resources	High	Highly	Yes	N/a	Yes	Low	No	Low
4. any use which results in the substantial depletion of natural resources	High	Highly	Yes	N/a	Yes	Low	No	Low
5. any use that results in the degradation of any area reserved for conservation purposes	High	Highly	Yes	N/a	Yes	Low	No	Low
Accumulation of resource use impacts: Low								
Community impacts (during operation and construction)								
(a) Social impacts								
1. any impacts which result in a change in the community's demographic structure	High	Highly	Yes	N/a	Yes	Low	No	Low
2. any environmental impact that may cause substantial change or disruption to the community (loss of neighbour cohesion, access to facilities, links to other communities, community identity or cultural character)	High	Highly	Yes	N/a	Yes	Low	No	Low
3. any impacts which result in some individuals or communities being significantly disadvantaged	High	Highly	Yes	N/a	Yes	Low	No	Low
4. any impacts on the health, safety, security, privacy or welfare of individuals or communities because of factors such as i) air pollution or odour, noise ii) vibration, blasting, electro-magnetic fields or radiation iii) release of disease or genetically modified organisms iv) lighting, overshadowing or visual	High	Highly	Yes	N/a	Yes	Low	No	Low

Table 2C - Analysis of the Nature of the Potential Impacts

	Evaluation Criteria							
Characteristics of potential impacts (adverse & beneficial)	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impact be reversed?	How well can the impacts be mitigated?	Do the impacts comply with plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	Ranking of potential significance
impacts								
5. any impacts that result in a change in the level of demand for community resources (eg facilities, services and labour force)	High	Highly	Yes	N/a	Yes	Low	No	Low
6. any other social impacts	N/a							Low
(b) Economic factors (including impacts on employment, industry and property value)								
1. any impacts which result in a decrease to net economic welfare	High	Highly	Yes	N/a	Yes	Low	No	Low
2. any impacts that result in a direct cost to the community or individuals	High	Highly	Yes	N/a	Yes	Low	No	Low
3. any impacts that result in a decrease in the community's economic stability	High	Highly	Yes	N/a	Yes	Low	No	Low
4. any impacts which result in a change to the public sector revenue or expenditure base	High	Highly	Yes	N/a	Yes	Low	No	Low
5. any other economic impacts	High	Highly	Yes	N/a	Yes	Low	No	Low
(c) Heritage, aesthetic and cultural impacts								
1. any impacts on a locality, place, building or natural landmark having aesthetic anthropological, archaeological, architectural, cultural, historical, scientific, recreational, scenic or social significance or other special value for present or future generations	High	Highly	Yes	N/a	Yes	Low	No	Low
2. any impacts from new lighting, glare or shadows	High	Highly	Yes	N/a	Yes	Low	No	Low
3. any other heritage, aesthetic, cultural impacts	high	high	no	Very well	yes	low	No	Low
(d) Land use impacts								
1. any major changes in land use	High	Highly	Yes	N/a	Yes	Low	No	Low
2. any curtailment of other beneficial uses	High	Highly	Yes	N/a	Yes	Low	No	Low
3. any property value impacts with land use implications	High	Highly	Yes	N/a	Yes	Low	No	Low
4. any other land use impacts	High	Highly	Yes	N/a	Yes	Low	No	Low
(e) Transportation impacts)								
1. substantial impacts on existing transportation systems (rail, water, road air or pedestrian – both public and private), altering present patterns of circulation, modal split or movement of people and/or goods	High	Highly	Yes	N/a	Yes	Low	No	Low

Table 2C - Analysis of the Nature of the Potential Impacts

	Evaluation Criteria							
Characteristics of potential impacts (adverse & beneficial)	What is the confidence in predicting impacts?	How resilient is the environment to cope with impacts?	Can the impact be reversed?	How well can the impacts be mitigated?	Do the impacts comply with plans, policies?	What is the level of public concern?	Are further studies required on impacts or mitigation?	Ranking of potential significance
2. directly or indirectly encouraging additional traffic i) during construction ii) during operation	High	Highly	Yes	N/a	Yes	Low	No	Low
3. increased demand for parking (off and on street including residential areas)	High	Highly	Yes	N/a	Yes	Low	No	Low
4. any other impacts on transportation or traffic	High	Highly	Yes	N/a	Yes	Low	No	Low
Accumulation of community impacts - Low								

TABLE 3EVALUATE THE LIKELY SIGNIFICANCE OF POTENTIAL IMPACTS ON THE ENVIRONMENT

Impacts	Potential significance considering the extent of impacts	Potential significance considering the level of adverse impacts on environmentally sensitive areas	Potential significance considering the nature of the impacts
Physical and pollution			
a) air impacts	low	low	low
b) water impacts	low	low	low
c) soil impacts	low	low	low
d) noise and vibration	low	low	low
Biological			
a) fauna	low	low	low
b) flora	low	low	low
c) ecological	low	low	low
Resource Use			
a) community resources	low	low	low
b) natural resources	low	low	low
Community			
a) social impacts	low	low	low
b) economic impacts	low	low	low
c) heritage, aesthetic, cultural impacts	low	low	low
d) land use impacts	low	low	low
e) transportation impacts	low	low	low
Activity as a whole	low	low	low

This activity is not likely to significantly affect the environment. No EA is required. ☑
or
This activity is likely to significantly affect the environment. An EIS is required. ☐

Person responsible for analysing the potential impacts
(eg preparing the REF if necessary)

Robert Byrnes,
Director
International Environmental Consultants

Signature: R Byrnes

Date: 14 July 2011

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19 August 2011

Fiona Bartier
Regional Environmental Manager - Central West
Centennial Coal
Lidsdale House, Castlereagh Highway
Lidsdale NSW 2790

Dear Fiona

Inglenook Exploration Program – Statement of Significance

As requested, we have prepared a Statement of Significance under Section 5A of the Environmental Planning and Assessment (EP&A) Act 1979 covering the Inglenook Exploration Program. Also, Section 111 of the EP&A Act requires that a determining authority "examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment" in relation to any activity. Clause 228 of the *Environmental Planning and Assessment Regulation 2000* details the "factors to be taken into account concerning the impact of an activity on the environment". Although all relevant factors for consideration are addressed in the REF for the Inglenook Exploration Program, we have summarised these below, which may assist in the assessment and determination by the NSW Division of Resources and Energy.

1. Background Data

As described in the REF, there are a number of threatened species and Endangered Ecological communities occurring within the exploration area. However, the proposed management provisions included in the REF have been based on the concept of avoidance. Site inspections of each exploration site and new access track by suitably qualified archaeologists and ecologists for due diligence will be undertaken where required in order to verify compliance with the primary strategy of avoiding impacts.

Threatened plant species known to occur within 10 km of the study area are listed below:

- *Eucalyptus cannonii* (Capertee Stringybark);
- Derwentia blakelyi, *Eucalyptus alligatrix* ssp. *miscella*
- *Grevillea obtusiflora spp. Fecunda; obtusiflora ssp. Obtusifolia, Leionema, sympetalum*
- *Persoonia marginata* (Clandulla Geebung);
- *Swainsona recta, sericea*
- *Prostanthera stricta*; and
- *Pultenaea sp. Genowlan Point* (Genowlan Pultenaea)

There are also four Endangered Ecological Communities (EEC) under the TSC Act 1995, that are considered to potentially occur within the exploration area which are:

- ❒ Box Gum Woodland and
- ❒ Fuzzy Box Woodlands
- ❒ Genowlan Point Allocasuarina Heathland; and
- ❒ Montane Peatlands and Swamps.

Threatened fauna species recorded within the exploration area include:

- ❒ Booroolong Frog (Litoria booroolongensis);
- ❒ Regent Honeyeater (Xanthomyza phyrgia);
- ❒ Spotted-tailed Quoll (Dasyurus maculatus);
- ❒ Koala (Phascolarctos cinereus);
- ❒ Glossy Black-cockatoo (Calyptorhynchus lathami);
- ❒ Barking Owl (Ninox connivens),
- ❒ Powerful Owl (Ninox strenua);
- ❒ Brown Treecreeper (Climacteris picumnus victoriae);
- ❒ Speckled Warbler (Pyrrholaemus sagittatus);
- ❒ Black-chinned Honeyeater (Melithreptus gularis gularis);
- ❒ Regent Honeyeater (Xanthomyza phyrgia);
- ❒ Hooded Robin (Melanodryas cucullata cucullata);
- ❒ Diamond Firetail (Stagonopleura guttata);
- ❒ Spotted-tailed Quoll (Dasyurus maculatus);
- ❒ Large-eared Pied Bat (Chalinolobus dwyeri); and
- ❒ Eastern Cave Bat (Vespadelus troughtoni).

2. Assessment Under Section 5A of the EP&A Act

There are seven parts or questions listed under Section 5A of the EP&A Act relating to ecological matters. These questions are outlined below and have been applied to the current proposal for all threatened species of flora and fauna, EEC's and for completeness, other vegetation communities and their habitat value. The discussion below is structured according to Section 5A of the EP&A Act.

A. in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle or the species such that a viable local population of the species is likely to be placed at risk of extinction.

The proposed exploration program would involve little or no disturbance to native vegetation. The project includes management procedures covering before, during and after drilling activities. These procedures include inspection by a qualified ecologist to determine the presence of any threatened species as well as any habitat trees or nests in the vicinity which may be disturbed directly or indirectly by the drilling activity. Should rare or endangered species be present or suitable habitat or feed trees, then the drill site will either be moved or modified to avoid impacts.

Post drilling rehabilitation initiatives include reinstatement of the vegetation communities that existing prior to drilling. In the vast majority of situations, this involves re-establishing improved pasture to the satisfaction of the land owner as well as weed management activities as required.

The exploration program is therefore highly unlikely to have an adverse effect on the life cycle of threatened species such that a viable local population of any of those species would be placed at risk of extinction.

B. *in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,*

There are no known endangered populations solely dependent on habitat within the Inglenook Exploration Area. Irrespective of this, the primary mitigation strategy of avoidance will ensure that there will be no impact on any endangered population.

C. *In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*
   is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
   is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Although there are several Endangered Ecological Communities which occur within the study area, the proposed exploration program will avoid as far as practicable, disturbance to native vegetation. The proposed exploration program would not affect the extent of any EEC, nor modify the composition of the community, such that its local occurrence would be placed at risk of extinction. Similarly, the proposed exploration program is unlikely to have an adverse affect on the composition of a local occurrence of any EEC such that it would be placed at risk of extinction.

D. *In relation to the habitat of a threatened species, population or ecological community:*
   The extent to which *habitat is likely to be removed or modified as a result of the action proposed;*
   Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
   The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

The Inglenook Exploration Program will not impact or disturb important habitat for any threatened species, population or ecological community. Therefore habitat will not be removed, modified, fragmented or isolated by the proposed activity.

E. *Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).* The TSC Act defines "*critical habitat*" as "*habitat declared to be critical habitat under Part 3*" of the Act.

There is no declared critical habitat of relevance to the study area. The proposed exploration program would not affect any area of critical habitat either directly or indirectly.

F. *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

The proposed drilling works would not affect any land that has been identified as important for the recovery of any threatened species or ecological community. The program would not be inconsistent with the objectives or actions or any recovery plan or threat abatement plan.

G. *Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed exploration program does not constitute an action that is part of a key threatening process and is not likely to result in the operation or increased impact of a key threatening process.

3. Assessment Under Clause 228 of the EP&A Regulation

The factors which need to be taken into account when considering the environmental impact of an activity are listed in Clause 228(2) of the *Environmental Planning and Assessment Regulation, 2000*. Those factors have been addressed below:

(a) Any environmental impact on a community?

The project will result in a minor increase in vehicle traffic in the region as well as additional noise and dust caused by the drill rig and vehicles crossing unsealed roads. When on private land, all traffic will be confined to nominated access tracks as far as practicable. Traffic generation on public roads will be well within the carrying capacity of the local road network. Noise generated by onsite plant and equipment will occur during daylight hours only over 2 to 3 week period. These activities will be located in excess of 200 m from residences. The activities will be undertaken in accordance with a land access agreement which includes compensation for the occupation of the site during drilling. There are no health implications from drilling activities.

(b) Any transformation of a locality?

The proposal will not cause a major transformation of any locality within the exploration area.

(c) Any environmental impact on the ecosystem of the locality?

As discussed in Section 2 above, the Inglenook Exploration Program has been designed to avoid impacts on ecosystems including threatened species and communities.

(d) Any reduction of the aesthetics, recreational, scientific or other environmental quality or value of a locality?

On occasions the drill rig may be visible from publicly accessible areas however the program is not considered an activity which would impact on the aesthetics, recreational, scientific or other environmental qualities or values of the area.

(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present generations?

There are no known items of European heritage which would be impacted by the exploration program. Although a number of archaeological sites exist in the area, each drill site will be inspected by qualified Archaeologist prior to disturbance. If archaeological material is identified the drill site will be relocated.

(f) Any impact on habitat of any protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)?

As described in Section 2 above, the Inglenook Exploration Program has been designed to avoid impacts on ecosystems including threatened species and communities. Should rare or endangered species be present or suitable habitat or feed trees, then the drill site will either be moved or modified to avoid impacts. By avoiding impacts on vegetation communities, the potential impact on fauna will be minimised.

(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?

Due to the short term nature of the exploration program in any one area and the comprehensive ecology checklists provided in the REF which form part of the proposal, the drilling activity is unlikely to endanger any species of animal or plant or other form of life.

(h) Any long-term effects on the environment?

The exploration program will be transient and rehabilitation initiatives will ensure that no long term environmental harm will occur on the surface. While exploration drilling has a low risk of impacting the existing groundwater resources, the program will incorporate mitigation and management measures to ensure that any risk of groundwater loss or cross contamination between aquifers is avoided. The program also includes:

- preferentially locating drill sites away from localised areas of potentially higher quality shallow alluvial aquifers typically associated with adjacent billabongs and sand lenses.

- casing to be used when drilling through the alluvium or water bearing sequence creating an effective seal. The casing provides a barrier to alluvium groundwater flows and minimises the potential for contamination of groundwater sources between the alluvium and other aquifers

- All boreholes not required as ongoing monitoring sites will be backfilled with grout to provide an effective seal in accordance with the DII Guidelines EDG1 'Sealing of Surface Exploration Boreholes' within seven days of completing the borehole. The seal will effectively and permanently stop interference of existing groundwater aquifers.

For boreholes which will be established as groundwater monitoring sites by installation of piezometers, the in-hole casing will be replaced with slotted pipe sections to allow for the collection of groundwater data. Water samples will be taken from each aquifer to determine any differential quality. Should there be a risk of cross contamination which may impact on the integrity of the system, the boreholes will be grouted up to the level of the target aquifer. This will differ between sites in order to gain necessary data on each and every aquifer within the system.

The implementation of these controls will ensure that there is minimal risk of any long term impacts on the environment.

(i) Any degradation of the quality of the environment?

The Inglenook Exploration Program has been designed to avoid any degradation in the quality of the environment. The program involves standard drilling techniques not dissimilar to drilling domestic water bores and uses the same chemicals and drilling equipment. Additional pollution controls have been incorporated to ensure that drilling muds and other fluids do not leave the drilling site, which will be fully rehabilitated on completion.

(j) Any risk to the safety of the environment?

It is considered that there is no risk to the safety of the environment. Sufficient mitigation strategies have been proposed to ensure that there are also no significant public safety issues. Some level of security will be required to be maintained throughout the exploration drilling program at each drill site, primarily to protect stock or unauthorised access. Security and public safety measures may include

local signage, temporary safety fencing or barriers to protect the drill rig equipment and the safety of the public and landowner. A security company may be employed if requested by the landowner.

(k) Any reduction in the range of beneficial uses of the environment?

The drilling program will largely occur on private land. In areas where public access is possible, safety measures will be employed in consultation with the land owner.

(l) Any pollution of the environment?

Effective surface water management systems will be implemented during the drill site establishment and maintained during drilling and rehabilitation activities. The REF includes a tiered management strategy to appropriately select drill sites and manage activities appropriately where in proximity to surface waters. These measures include avoiding drill sites closer than 40 m from all water courses, control of sediment runoff by following sediment control procedures down slope of the site disturbance (e.g. sediment fencing), creation of sumps and/or tanks at each drill hole to control erosion and sediment including installation of clean water diversions around drilling pad to minimise overflow or sumps and timely rehabilitation of drill hole locations.

(m) Any environmental problems associated with the disposal of waste?

All wastes are will be managed in accordance with the following procedures:

- Contractors/employees shall keep all work areas maintained and in a neat orderly manner. The use of litter bins, regular maintenance and site inductions shall prevent the accumulation of litter on site;
- Contractors/employees shall adhere to relevant waste management principles and strategies;
- Contractors/employees are trained in waste management;
- Chemicals, waste oils and lubes shall be collected for safe transport off site for reuse, recycling or disposal;
- General refuse shall be collected and transported to local council approved disposal sites; and
- On completion of each drill site all waste material shall be removed.

Site cleanliness will form part of the site inspection check list and the views and comments of each landowner will be included. With the incorporation of these mitigation strategies, the potential for environmental problems associated with the disposal of wastes will be avoided.

(n) Any increased demands on resources, natural or otherwise which are, or are likely to become in short supply?

The project will result in the temporary loss of a small area of agricultural land which will be fully rehabilitated on completion. The project will use approximately 1,300 litres of diesel per drill site. Overall the project will not significantly increase demands on resources that are likely to become in short supply.

(o) Any cumulative environmental effect with other existing or likely future activities?

In consideration of the range of mitigating and control measures proposed in the REF for the project, including preliminary investigations for archaeological heritage, land status, flora and fauna and noise, the development of constraints and environmental sensitivity mapping and the implementation of drill site selection management and mitigation procedures, a significant cumulative impact on the

environment is not expected. The proposed drill sites are specially selected to have minimal impact on the environment and community.

4. Conclusion

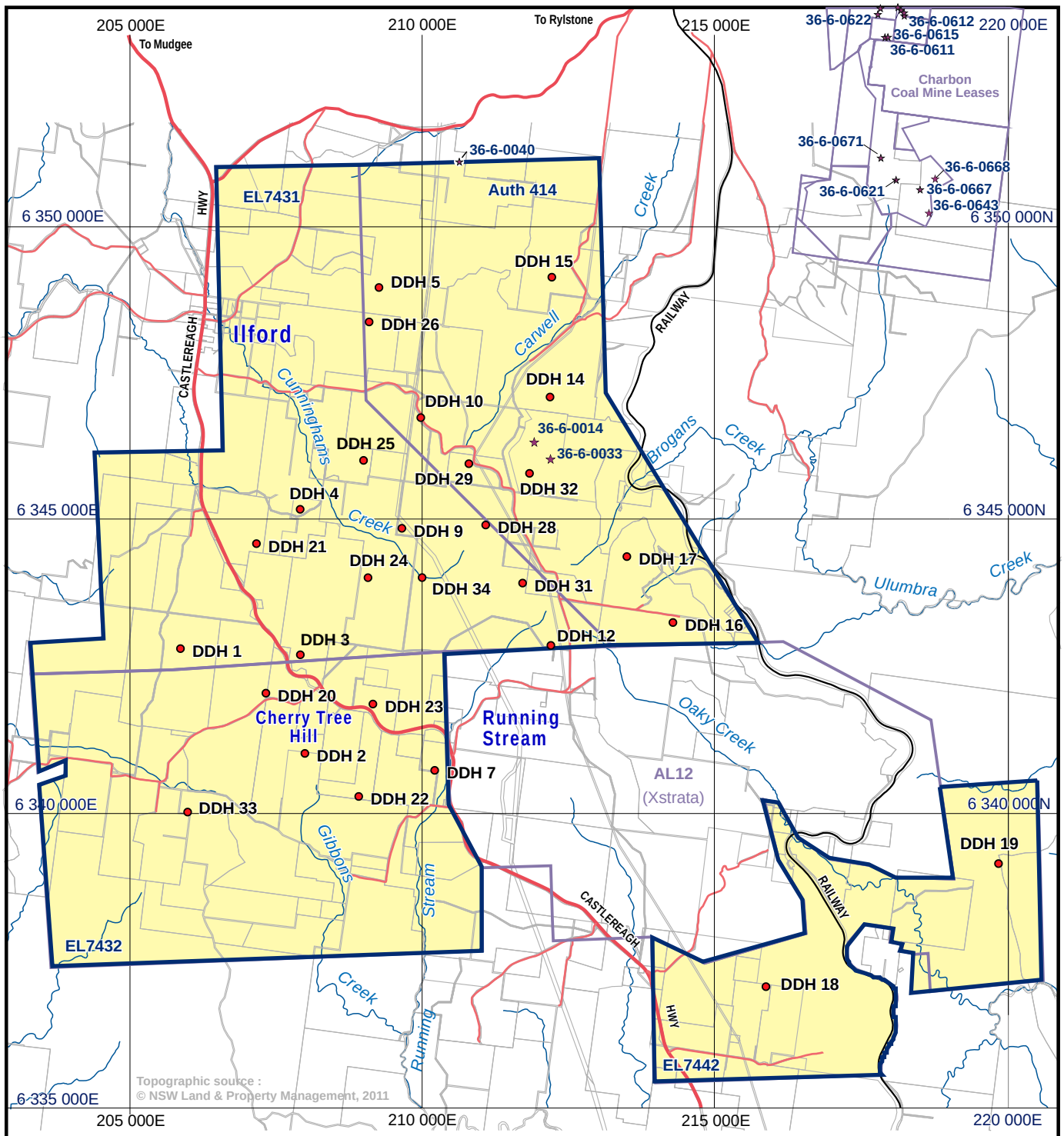
Based upon the considerations detailed above, the proposed Inglenook Exploration Program would not be likely to impose a significant effect upon any "threatened species, population or ecological community" listed on the schedules of the NSW TSC Act. Consequently, a Species Impact Statement is not required for the project. Also, in considering the matters listed in Clause 228(2) of the *Environmental Planning and Assessment Regulation, 2000*, the activity is not likely to significantly affect the environment and therefore no EIS is required.

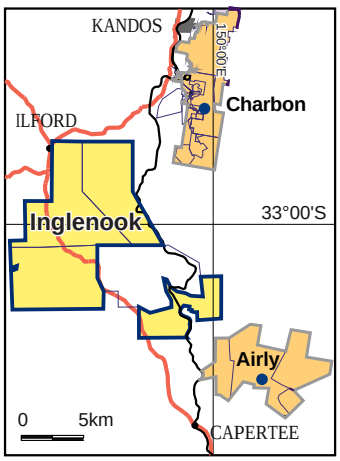
We trust this information is sufficient for your purposes however please do not hesitate to contact me should you required further information or clarification.

Yours faithfully

Robert Byrnes
Director
International Environmental Consultants Pty Ltd

Appendix E – Archaeology Searches (AHIMS)





Inglenook Project Area

Other tenements

Cadastral boundaries

Main road

Secondary road

Railway

River

DDH 17 — Proposed drill sites as at August 2011

36-6-0014 — Archaeological site

0 1 2 3 4 5km

Grid : GDA94 MGA Zone 56

Centennial Coal

INGLENOOK PROJECT

Drill Site Locations

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 109453

Client Service ID : 49529

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-1-2544	Carinya (C-ST-1);Hillcroft;	AGD	56	220840	6332250	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	**Recorders**	Robynne Mills					**Permits**		
37-4-0063	Kooringle 5;	AGD	56	224690	6349540	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1333
	Contact	**Recorders**	Warren Bluff					**Permits**		
45-1-0127	Airly Mountain	AGD	56	224060	6331080	Open site	Valid	Artefact : -	Open Camp Site	1947
	Contact	**Recorders**	Helen Brayshaw,Mary Dallas Consulting Archaeologists					**Permits**		
45-1-0030	Capertee State Forest;	AGD	56	224650	6326650	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	
	Contact	**Recorders**	Unknown Author					**Permits**		
36-6-0618	CC1;	AGD	55	778800	6353550	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Elizabeth Rich					**Permits**	709	
36-6-0014	The Chimney;"Reloha".;	AGD	55	772510	6346570	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	213
	Contact	**Recorders**	R French					**Permits**		
36-6-0612	Charbon Site 2;	AGD	55	779250	6353500	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Robynne Mills					**Permits**		
36-6-0615	Charbon Site 1;	AGD	55	778950	6353150	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	R Williams,Robynne Mills					**Permits**		
36-6-0667	C-OS-1/Charbon Colliery	AGD	55	779350	6350510	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Robynne Mills					**Permits**	1923	
36-6-0714	Charbon (CH-OS2 with PAD)	GDA	55	778467	6355507	Open site	Valid	Artefact : 2		
	Contact	**Recorders**	Warwick Peckham,Doctor.Jodie Benton,Ms.Wendy Lewis,Mr.Phillip Cameron					**Permits**		
36-6-0715	Charbon (CH-0S3 with PAD)	GDA	55	777797	6355869	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Warwick Peckham,Doctor.Jodie Benton,Ms.Wendy Lewis,Mr.Phillip Cameron					**Permits**		
36-6-0717	Charbon (CH-OS6)	GDA	55	778321	6350093	Open site	Valid	Artefact : 6		
	Contact	**Recorders**	Warwick Peckham,Doctor.Jodie Benton,Ms.Wendy Lewis,Mr.Phillip Cameron					**Permits**		
36-6-0721	Charbon Scarred Tree 2	GDA	55	779523	6356809	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Warwick Peckham,Doctor.Jodie Benton,Ms.Wendy Lewis,Mr.Phillip Cameron					**Permits**		
36-6-0723	Charbon Scarred Tree 4	GDA	55	778776	6351846	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	Warwick Peckham,Doctor.Jodie Benton,Ms.Wendy Lewis,Mr.Phillip Cameron					**Permits**		
44-3-0149	Airly 1	GDA	56	219208	6330113	Open site	Valid	Artefact : 3		

Report generated by AHIMS Web Service on 19/08/2011 for Deborah Farina for the following area at Datum :AGD, Zone : 55, Eastings : 752420 - 792420, Northings : 6324428 - 6364428 with a Buffer of 200 meters.Additional Info : As part of due diligence investigations. Number of Aboriginal sites and Aboriginal objects found is 64

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 109453

Client Service ID : 49529

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	**Recorders**	RPS Australia East Pty Ltd -Hamilton					**Permits**		
36-6-0794	Aarons Pass 1 (AP1)	GDA	55	762610	6360030	Open site	Valid	Artefact : 7		101793,101867,102268
	Contact	**Recorders**	Mr.David Maynard					**Permits**	3280	
36-6-0796	Aarons Pass 3 (AP3)	GDA	55	762638	6363136	Open site	Valid	Artefact : 8		101793
	Contact	**Recorders**	Mr.David Maynard					**Permits**		
36-6-0810	RPS RS2	GDA	56	217946	6354402	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	RPS Australia East Pty Ltd -Hamilton,Miss.Cheng Yen Loo					**Permits**		
45-1-0168	Dog Trap Creek;	AGD	56	226000	6329950	Open site	Valid	Artefact : -	Open Camp Site	2193
	Contact	**Recorders**	Helen Brayshaw,Mary Dallas Consulting Archaeologists,John Bugg					**Permits**		
36-6-0005	The Long Mountain;	AGD	55	770038	6356252	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	Contact	**Recorders**	Brown					**Permits**		
36-6-0017	The Chimney;Reloha;	AGD	55	772510	6346570	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	Contact	**Recorders**	R French					**Permits**		
36-6-0610	Bocoble JA-2;B/JA-2;	AGD	55	754720	6363770	Open site	Valid	Artefact : -	Isolated Find	2731
	Contact	**Recorders**	Mr.John Appleton					**Permits**		
37-4-0110	Horse Gully 2	AGD	56	226035	6356839	Open site	Valid	Artefact : 6, Ochre Quarry : 4		
	Contact Sarah Colley	**Recorders**	Miss.Sharon Riley,Paul Houston					**Permits**		
36-6-0797	Aarons Pass 4 (AP4)	GDA	55	762725	6363358	Open site	Valid	Artefact : 6		101793
	Contact	**Recorders**	Mr.David Maynard					**Permits**		
36-6-0727	Charbon (CH-OS4 with PAD)	GDA	55	778866	6355587	Open site	Valid	Potential Archaeological Deposit (PAD) : 1, Artefact : -		
	Contact	**Recorders**	Doctor.Jodie Benton,Mr.Phillip Cameron					**Permits**		
44-3-0028	Capertee	AGD	55	775492	6333617	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	1298,4795
	Contact	**Recorders**	ASRSYS					**Permits**		
37-4-0061	Kooringle 3;	AGD	56	224070	6349750	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	1333
	Contact	**Recorders**	Warren Bluff					**Permits**		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 109453

Client Service ID : 49529

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-1-0252	AC-OC-1;"Airly";	AGD	56	220110	6331040	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Robynne Mills					**Permits**		
45-1-0167	Genowlan Creek 1	AGD	56	225360	6332640	Closed site	Valid	Artefact : -	Shelter with Deposit	2193
	Contact	**Recorders**	Helen Brayshaw,Mary Dallas Consulting Archaeologists,John Bugg					**Permits**		
44-3-0044	Running Stream Kadisha	AGD	55	773950	6334700	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	1097,1298
	Contact	**Recorders**	Allan Lance					**Permits**		
36-6-0611	Charbon Site 1;	AGD	55	778900	6353150	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Robynne Mills					**Permits**		
44-3-0085	Jack Halls Creek;Kadisha;Sofala;	AGD	55	773950	6334700	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	1097
	Contact	**Recorders**	J Webster,Allan Lance					**Permits**		
44-3-0029	Capertee.	AGD	55	778043	6328484	Closed site	Valid	Artefact : -, Art (Pigment or Engraved) : -	Shelter with Art,Shelter with Deposit	1298
	Contact	**Recorders**	Unknown Author					**Permits**		
36-6-0671	C-IF-2 Charbon Colliery	AGD	55	778710	6351090	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Therin Archaeological Consulting					**Permits**	1923	
37-4-0060	Kooringle 2;	AGD	56	224180	6349750	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1333
	Contact	**Recorders**	Warren Bluff					**Permits**		
37-4-0062	Kooringle 4;	AGD	56	224740	6349520	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1333
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-6-0617	Charbon Site 3;	AGD	55	779200	6353600	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	R Williams,Robynne Mills					**Permits**		
37-4-0109	Horse Gully 1	AGD	56	226086	6356715	Open site	Valid	Artefact : 6		
	Contact Sarah Colley	**Recorders**	Miss.Sharon Riley					**Permits**		
44-3-0147	CHC-ST1 (Capertee)	GDA	55	777705	6329080	Open site	Deleted	Modified Tree (Carved or Scarred) : 1		99921
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		
36-6-0795	Aarons Pass 2 (AP2)	AGD	55	762529	6362783	Open site	Valid	Artefact : 23		101793,102268
	Contact	**Recorders**	Mr.David Maynard					**Permits**	3280	
36-6-0040	BMP 42;Dubbo;	AGD	55	771502	6351437	Open site	Valid	Artefact : -	Open Camp Site	1097
	Contact	**Recorders**	Unknown Author					**Permits**		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 109453

Client Service ID : 49529

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-6-0678	C-IF-2, Charbon Colliery	GDA	55	779482	6350096	Open site	Valid	Artefact : 1		
	Contact T Russell	**Recorders**	Michael Therin					**Permits**		
36-6-0716	Charbon (CH-OS5 with PAD)	GDA	55	779093	6356764	Open site	Valid	Artefact : 3		
	Contact	**Recorders**	Warwick Peckham,Doctor.Jodie Benton,Ms.Wendy Lewis,Mr.Phillip Cameron					**Permits**		
36-6-0718	Charbon (CH-OS1 with PAD)	GDA	55	777854	6356043	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Warwick Peckham,Doctor.Jodie Benton,Ms.Wendy Lewis,Mr.Phillip Cameron					**Permits**		
36-6-0720	Charbon Scarred Tree 1	GDA	55	779294	6356880	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Warwick Peckham,Doctor.Jodie Benton,Ms.Wendy Lewis,Mr.Phillip Cameron					**Permits**		
36-6-0722	Charbon Scarred tree 3	GDA	55	779839	6356772	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Warwick Peckham,Doctor.Jodie Benton,Ms.Wendy Lewis,Mr.Phillip Cameron					**Permits**		
36-6-0724	Charbon Scarred Tree 5	GDA	55	779368	6351816	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Warwick Peckham,Doctor.Jodie Benton,Ms.Wendy Lewis,Mr.Phillip Cameron					**Permits**		
36-6-0725	Charbon-PAD 1	GDA	55	777969	6350372	Open site	Valid	Potential Archaeological Deposit (PAD) : 2		
	Contact	**Recorders**	Warwick Peckham,Doctor.Jodie Benton,Ms.Wendy Lewis,Mr.Phillip Cameron					**Permits**		
36-6-0811	RPS ST1	GDA	56	219260	6354431	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	RPS Australia East Pty Ltd -Hamilton,Miss.Cheng Yen Loo					**Permits**		
36-6-0643	C-AS-1	AGD	55	779480	6350100	Closed site	Valid	Art (Pigment or Engraved) : 7, Artefact : -		4801
	Contact	**Recorders**	Robynne Mills					**Permits**		
37-4-0059	Kooringle 1;	AGD	56	224300	6349950	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	1333
	Contact	**Recorders**	Warren Bluff					**Permits**		
37-4-0001	Noola;Bogee Nile Creek;	AGD	56	231473	6351414	Closed site	Valid	Artefact : -	Shelter with Deposit	
	Contact	**Recorders**	Unknown Author					**Permits**		
44-3-0056	Capertee;	AGD	55	778043	6328484	Open site	Valid	Ceremonial Ring (Stone or Earth) : -, Modified Tree (Carved or Scarred) : -	Bora/Ceremonial,Carved Tree	65
	Contact	**Recorders**	Unknown Author					**Permits**		
36-6-0621	CC2;	AGD	55	778950	6350700	Open site	Valid	Artefact : -	Open Camp Site	2796

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 109453

Client Service ID : 49529

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	**Recorders**	Denise Donlon,Alice Gorman					**Permits**	1923	
36-6-0622	CC1;	AGD	55	778850	6353650	Open site	Valid	Artefact : -	Open Camp Site	2796
	Contact	**Recorders**	Alice Gorman					**Permits**	709	
36-6-0029	Church Mountain;Charbon Colliery;	AGD	55	778633	6356018	Open site	Valid	Artefact : -	Open Camp Site	253,4463
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists					**Permits**		
36-6-0033	The Chimney;Mt Ilford Rd;	AGD	55	772770	6346262	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1097
	Contact	**Recorders**	J Johnson					**Permits**		
36-6-0613	Charbon Site 3;	AGD	55	779150	6353650	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Robynne Mills					**Permits**		
36-6-0616	Charbon Site 2;	AGD	55	779250	6353550	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	R Williams,Robynne Mills					**Permits**		
36-6-0809	RPS RS1	GDA	56	219339	6354367	Closed site	Valid	Artefact : -		
	Contact	**Recorders**	RPS Australia East Pty Ltd -Hamilton,Miss.Philippa Sokol					**Permits**		
36-6-0668	C-05-2	AGD	55	779620	6350680	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Robynne Mills					**Permits**	1923	
36-6-0713	CEA1	AGD	55	778543	6355138	Open site	Valid	Artefact : 5		
	Contact T Russell	**Recorders**	Michael Therin					**Permits**		
36-6-0719	Charbon Rock Shelter 1 with PAD	GDA	55	779950	6357234	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Warwick Peckham,Doctor.Jodie Benton,Ms.Wendy Lewis,Mr.Phillip Cameron					**Permits**		
36-6-0674	Crudine Creek	AGD	55	763400	6357000	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Dominic Steele					**Permits**	2179	

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