Springvale Coal

Statement of Environmental Effects

Proposed Upcast Ventilation Shaft and Associated Facilities Newnes Plateau

October 2002

Umwelt
Environmental Consultants

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1.0 INTRODUCTION

1.1 THE APPLICANT

Springvale Coal Pty Limited (Springvale) operates Springvale Colliery, which is located in the Lithgow local government area, approximately 15 kilometres northwest of Lithgow and 2 kilometres east of the Wallerawang Power Station (**Figure 1.1**). Springvale is a joint venture company owned by:

- Centennial Coal Company Ltd (50% holding); and
- SK Corporation and Kores (two South Korean entities) (50% holding).

Springvale was granted development consent to construct and operate an underground coal mine, overland conveyor and washery by the Minister for Urban Affairs and Planning on 27 July 1992 (Document No. 11/92). This consent allows for the extraction of up to 3.4 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal. In addition, development consent was granted by Lithgow City Council in 1998 approving small scale open cut mining (which is not currently carried out). There have been two further amendments to the original development consent (granted in 1993 and 1994) including:

- modifications to the pit top layout;
- modifications to stormwater controls;
- a new mine entry;
- relocation of the ventilation shafts;
- relocation of the overland coal conveyor route; and
- extension of a road to access the ventilation shafts.

A full copy of the development consent conditions is provided in **Appendix 1**.

Springvale currently has a 20 year contract to supply Mt Piper Power Station with approximately 2 Mtpa ROM coal. In addition, Springvale has recently won a contract to supply coal to Wallerawang Power Station and has recently submitted a development application to Lithgow City Council for an additional section of overland coal conveyor. Springvale also has the option to supply coal to export markets. Export coal is transported by conveyor to the coal preparation plant located at the Springvale coal services area, approximately 3 kilometres west of the pit top, before being washed and returned to Lidsdale Rail Siding for delivery to Port Kembla for export.

Land within the general vicinity of Springvale Colliery has been utilised for various underground and open cut coal mining operations since the 1930s. The lease area acquired at that time was some 950 hectares, however a proportion of the area has been progressively sold to Delta Electricity. Coal mining, power station developments and commercial forestry dominate current land use in the area. The land above Springvale's current underground mining area is occupied by the Newnes State Forest, which includes both native forests and pine plantations.

FIGURE 1.1
Location of Proposed Ventilation Shaft Facility

Umwelt (Australia) Pty Limited
Base Map Source: Wallerawang 1:100 000 Topographic Map

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1.2 PROPOSED DEVELOPMENT

The proposed development includes the construction and operation of an upcast ventilation facility on the Newnes Plateau, within the Newnes State Forest. It is planned that the facility will include a 3.5 metre upcast ventilation shaft and a series of boreholes, which will be used to deliver power, compressed air and materials to the underground workings of Springvale Colliery. Associated facilities will include buildings for electrical switchgear and compressors and a dam(s) for the storage and discharge of water pumped from the underground workings. The proposed facility will replace the existing upcast ventilation shaft facility located to the west of the proposed shaft site (refer to **Figure 1.2**). **Section 3.0** provides a detailed description of the proposed development.

The development of a new upcast ventilation shaft facility is required to ensure that mine ventilation is sufficient to allow the safe continuation of mining operations as the operation moves further from the existing shafts. The new facility will also provide increased operational efficiency due to the location of service boreholes closer to underground working areas. Further justification for the proposed development is provided in **Section 1.5**.

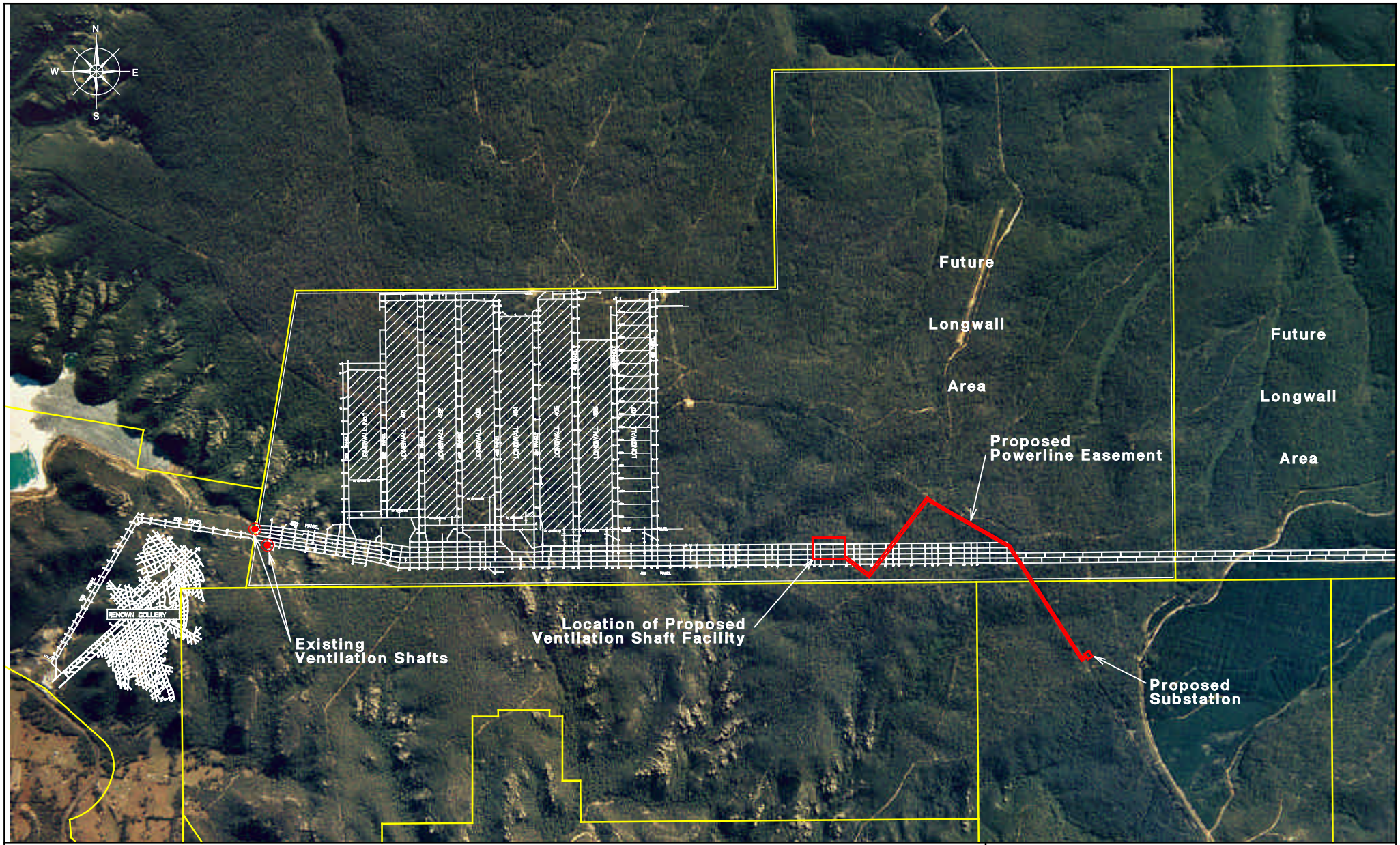
This Statement of Environmental Effects (SEE) has been prepared by Umwelt (Australia) Pty Limited (Umwelt) on behalf of Springvale to accompany the development application for the proposed facility, which will be lodged with Lithgow City Council.

1.3 LOCATION

The proposed upcast ventilation shaft facility is located on the Newnes Plateau in the Newnes State Forest approximately 9 kilometres north of Lithgow (refer to **Figure 1.1**). It is located above Springvale Coal's future main development roadways within ML 1326 (refer to **Figure 1.2**) and is within Mining Lease for Mining Purposes application area MLA 206.

1.4 AUTHORITY CONSULTATION

Two options were initially considered for development assessment of the project, being either a development application to Lithgow City Council or a modification of consent to PlanningNSW under Section 96(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act). In correspondence of 3 May 2002 to Lithgow City Council, PlanningNSW indicated that both options were available to Springvale. Subsequent to this correspondence, Springvale and Umwelt provided a project briefing to PlanningNSW on 12 June 2002. The outcome of this meeting was that the most appropriate assessment path for the development would be lodgement of a development application with Lithgow City Council. Lithgow City Council confirmed acceptance of this approach in correspondence of 25 June 2002 (refer to **Appendix 2**). On this basis, Lithgow City Council will be the consent authority for the proposed development. Council's requirements for consideration in this SEE are included in **Table 1.1**, with an indication of the section in this document in which each requirement is addressed.



Legend

- Location of Proposed Ventilation Shaft Facility
- Existing Ventilation Shafts
- Mining Lease Boundary

0 1km 2km

Umwelt (Australia) Pty Limited
Source: Springvale Mine

FIGURE 1.2
Proposed Ventilation Shaft Facility

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Table 1.1 – Checklist of Requirements for SEE

Requirement	SEE Section No.
• Summary of the proposed development	1.2 & 3.0
• Detail of the mine including all current development approvals and licences issued by other government authorities	1.1
• The need for the development	1.5
• Planning considerations including discussions or documentation with PlanningNSW	2.0
• Consequences of not proceeding with the development	6.3
• Considerations of any possible feasible alternatives and reasons for selecting the preferred alternative	6.0
• Details of the existing environment including terrain, soils, hydrology	4.0
• Visual amenity including the location of adjacent land tenures, residences etc.	4.9
• Conservation or archaeological value	4.7 & 4.8
• Specific land use constraints	4.3
• Existing infrastructure and site improvements	3.0 & 4.0
• Proposed length of time for construction works	3.0
• Detail proposed water management for the entire site. Potential sediment movement and erosion controls dealing with the containment of runoff	5.2
• Proposals for vegetation establishment and landscaping	5.8
• Potential water impacts	4.2
• Potential air quality impacts	4.6
• Potential soil impacts	4.1
• Potential noise impacts	4.5
• Potential visual impacts	4.9
• Potential impacts related to transportation of materials	4.10
• Potential socio-economic impacts	4.14
• Potential flora and fauna impacts	4.4
• Hazard and risk to public safety	3.8 & 4.13
• Measures to mitigate likely adverse environmental impact	5.0
• Proposed environmental impact prevention and mitigation measures and safeguards during and after construction	5.0
• Assessment and effectiveness of the measures proposed. Demonstrate how existing measures have worked and operated with current mining operations	5.1
• Proposed on-going monitoring, including reporting procedures and identifying environmental quality standards	5.10
• Establish relevant approvals required for various aspects of the development	2.2

Several site inspections and meetings were carried out with various government agencies regarding the project, including:

- a meeting with representatives of Lithgow City Council on 6 March 2002;
- a meeting with representatives of PlanningNSW on 12 June 2002;

- a meeting and site inspection with representatives of State Forests of NSW (State Forests) on 12 March 2002;

- a meeting and site inspection with representatives of the Environment Protection Authority (EPA) on 14 March 2002; and

- a meeting with representatives of the Department of Mineral Resources (DMR) on 4 March 2002.

In addition to the above meetings, the Department of Land and Water Conservation (DLWC), EPA, Sydney Catchment Authority (SCA), National Parks and Wildlife Service (NPWS), State Forests and DMR were all briefed regarding the proposed development. The correspondence from these agencies is contained in **Appendix 2**, with a summary of the requirements of each agency included below.

The issues raised by the agencies have been addressed in **Sections 3** to **6** of this document.

1.4.1 Department of Land and Water Conservation

The DLWC indicated that, as the proposed ventilation shaft should result in only minimal dewatering of the mine, they do not require any detailed groundwater information at this stage. They indicated that this requirement may change should there be any significant dewatering of the mine from this location in the future.

The DLWC also indicated that a Soil and Water Management Plan that deals with any soil disturbance and surface run-off within and from the site should be included in any documents related to the proposal and be submitted to Council for approval.

1.4.2 Environment Protection Authority

The EPA forwarded general and standard requirements that should be considered in preparing the SEE. The EPA also raised several specific issues relating to the proposal including that:

- a variation to Springvale's current environment protection licence (No. 3607) would be required to cover the proposed works;

- in undertaking the physical works proposed for the site, consideration should be given to ensure that a high standard of sediment and erosion controls and general site management are adopted;

- the SEE should qualify and quantify the expected water discharge from the proposed discharge point;

- the SEE should take into account the possible addition of a Pollution Reduction Program (PRP) to Springvale's environment protection licence to address the overall wastewater management of the mine; and

- the potential impacts from dewatering into the Middle River must be fully quantified.

1.4.3 Sydney Catchment Authority

As the proposed project is within the hydrological catchment of Sydney's water supply, Springvale is required to consult with the SCA under the provisions of the *Sydney Water Catchment Management Act 1998* and *State Environmental Planning Policy 58 – Protecting*

Sydney's Water Supply (SEPP 58). On this basis, the SCA advised that this SEE should provide an explanation as to how the proposed activities will comply with the three matters outlined in Clause 10 of SEPP 58 (refer to **Section 2.3.4**). The SCA indicated that the concurrence of the SCA would not be required for the development.

The SCA also required that the SEE should include, or refer to the preparation of, an appropriate soil and water management plan, and should also document how the various safeguards and plans are to be explained to all personnel and how they will be appropriately implemented.

The SCA also specified that any spill or incident be reported to the 24 hour Incident Management Hotline and to the SCA Katoomba office during normal business hours.

1.4.4 State Forests of New South Wales

State Forests provided the results of recent flora and fauna surveys completed in the vicinity of the proposed development area and indicated that the development site and surrounds should be surveyed for threatened species including *Derwentia blakelyi* and *Persoonia hindii*. State Forests also indicated that a population of *Derwentia blakelyi* is located to the east of the ventilation facility site and indicated that it may require consideration in the SEE.

Further requirements of State Forests included that existing tracks and clearings should be used wherever possible in the development of infrastructure and roads; that all road construction, upgrading and use must meet the standards and requirements of State Forests; and that the SEE must detail rehabilitation plans for the site.

1.4.5 National Parks and Wildlife Service

The NPWS forwarded a copy of its general guidelines for impact assessment to be addressed where appropriate. It was also requested that any SEE forwarded to NPWS for comment should state the reasons for the referral.

1.4.6 Department of Mineral Resources

The DMR advised that the SEE should address the following environmental issues:

- the appropriate disposal and/or utilisation of spoil material from the excavation of the shaft;
- an outline of site access issues for personnel and materials during both the construction and operating stages;
- an outline of the nature of all proposed water control structures that will be utilised during both the construction and operating stages, along with water usage and water discharge requirements;
- an outline of potential noise impacts during both the construction and operating stages, with particular consideration to the shaft being used as an up-cast shaft; and
- details of electric power requirements, with appropriate consideration for the installation of power lines, transformers, etc.

DMR also advised that consideration should be given to occupational health and safety issues. These issues will be addressed through ongoing discussions between the DMR and Springvale as the project progresses.

1.5 JUSTIFICATION FOR THE DEVELOPMENT

Springvale Colliery is a continuing operation that extracts coal by longwall mining methods. The longwall panels are located in a generally north-south orientation, with successive panels commencing to the east of each previous panel (refer to **Figure 1.2**). The working face of the mine is therefore gradually moving further away from the existing ventilation shaft facility. Ventilation modelling has indicated that the underground operation is approaching the physical limits of the existing ventilation facility, with the proposed shaft required to be operational within two years. The efficiency of other services, such as power supply and compressed air supply, is also being affected due to the increasing distances from the existing mine entries. It is therefore essential for the safe and efficient ongoing operation of Springvale Colliery that a ventilation shaft facility be established in the approximate location shown on **Figures 1.1** and **1.2**.

Springvale Colliery currently employs approximately 210 persons (Springvale 2001), with additional indirect employment also depending on the mining operation. The establishment of the proposed ventilation shaft facility is required to ensure that Springvale Colliery remains a viable operation which continues to provide local employment and contribute to the local and State economies.

2.0 PLANNING CONTEXT

Details of the legislation applicable or potentially applicable to the proposed development are outlined below, with an indication of the relevant requirements in relation to the proposed development.

2.1 COMMONWEALTH LEGISLATION

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the approval of the Commonwealth Minister for the Environment is required for any action that may have a significant impact on matters of national environmental significance. These matters are:

- world heritage properties;
- Ramsar wetlands;
- cetaceans, migratory species, threatened species, critical habitats or ecological communities listed in the EPBC Act;
- Commonwealth land, marine areas or reserves; and
- nuclear actions.

As the proposed project does not relate to any of the matters of national environmental significance prescribed by the EPBC Act (refer to **Appendix 3**), approval from the Commonwealth Minister for the Environment is not required for this proposal.

2.2 STATE LEGISLATION

2.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act is administered by PlanningNSW. It controls the planning and development regime for New South Wales.

The objectives of the EP&A Act relevant to the proposed development are to encourage:

- the proper management, development and conservation of natural and constructed resources;
- public involvement;
- the promotion and co-ordination of the orderly and economic use and development of land;
- ecologically sustainable development; and
- the protection of the environment.

2.2.1.1 Approval Process for this Development

As outlined previously, approval will be sought for this proposed development via the lodgement of a development application with Lithgow City Council under Part 4 of the EP&A Act. The development application will be accompanied by this SEE.

2.2.1.2 Designated Development

Schedule 3 of the EP&A Regulation 2000 lists development categories which are considered to be "designated" (ie. require an environmental impact statement (EIS) to be prepared to accompany the development application). The proposed ventilation shaft facility is not listed as designated development under the EP&A Regulation 2000 and as such an EIS is not required.

2.2.1.3 Integrated Development

A proposal that requires post-consent approvals identified in Section 91 of the EP&A Act is defined as "integrated development". The agencies administering these approvals are referred to as Approval Bodies. A copy of the development application and SEE must be provided to each of the Approval Bodies. The Approval Bodies then assess the SEE and provide General Terms of Approval to the consent authority. The terms of any approvals, permits or licences issued by Approval Bodies must be consistent with any development consent granted. If an Approval Body refuses to provide General Terms of Approval, the consent authority must refuse the application.

As a number of relevant post-development consent approvals will be required for the construction and operation of the ventilation shaft facility, the proposal is integrated development. Approval Bodies include:

- EPA (modification to the existing Springvale environment protection licence (No. 3607) issued under the *Protection of the Environment Operations Act 1997*);
- DLWC (Part 5 Permit under the *Water Management Act 2000* / *Water Act 1912* for the extraction of minewater); and
- DLWC (Part 3A permit under the *Water Management Act 2000* / *Rivers and Foreshores Improvement Act 1948* for works within 40 metres of a creek).

2.2.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (PoEO) Act is administered by the EPA. The Act establishes procedures for the granting of licences for environmental protection including waste, air, water and noise pollution control. The owner or operator of a scheduled activity (Schedule 1 of the PoEO Act) is required to hold a licence to pollute and must comply with the conditions of that licence.

The existing Springvale environment protection licence (EPL No. 003607) will be varied to incorporate the new ventilation shaft facility.

2.2.3 Water Management Act 2000

The *Water Management Act 2000* is administered by DLWC and consolidates water management legislation in NSW. It repeals a number of Acts including the *Water Act 1912* and the *Rivers and Foreshores Improvement Act 1948*. At the time of preparation of this SEE, regulations detailing the licensing provisions of the *Water Management Act 2000* had not been gazetted. The licensing provisions of the *Water Act 1912* and *Rivers and*

Foreshores Improvement Act 1948 remain in effect until such time as the *Water Management Regulation* is gazetted. The relevant provisions of that legislation are provided below.

2.2.3.1 Water Act 1912

The *Water Act 1912* is administered by DLWC. Under the legislation, a permit and/or licence is required to extract surface or groundwater, or for licensable dams, diversions and embankments.

The proposal includes the pumping of minewater via a dewatering borehole and will therefore require a permit under Part 5 of the *Water Act 1912* (refer to **Section 3.4**). The proposal does not include any licensable dams, diversions or embankments and will not involve the extraction of surface water.

2.2.3.2 Rivers and Foreshores Improvement Act 1948

The *Rivers and Foreshores Improvement Act 1948* is administered by DLWC. A permit is required under Part 3A of the Act to excavate or remove materials from 'protected land' or do anything likely to interfere with the flow of 'protected waters'.

The legislation defines 'protected waters' as rivers, lakes into and from which rivers flow, and coastal lakes / lagoons along with their channels to the sea. 'Protected land' covers the bed, bank or shore of protected waters as well as land within 40 metres of the bank, including any deposited material.

Springvale will require a permit under this Act as the proposed discharge point will be constructed within 40 metres of an unnamed tributary of Middle River (refer to **Section 3.4**).

2.2.4 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* is administered by NPWS. A Consent to Destroy permit is required under Section 90 of the Act prior to the destruction of any known Aboriginal archaeological sites. An Aboriginal archaeological survey was undertaken over the proposed development area by Umwelt in conjunction with the Bathurst Local Aboriginal Land Council and representatives of the registered Native Title claimants, the Gundungurra Tribal Council (Claim Nos. NC 97/4 and NC 97/7). One Aboriginal archaeological site was recorded during this survey, with no sites previously recorded within the development area. The recorded site will not, however, be disturbed by the proposed development. On this basis, there will be no requirement for a Section 90 permit under this Act (refer to **Section 4.7**).

2.2.5 Threatened Species Conservation Act 1995

A licence is required under the *Threatened Species Conservation Act 1995* to harm any animal that is a member of a threatened species, population or community. A licence is not however, required for any action that is undertaken in accordance with a development consent granted under the EP&A Act. A licence under *the Threatened Species Conservation Act 1995* will therefore not be required for the proposed development.

2.2.6 Roads Act 1993

The *Roads Act 1993* is administered by the RTA, local Council or DLWC. The RTA has jurisdiction over major roads, local council over minor roads and DLWC over road reserves or Crown roads.

Under Section 138 of Part 9, Division 3 of the Act, a person must not:

(a) erect a structure or carry out a work in, on or over a public road, or
(b) dig up or disturb the surface of a public road, or
(c) remove or interfere with a structure, work or tree on a public road, or
(d) pump water into a public road from any land adjoining the road, or
(e) connect a road (whether public or private) to a classified road, otherwise than with the consent of the appropriate roads authority.

As none of these works are proposed to be undertaken, consent under Section 138 of the Act is not required.

2.2.7 Heritage Act 1977

The *Heritage Act 1977* provides for the conservation of the State's natural and built heritage. The Act provides for the constitution of the NSW Heritage Council, which is the body that administers the Act. The Heritage Council maintains the State Heritage Register, which lists heritage items of State significance. The Act also requires that a permit be obtained prior to disturbance of any known heritage item (greater than 50 years old). There are no heritage items affected by construction or operation of the proposed ventilation shaft facility, and therefore a permit under this Act will not be required (refer to **Section 4.8**).

2.2.8 Fisheries Management Act 1994

The *Fisheries Management Act 1994* provides for the conservation of the State's aquatic resources and is administered by NSW Fisheries. The Act applies to all aquatic animals, whether alive or dead, excluding marine mammals, reptiles, birds and amphibians, which are covered by the provisions of legislation administered by the NPWS. The Act requires that potential impacts on fish passage, water quality, fish habitat, riparian vegetation and threatened species be addressed.

The proposed project does not require a permit under the *Fisheries Management Act 1994* as the granting of a Part 3A permit under the *Rivers & Foreshores Improvement Act 1948* negates the need to obtain a Fisheries permit.

2.3 STATE ENVIRONMENTAL PLANNING POLICIES

The State Environmental Planning Policies (SEPPs) potentially relevant to the proposed development include *SEPP 11 – Traffic Generating Development*, *SEPP 33 – Hazardous and Offensive Development*, *SEPP 44 – Koala Habitat Protection* and *SEPP 58 – Protecting Sydney's Water Supply*. The applicability of these SEPPs to the proposed development is discussed below.

2.3.1 State Environmental Planning Policy 11

SEPP No. 11 – Traffic Generating Developments requires that the RTA is made aware of and given the opportunity to make representations in respect of developments listed in Schedule 1 of that SEPP (specifically developments relating to extractive industry or mining). Part 7, Clause 3 specifically states:

> "*Where a consent authority receives a development application to carry out development specified in Schedule 1, the consent authority shall, within 7 days of its receipt of the application, forward a copy of the application to the Traffic Authority.*"

The proposed development is not listed in Schedule 1 of the SEPP and is therefore not required to be referred to the RTA. The proposal is not considered to generate significant volumes of traffic (refer to **Section 4.10**).

2.3.2 State Environmental Planning Policy 33

SEPP No. 33 – Hazardous and Offensive Development requires the consent authority to consider whether an industrial proposal is a potentially hazardous industry or a potentially offensive industry. Under Clause 3 a potentially hazardous industry is defined as a development that "*would pose a significant risk in relation to the locality: to human health, life or property; or to the biophysical environment, and includes a hazardous industry and a hazardous storage establishment"* and a potentially offensive industry is defined as a development that "*would have a significant adverse impact in the locality or on the existing or likely future development on other land, and includes an offensive industry and an offensive storage establishment*" (Department of Planning 1994).

The aim of this policy is to link the permissibility of a proposal to its safety and pollution control performance. The assessment process is applicable to the storage and handling as well as the transportation of hazardous materials to and from the site. The assessment establishes whether the proposal is potentially hazardous and if this is not the case, SEPP 33 is not applicable.

A hazard assessment of the proposed development is contained in **Section 4.13**.

2.3.3 State Environmental Planning Policy 44

SEPP No. 44 – Koala Habitat Protection applies to the extent that a Council is restricted from granting development consent for proposals on land identified as core Koala habitat without the preparation of a plan of management. As Lithgow City Council is listed on Schedule 1 of the Policy, SEPP 44 is relevant to this proposal. A detailed assessment was conducted as part of the flora and fauna assessment to determine whether the site contains core Koala habitat.

As discussed in **Section 4.4.2**, no core Koala habitat was found to occur at the site, and consequently a koala plan of management is not required for the proposed development.

2.3.4 State Environmental Planning Policy 58

SEPP No. 58 – Protecting Sydney's Water Supply requires that the Chief Executive of the SCA is made aware of development in the hydrological catchment of the Sydney water supply. Specific matters for consideration in regard to this project are provided in Clause 10. To this end, the proposal must consider the following:

- *whether the development will have a neutral or beneficial effect on the water quality of the rivers, streams or groundwater in the hydrological catchment, including during periods of wet weather;*

- *whether the water quality management practices proposed to be carried out as part of the development or activity are sustainable over the long term; and*

- *whether the development or activity is compatible with relevant environmental objectives and water quality standards for the hydrological catchment when the Government establishes these objectives and standards.*

The SCA has been advised of this project, and has indicated that the Chief Executive of the SCA does not require concurrence to be issued. A discussion of the water quality aspects of the proposed development is included in **Section 4.2**.

2.4 LOCAL PLANNING

2.4.1 Local Environmental Plan

The proposed ventilation shaft facility lies within the 1(f) rural (forestry) zone under the *Greater Lithgow City Council Local Environmental Plan (LEP) 1994*. The objectives of the zone are:

a) to identify land managed by the Forestry Commission under the Forestry Act 1916;

b) to preserve existing forests within the City of Greater Lithgow, while allowing compatible development; and

c) to prevent pollution of water supply catchments and water quality in major water storages.

Development for the purposes of extractive industries or mining in the 1(f) rural (forestry) zone is permissible under the LEP with development consent from Council.

2.4.2 Development Control Plans – Industrial Development Control Plan

The land affected by the proposed development is subject to *The Council of Greater Lithgow - Development Control Plan Number 6 - Industrial Development (undated)*. This Plan provides a guide for development proposals in all industrial zones and industrial development in rural and village zones. The objectives of the Plan are as follows:

- *to identify suitable industrial land in non-urban and village areas, and set standards for all industrial development in regard to visual impact, landscaping, parking requirements, access, setbacks, storage areas, signs, drainage and security;*
- *to encourage growth in the industrial sector, provided that new industrial development does not present unacceptable risks to residential areas or other land, water or streams by way of pollution, hazards or otherwise;*
- *to encourage applicants to act in their own interests by submitting fully substantiated and documented proposals, including hazards analysis where appropriate;*
- *to encourage a process which minimises problems with development proposals, through appropriate consultation prior to applications being submitted;*
- *to encourage visual and operational compatibility between industrial development and residential areas; and*
- *to encourage improvements to the character and appearance of industrial development.*

In accordance with the relevant objectives of the DCP, the following measures have been adopted:

1. A visual assessment has been undertaken in order to determine the visual impact of the proposed development on the existing visual character of the locality (**Section 4.9**). In

addition, all structures erected at the site will be constructed from materials that are colour compatible with the local landscape.

2. The development will not prejudice commercial forestry production potential on the adjoining land.

3. There will be no adverse impact from signage required for the development.

4. Appropriate consultation has been undertaken with Council and relevant authorities.

5. Appropriate rehabilitation strategies have been identified and include the reuse of topsoil, establishment of stable ground cover and planting of native trees and shrubs, where required (refer to **Section 5.8**).

6. Security fences and appropriate warning signage will be installed to prevent unauthorised access to the site.

7. The development will comply with Council's policy in regard to soil erosion and sediment control. Appropriate erosion and sediment controls will be installed during both the construction and operational phases of the project (refer to **Section 5.2**).

3.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1 GENERAL SITE LAYOUT

It is proposed to establish the upcast ventilation facility on the Newnes Plateau within the Newnes State Forest. The planned facility will include both the ventilation shaft and a series of boreholes, which will be used to deliver power, compressed air and materials to the underground workings of Springvale Colliery. Associated facilities will include buildings for electrical switchgear and compressors, and a dam(s) for the storage and discharge of water pumped from the underground workings. The conceptual layout of the proposed facility is indicated on **Figure 3.1**.

The proposed facility includes the following infrastructure:

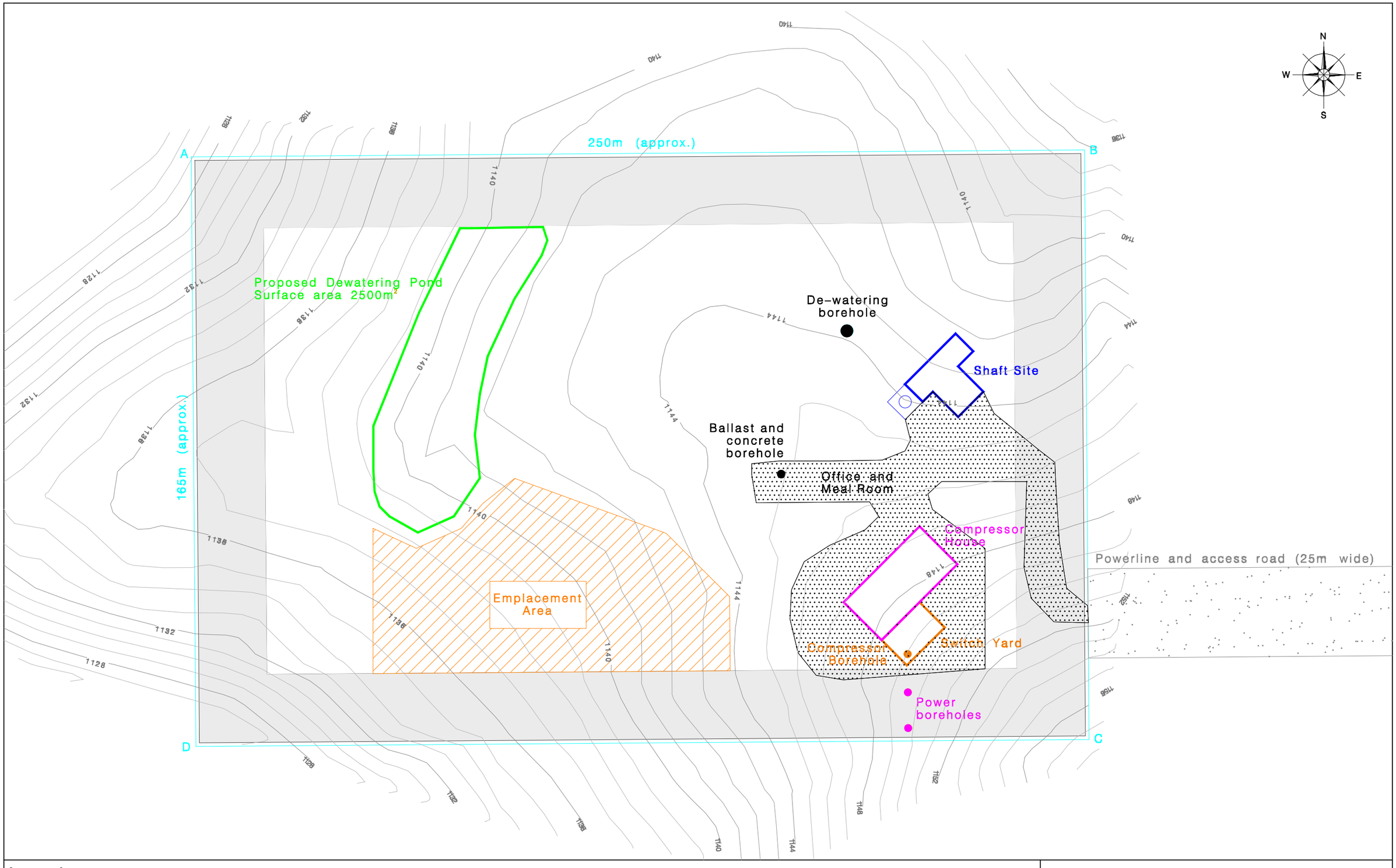
- a 3.5 metre (finished diameter) upcast ventilation shaft to a depth of approximately 380 metres (including a 20 metres below seam water collection sump);
- a 0.35 metre diameter materials borehole for ballast and concrete to a depth of approximately 360 metres;
- two 0.2 metre diameter boreholes for power and communications to a depth of approximately 360 metres;
- a 0.25 metre diameter compressed air borehole to a depth of approximately 360 metres;
- a 0.25 metre diameter dewatering borehole to a depth of approximately 360 metres;
- two 11 kV/415 V transformers for site power supply;
- a compressor housing shed containing up to four 250 kW, 900 cfm compressors; and
- a dewatering dam(s) (of approximate total capacity 2500 m^3).

Detailed design work for the above proposed facilities has not yet been completed and there may be variations to the above dimensions and capacities, as required to meet site specific requirements.

3.2 UPCAST VENTILATION SHAFT

The upcast ventilation shaft is planned to be a 3.5 metre finished diameter shaft, which will be excavated to a diameter of approximately 4.5 metres to allow for concrete lining. The depth of the shaft will be approximately 380 metres, including a 20 metre below seam water collection sump. It is estimated that excavation of the shaft will result in the generation of up to approximately 10,000 m^3 of material (after allowing a bulking factor). Some of this material will be emplaced on the ventilation shaft site to form hardstand areas or in the designated emplacement area on site (refer to **Figure 3.1**). It is expected that the remainder will be removed from site and, possibly, be used for remedial work on some of the forestry roads. A conceptual earthworks design for the ventilation shaft site is provided on **Figure 3.1** and **3.2**.

Following the completion of shaft sinking, the shaft will be used for downcast ventilation from about the second quarter of 2004 until the installation of ventilation fans, which is planned for mid 2005. During this period the top of the shaft will be covered with a steel



Legend

Cleared Area 20m Wide

Hard Stand Area

Umwelt (Australia) Pty Limited
Source: Springvale Mine

0 20 40 60m

FIGURE 3.1
Ventilation Shaft Facility
Conceptual Operational Surface Layout

A3 Scale 1:1000

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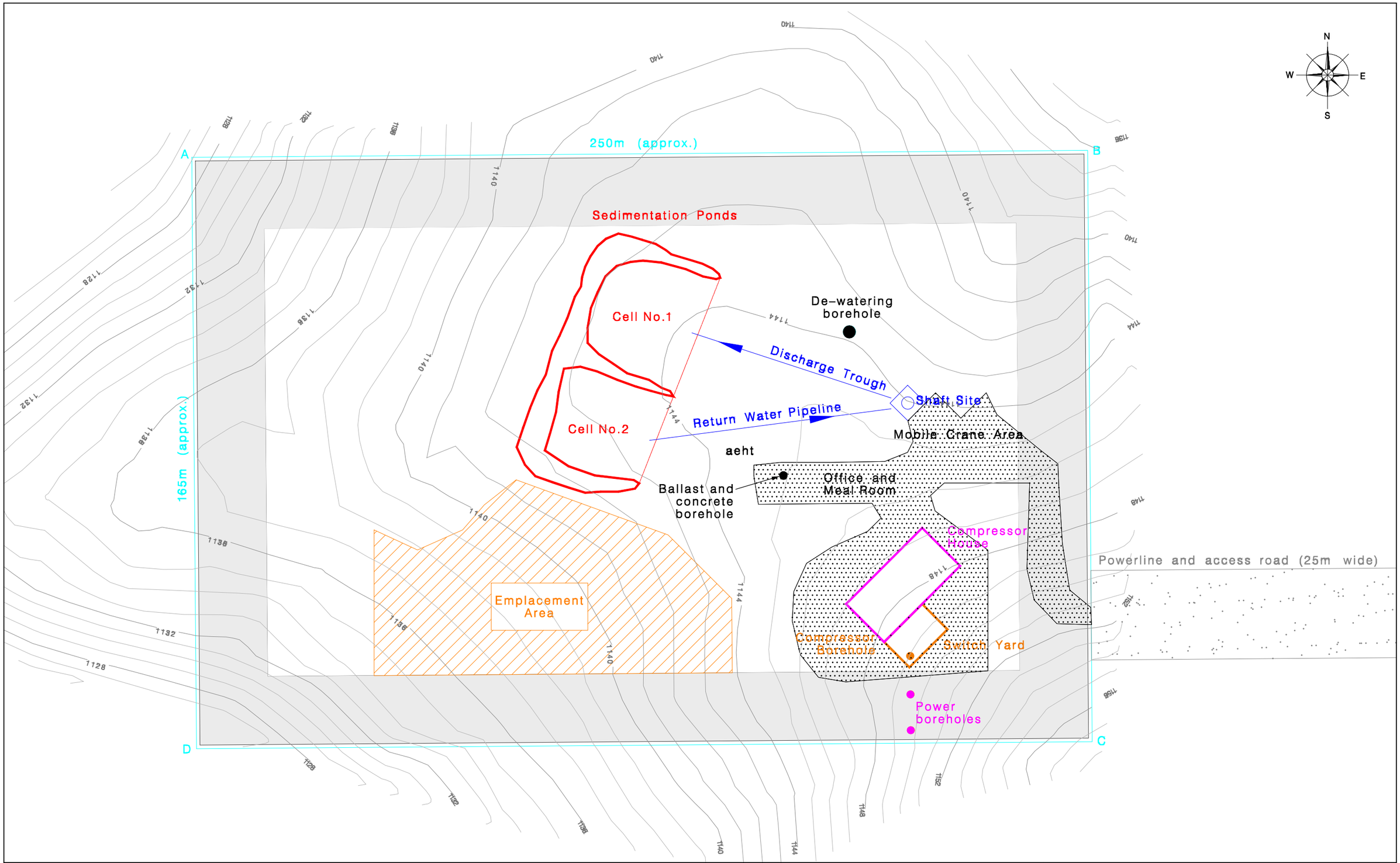


Legend

- Cleared Area 20m Wide
- Hard Stand Area

Umwelt (Australia) Pty Limited
Source: Springvale Mine

0 20 40 60m

FIGURE 3.2
Ventilation Shaft Facility – Conceptual Construction Surface Layout

A3 Scale 1:1000 | Ref No.:R02_V1/1571_022.dgn

mesh grid which will be welded and/or locked in place to prevent access to the shaft. Access to the shaft site will also be limited by security fencing (refer to **Section 3.12**).

It is planned that installation of the ventilation fans will be completed in mid 2005, with either one or both of the existing Springvale Colliery ventilation fans being relocated to the new ventilation shaft site or new similar configuration fans being purchased. The current Springvale Colliery upcast ventilation system consists of two mine fans which exhaust a total of approximately 120 m^3/s of air from the mine (**Plates 3.1** and **3.2**). Ventilation modelling for future workings has been undertaken using these or similar capacity fans as the basis for the model. The fan complex will include a lockable building (approximately 7 m x 8 m x 3 m high) to house the starting and monitoring equipment for the fans and compressors. The building will be coloured with natural tones to blend with the surrounding environment.

Further details of the shaft sinking process are provided in **Section 3.9.2**.

3.3 BALLAST / CONCRETE BOREHOLE

The ballast and concrete borehole (**Figure 3.1**) will be used to deliver ballast (for underground road construction) and concrete for civil works to the underground workings. It is planned that the borehole will have a finished diameter of 0.35 metres, be steel cased, and extend to the workings at a depth of approximately 360 metres. The borehole will be capped with a steel grid to prevent oversized material falling through and blocking the borehole. Above the grid will be a truck receival hopper, which will have lockable light weight steel folding doors to cover the borehole when not in use (refer to **Figure 3.3**).

In the 2001 calendar year, 6094 tonnes of ballast were transported a distance of approximately 6 to 8 kilometres underground, from the pit top entries to the working areas, using diesel powered load haul dump machines and a ballast trailer. Based on the current use of 25 tonne capacity trucks to deliver the ballast to the Colliery, this equates to approximately 245 truck movements per year. In the same period, concrete use was 1116 cubic metres, delivered to the present downcast shaft site. Based on 4 m^3 per truck, this equates to approximately 280 truck movements per year. Ballast and concrete demand for the ongoing operation is expected to be similar to the demand in 2001.

3.4 DEWATERING BOREHOLE

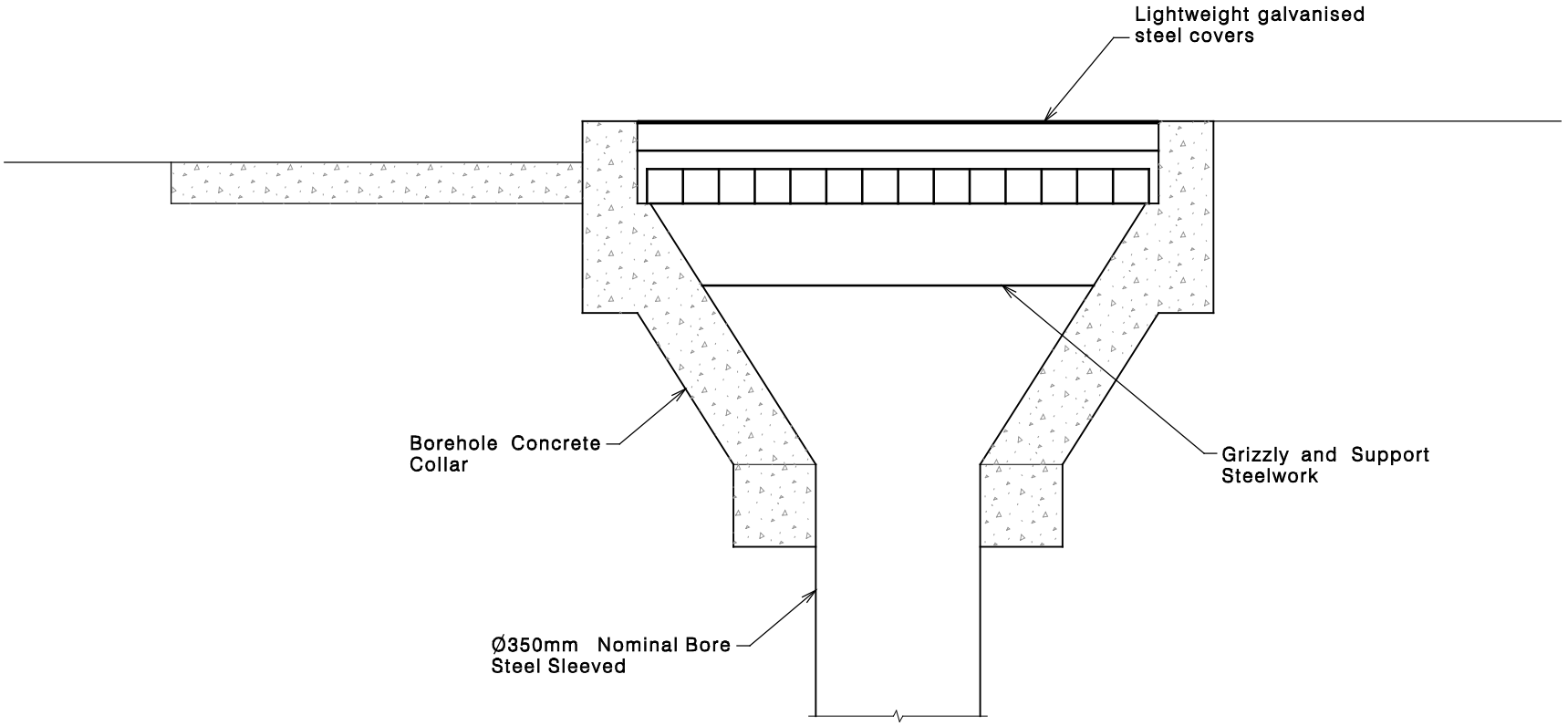
A 0.25 metre diameter (steel cased) borehole (**Figure 3.1**) is planned to provide dewatering of the underground mining area. The borehole will be drilled to the workings at a depth of approximately 360 metres. It is intended, at this stage, that a horizontal multi-stage centrifugal pump with an approximate capacity of 80 L/sec would be used to pump water through this borehole to the surface. The pump, starting and control equipment would be located underground.

Springvale has recently completed drilling a geotechnical investigation borehole at the site of the proposed ventilation shaft. Hydrogeological testing was carried out to estimate water flows from the shaft with the results indicating that long term water inflows from the shaft itself will not exceed 2 L/sec.

Based on current experience, it is estimated that the pump will be required to operate full time for only relatively short durations of up to a few weeks per year during some longwall changeovers. At other times, the pump is expected to operate periodically. For example, based on current knowledge, it may only operate for approximately one hour per day, every second day.

PLATE 3.1
Current Upcast Ventilation Fan Complex

PLATE 3.2
Current Upcast Ventilation Fan Complex



Legend

FIGURE 3.3
Conceptual Design of Materials
Borehole Hopper

Umwelt (Australia) Pty Limited
Source:

A4 Not to Scale | Ref No.:R02_V1/1571_046.dgn

Full details on expected total water make and discharge water quality will not be available until the mine workings reach the proposed shaft site area in mid to late 2003. Therefore, the impacts associated with the discharge cannot be fully quantified at this time. Springvale proposes to provide full details of the proposed dewatering borehole including expected discharge volumes, discharge water quality, receiving water quality and discharge infrastructure and location, in the form of supporting information to accompany applications for the required statutory approvals prior to the drilling and installation of the dewatering borehole. The final dewatering strategy at the ventilation shaft facility site will be consistent with the outcomes of Springvale's current Pollution Reduction Program investigations as outlined in **Section 4.2.1**. Further conceptual details of the proposed dewatering borehole are provided below.

It is proposed that minewater will be pumped from the underground workings to a settling pond with an aeration facility. An example of an existing settling pond and aeration facility is provided in **Plate 3.3**. The size of the settling pond will be confirmed once the extent of water make is more accurately known, however it is estimated that it will have a capacity in the order of 2500 m^3. Provided that suitable material is available, the settling pond will be constructed from on-site material with likely construction equipment including a D6 bulldozer, excavator and, possibly, a compactor.

At this stage, it is proposed that discharge will be via a buried 150 millimetre diameter poly pipeline which will run from the settling pond to the discharge point on a tributary of Middle River. The location and design of the discharge point will be included in the supporting information provided to the relevant statutory authorities prior to seeking the necessary permits and licences for this work. The subsequent approvals required for dewatering and discharge are further modification of the EPA licence, a permit from DLWC for extraction of groundwater, and approval for works within 20 metres of protected waters from DLWC.

3.5 COMPRESSED AIR BOREHOLE

It is planned that installation of one or two compressor units of 900 cfm capacity will be undertaken as part of the initial stages of construction, as compressed air will be required for the shaft sinking phase. The compressors will be housed in a building approximately 20 metres by 8 metres by 3.2 metres high, with cladding being of natural tones to blend with the surrounding environment.

Following the completion of ventilation shaft sinking, a 0.25 metre diameter steel cased borehole will be established for delivery of compressed air to the underground workings. The borehole will be drilled to a depth of approximately 360 metres. The compressor house will be of sufficient size to house up to four compressor units, should this be required at a later date.

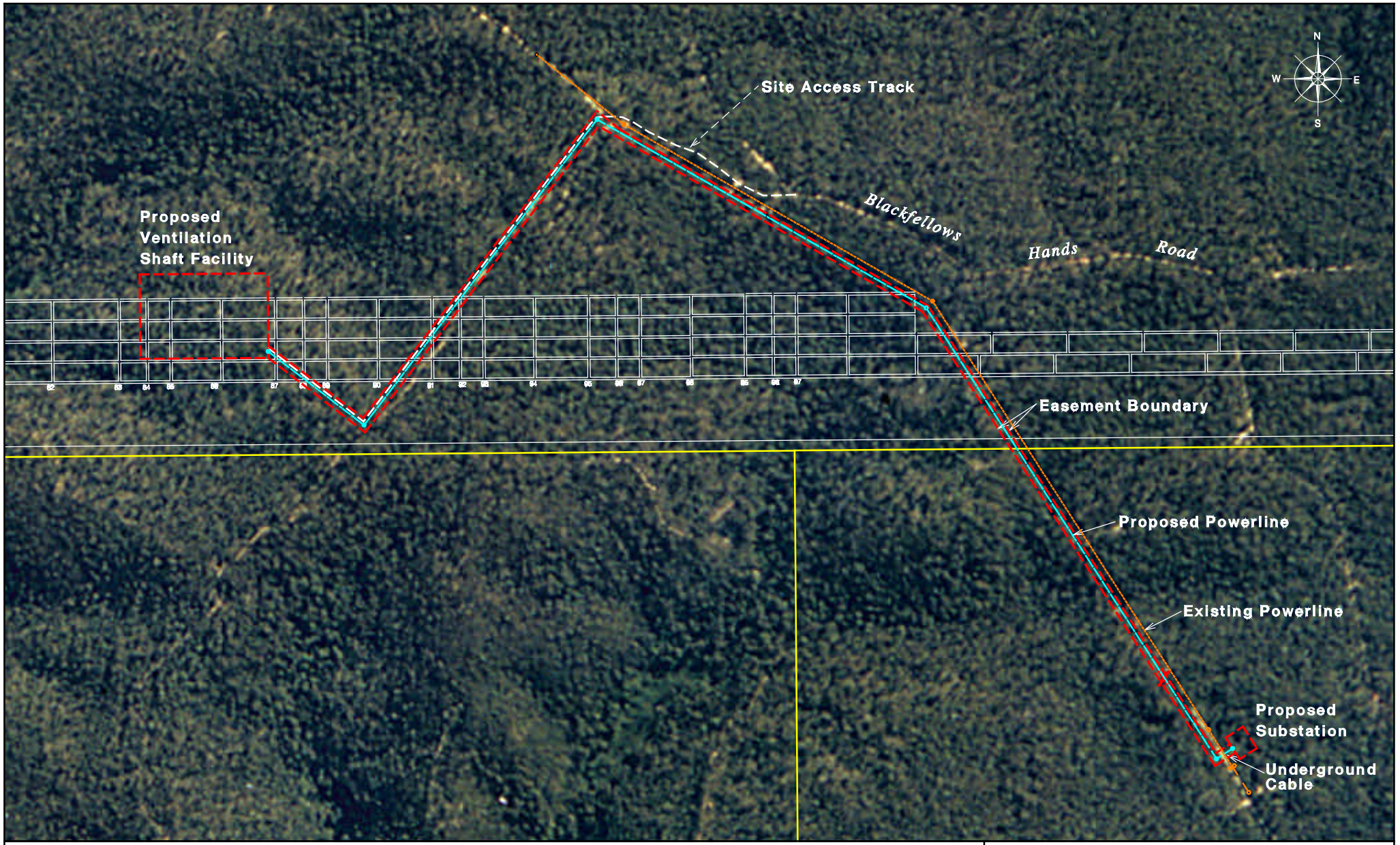
3.6 POWER SUPPLY BOREHOLES

Two 0.2 metre diameter, steel cased boreholes are planned to accommodate the two 0.12 metre 11 kV power supply cables required to deliver power to underground operations. These boreholes would also be used for communication and control cables. The boreholes will be drilled to a depth of approximately 360 metres to the underground workings.

3.7 SITE POWER SUPPLY

It is planned that power supply for the site will be taken from an existing 66 kV transmission line which exits to the east of the proposed ventilation shaft site (refer to **Figure 3.4**). A

PLATE 3.3
Existing dewatering facility settling pond and aeration facility



Legend

- Mining Lease Boundary
- Main Development Headings
- Proposed Surface Facility Layout
- Proposed Powerline
- Existing Powerline

0 100 250 500m

Umwelt (Australia) Pty Limited
Source: Springvale Colliery

FIGURE 3.4
Facility Power Supply Infrastructure

A4 Scale 1:10 000 | Ref No.:R02_V1/1571_039.dgn

substation will be constructed adjacent to the existing powerline (on the eastern side) with a 66 kV / 11 kV 8 MVA capacity transformer being installed. The substation will be established within a 40 metre by 40 metre cleared area to provide for bushfire protection, with the transformer and switchgear enclosed within a smaller fenced compound.

Power will be transferred from the substation site by buried cable, under the existing 66 kV powerline, for a distance of approximately 50 metres to the commencement of a new 11 kV powerline. The 11 kV powerline will run along a 20 metre wide easement adjacent to the existing 66 kV easement for a distance of approximately 1800 metres prior to leaving the existing easement and running generally south west for a distance of approximately 1000 metres to the ventilation shaft facility site (refer to **Figure 3.4**). The 20 metre wide easement will be cleared to provide the powerline with bushfire protection.

At the ventilation shaft facility site, the following electrical equipment is proposed:

- terminal pole with lightning arresters;
- 1500 kVA, 11 kV/415 V transformer to supply compressors;
- 750 kVA, 11 kV/415 V transformer to supply ventilation fans;
- 11 kV switchgear controlling two underground supply feeders and one spare, housed within a locked building / shed; and
- low tension control panels for compressors and fans, housed within a locked building.

3.8 SITE SERVICES

The proposed development includes the upgrade of the existing forestry track for a distance of approximately 1.4 kilometres, and then the construction of 0.3 kilometres of new road from the existing forestry track to the shaft site (refer to **Figure 3.4**). Road construction and upgrading will meet the standards and requirements of State Forests as outlined in the *State Forests of NSW Forest Practices Code Part Four – Forest Roads and Fire Trails*.

The proposed access road will be upgraded / constructed as an all weather gravel road, approximately 3.6 metres wide, crowned in the centre with 100 mm of road base. It may be possible to construct some, or all, of this road using on site material; however if sufficient suitable material is not available, both road base and sub grade material will be imported. The access road will be constructed within the 20 m bushfire protection corridor established for the proposed 11 kV transmission line to the shaft site. Appropriate spoon drains, level spreaders and other drainage structures will be established along the road to minimise concentrated water flows and prevent scouring.

In addition to the new access road, there may be a requirement for minor road works to satisfy the requirements of State Forests in regards to site access. These works may include marginal widening of sections of Blackfellows Hands Road, which will be undertaken in consultation with State Forests.

Hardstand areas will be established at the site to provide for all weather parking of light service vehicles adjacent to buildings and for turning and backing of ballast and concrete trucks when delivering materials to the materials borehole. The conceptual design of the hardstand areas is shown in **Figure 3.1**. The hardstand areas would be finished with gravel or other suitable material which will be sourced from excavated material where possible, or will otherwise be imported to the site.

No permanent water supply is planned for the site. During construction, it is envisaged that a water tanker will be used for shaft and borehole drilling. The site will not have any permanent crib room facilities, however, a temporary crib room and portable toilet facilities will be established during the construction phase.

3.9 SITE PREPARATION AND CONSTRUCTION ACTIVITIES

3.9.1 Preliminary Site Works

Preliminary works required at the site include establishment of erosion and sediment controls, construction of the access track and clearing and levelling of the 66 kV / 11 kV substation site and immediate ventilation shaft site. A bulldozer (nominally a D6) will be used for tree clearing, initial road forming and associated drainage works, with a grader likely to be used for final road trimming. The access track will initially be constructed to provide access for construction machinery before being upgraded at a later stage to provide all weather access. Appropriate erosion and sediment controls will be installed around each of the work areas as the initial stage of site works.

Initial works at the ventilation shaft site will consist of clearing and levelling at the immediate shaft site for the compressor transformer and compressor house. Following the completion of these works, clearing and levelling, where required, of the remainder of the site will be progressed as fill material becomes available from the borehole excavation. Trees cleared from the site will be placed around the margins of the site to aid in erosion and sediment control.

It is anticipated that the preliminary site work would commence in the first half of 2003 and be completed by mid 2003. It is envisaged at this stage that the machinery used for preliminary site work would include a dozer, a crane, an excavator, a compactor and a grader.

3.9.2 Shaft Sinking

Prior to the commencement of shaft sinking, it is proposed to establish power supply to the site and install one or two compressors to be used for the shaft sinking process. Access road upgrades, transmission line construction and site environmental protection works would be undertaken during this establishment phase. Construction will commence with the establishment of a temporary crib room, site office, small workshop / store, car park facilities and moving equipment onto site.

At this stage the shaft sinking method is unknown, however likely options include the use of raise boring or blind hole drilling techniques. In both cases, it is proposed that the excavated material will be brought to the surface and that the shaft will be concrete cased to its finished diameter once drilling has been completed.

The raise boring technique under consideration involves drilling a small, subsidiary shaft (approximately 1.4 metre diameter) through to the nominated depth, with the excavated material dropping to the bottom of the hole and being temporarily stored underground. Once drilling of the subsidiary shaft is complete, the excavated material will be brought to the surface by a small winder and used in site earthworks.

The ventilation shaft would then be drilled using the raise boring drill rig, with the excavated material once again dropping to the bottom of the shaft during drilling. The material would then be brought to the surface via the subsidiary shaft and incorporated into site earthworks. If the raise boring technique is chosen, the subsidiary shaft may be used for the supply of

some services to the underground operations, and consequently not all of the service boreholes discussed in **Sections 3.3** to **3.6** would be drilled.

The blind hole drilling method involves drilling the shaft to final diameter in one or several passes until the final diameter is reached. Compressed air is used to bring excavated material to the surface in a slurry form continually throughout the drilling process. Settling ponds are used to dry out the material, which would then be incorporated into site earthworks. Any water remaining in the sedimentation pond after the finalisation of the drilling process will be pumped out by a licensed waste disposal contractor for disposal off site.

Although the exact drilling method is not currently known, the generally soft nature of the material through which the shaft will be constructed (primarily sandstones and siltstones) means that it is unlikely that blasting will be required. A limited number of small scale localised blasts may be required for particular strata, however this requirement is unable to be determined until shaft drilling has commenced. One such area where blasting may be required is the below seam sump in the event that the raise boring method is selected.

It is expected that the equipment to be used for shaft sinking would be a drilling rig, mobile crane, excavator and pumps. Following site establishment, it is estimated that shaft sinking will take approximately six to eight months, with the shaft being in use as a downcast from early to mid 2004.

3.9.3 Drilling of Service Boreholes

It is planned to use open hole drilling methods for each of the services boreholes to be established at the ventilation shaft facility site. Drilling operations will commence with site preparation activities, including establishment of appropriate erosion and sediment controls, the formation of a drilling pad, and excavation of sumps. An example of a typical drilling site is provided by **Plate 3.4**. Two to three sumps approximately 3 metres by 3 metres will be established for each drill site, with silt fences and hay bale catch dams located downslope of the sumps. Drilling equipment will include a truck mounted drill rig, water truck and an excavator or backhoe to excavate the sumps.

The construction of each borehole will commence with the drilling of a pilot hole through to the target seam. The hole is then reamed out to the required diameter, with the larger boreholes such as the materials borehole potentially requiring several passes. The boreholes will then be cased and grouted into the strata over their full length. It is expected that it will take in the order of three weeks to complete each service borehole.

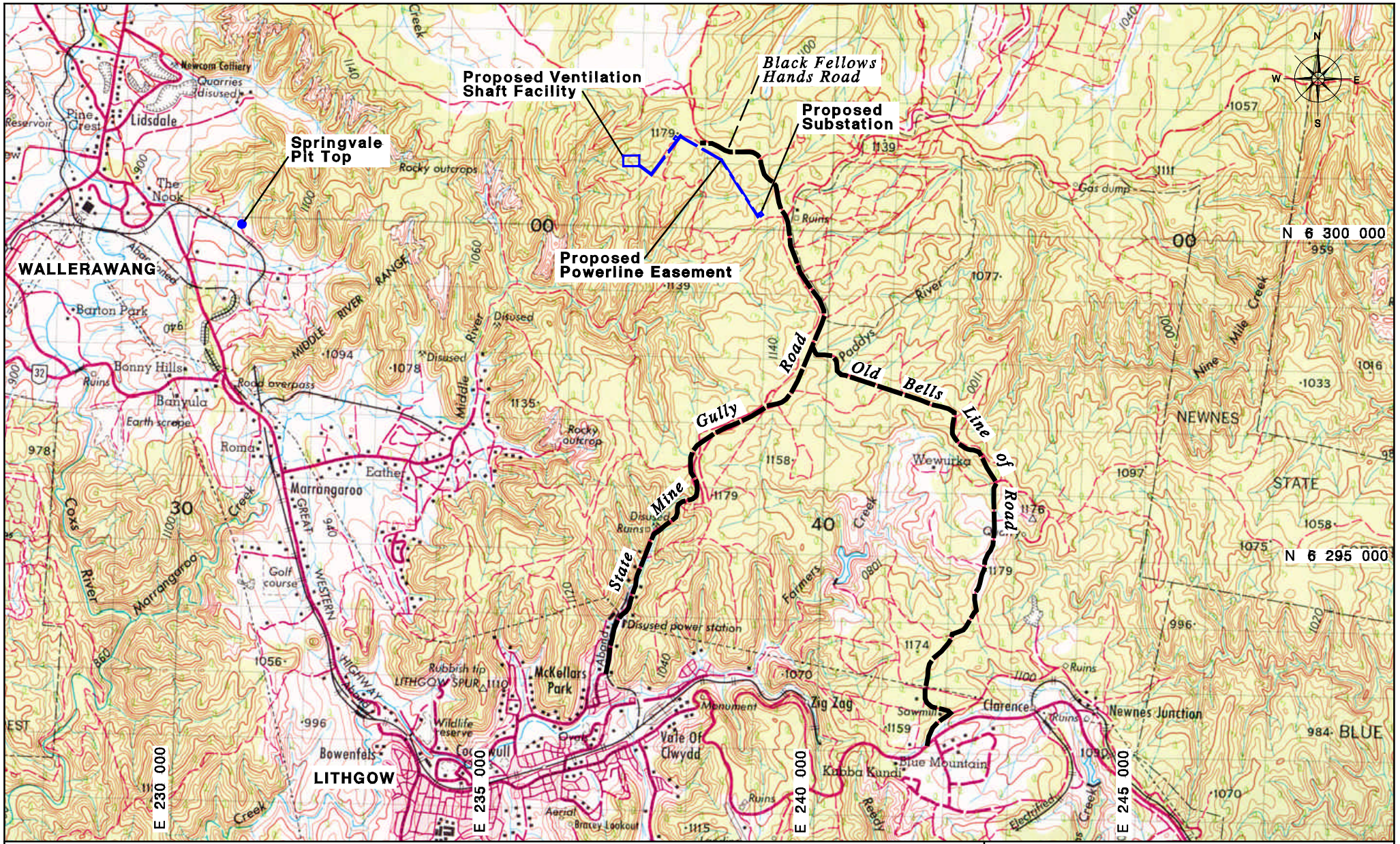
Following the completion of each borehole, the respective surface facilities will be installed to make the boreholes operational. It is expected that drilling of the boreholes will commence in mid 2004 with the majority of boreholes operational by late 2004.

3.10 TRANSPORT ROUTE

3.10.1 Construction Phase

The primary transport route to the site for light vehicles will be via State Mine Gully Road and then Blackfellows Hands Road which joins the proposed site access track (**Figure 3.5**). Heavy vehicle traffic may access the site via the same route or, alternatively, via Clarence and Old Bells Line of Road before joining Blackfellows Hands Road.

PLATE 3.4
Example of a typical borehole drilling operation



Legend

Site Access Routes

Umwelt (Australia) Pty Limited
Base Map Source: Wallerawang 1:100 000 Topographic Map

0 1 2 4km

FIGURE 3.5
Proposed Facility Access Routes

A4 Scale 1:80 000 | Ref No.:R02_V1/1571_041.dgn

Access to the substation and 11 kV powerline construction areas will be along the existing access track along the 66 kV powerline which can be accessed via either State Mine Gully Road or Blackfellows Hands Road.

The number of heavy vehicle movements during the construction phase cannot be accurately identified at this time however there are likely to be up to 15 movements per day during peak construction periods. Heavy vehicle movements will not be continuous throughout the construction period, with delivery of materials including concrete being periodic. Light vehicle movements to and from the site will occur daily during construction activities, with an estimate of up to 20 vehicle movements per day during peak periods.

3.10.2 Operational Phase

The site access route during the operational phase will be the same as specified above for the construction phase.

Routine operational heavy traffic will consist of vehicles for ballast and concrete delivery, which, based on 2001 figures, is likely to be in the order of 250 traffic movements per year for ballast delivery and 280 traffic movements per year for concrete delivery. Other occasional heavy vehicle movements to the site during operation of the facility may include parts and machinery during maintenance work and breakdown repairs.

Routine light vehicle traffic during the operational phase will include vehicles for security checks and routine statutory equipment inspections, with periodic traffic including vehicles involved in maintenance work and breakdown repairs. The estimated average number of light vehicle traffic movements during the operational phase is two vehicle movements per day.

3.11 HOURS OF OPERATION

3.11.1 Construction Phase

It is planned that site establishment and general construction activities will be undertaken during daylight hours five days per week (Monday to Friday), possibly extending to Saturdays during peak periods and/or to allow for equipment maintenance. During the shaft drilling phase, operations may take place 24 hours per day, 7 days per week.

3.11.2 Operation Phase

The ventilation shaft site will operate for 24 hours per day seven days per week, except for short duration shutdown periods for maintenance. The facility will not be permanently staffed but will be inspected by security personnel on a random basis at least daily, with routine statutory inspections and periodic maintenance activities also undertaken. Periodic activities such as the delivery of ballast or concrete will also be undertaken at the site.

3.12 SECURITY

The site will not be permanently staffed, as outlined above, but will be subject to daily inspections by security personnel on a random basis. Access to the site will be restricted by a suitable security fence, nominally a 1.8 metre chainwire fence topped with three rows of barbed wire, and will have signage indicating that access to the site is restricted to authorised personnel only. The outdoor electrical transformer installations will also be surrounded by security fencing with appropriate signage.

Inside the ventilation shaft compound, access to each of the boreholes will be restricted by lockable covers, with access to the ventilation shaft prevented by a steel mesh cover during the shaft's downcast period and by steel fan ducting once the fans are installed.

The operation of the equipment will be continuously monitored and the information will be transmitted back to the mine's pit top Control Room, which is staffed throughout the year on a 24 hour per day 7 days a week basis.

4.0 EXISTING ENVIRONMENT AND IMPACT ASSESSMENT

4.1 SOILS AND EROSION

The Wallerawang 1:100,000 Soil Landscapes Map Sheet (King, 1993) maps the site within the Medlow Bath (mb), Warragamba (wb) and Newnes Plateau (np) soil landscape units (refer to **Figure 4.1**). Descriptions of each of these soil landscape units are included below (adopted from King, 1992).

Medlow Bath

The Medlow Bath soils are described as being moderately deep (<100 cm) earthy sands and yellow earths on crests and sideslopes, and shallow (<60 cm) lithosols / siliceous sands associated with rock outcrops. The soils are generally shallow stony acid soils of very low fertility, very high potential aluminium toxicity and moderate erodibility.

Erosion hazards are described as being moderate for non-concentrated flows and moderate to high for concentrated flows. The soils are considered to be stable with foundation hazard being generally low.

Warragamba

The Warragamba soils are developed most extensively in deeply incised valleys on the Blue Mountains Plateau. They consist of shallow to deep (50 – 150 cm) lithosols on crests and ridges; brown earths, red podzolic soils on upper slopes and yellow podzolic soils on lower slopes. The soils generally have a severe water erosion hazard, and are acid stony soils of low fertility.

Erosion hazards are described as being very high to extreme for both non-concentrated and concentrated flows and are not recommended for either urban or rural development.

Newnes Plateau

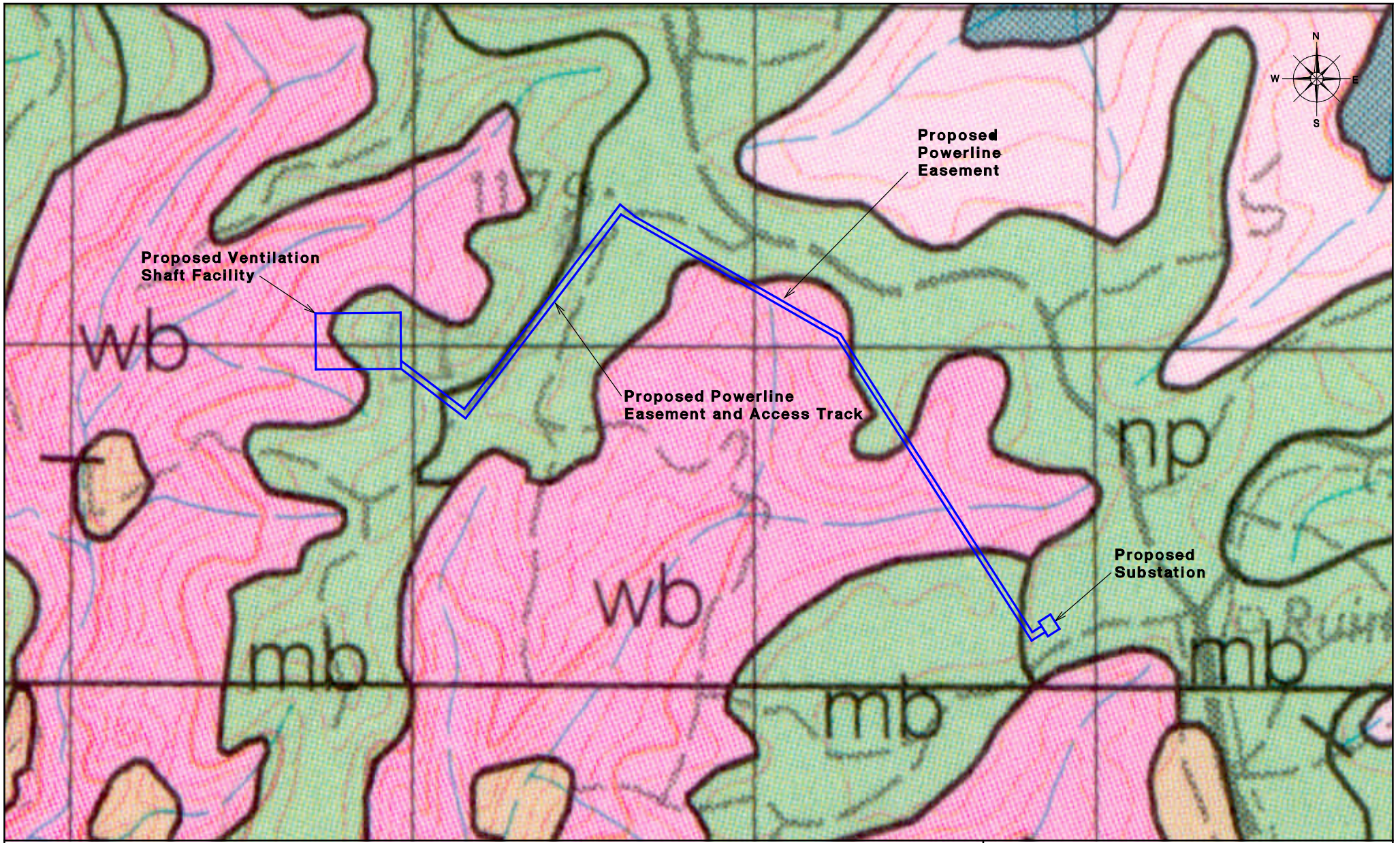
The Newnes Plateau soils are generally found on broad crests and ridges on the Newnes Plateau. They range from shallow (<50 cm) sands / lithosols on crests associated with rock outcrops to deep earthy sands (>200 cm) on deeply weathered friable sandstones. Other soil types occurring include leached sands near drainage depressions and yellow earths associated with shale / ironstone lenses.

The soils have very low to low soil fertility, with erosion hazards being described as slight to moderate for both non-concentrated and concentrated flows.

Overall, the Medlow Bath, Warragamba and Newnes Plateau soils which will be affected by the proposed development have a moderate to extreme erosion hazard. Therefore, a range of appropriate erosion and sedimentation controls will be required during both the construction and operation periods to limit the potential for off site sedimentation impacts. The required controls are outlined in detail in **Section 5.2**.

4.2 TOPOGRAPHY / HYDROLOGY / WATER QUALITY

The study area is situated on the Newnes Plateau, which is comprised of gentle low hills with broad crests on a sandstone plateau surface (King 1993). The area is characterised by ridgetops, sheer cliffs, spurs, steep gullies, broad valleys and headwater valleys. The study area is drained by tributaries of Middle River which discharges into Marrangaroo Creek, which is part of the catchment area of the Coxs River. Coxs River flows south to



Legend

Soil Landscape Units:

- wb Warragamba
- mb Medlow Bath
- np Newnes Plateau

Umwelt (Australia) Pty Limited
Base Map Source: Wallerawang 1:100 000 Soil Landscape Map

0 0.25 0.5 0.75km

FIGURE 4.1
Soil Landscapes

A4 Scale 1:15 000 | Ref No.:R02_V1/1571_038.dgn

Warragamba Dam, the major water supply for Sydney. The ridges of Newnes Plateau rise sharply from the valley of Middle River / Marrangaroo Creek, approximately 1 kilometre to the southwest of the study area.

The proposed ventilation shaft site is situated partially on a level ridgetop and partially on the upper slopes and crest of a spur that extends west from the ridge (**Figure 1.1**). The proposed substation, 11kV powerline and access track are located primarily on a level ridgetop, with the powerline crossing several upper order drainage lines of Marrangaroo Creek. The western portion of the study area rises from approximately 1130 to approximately 1150 metres above sea level over a distance of 265 metres. The ridgeline is approximately 1170 metres above sea level.

The nearest relevant and available water quality monitoring data is from Springvale's monitoring point on Coxs River, which is sampled on a weekly basis. This monitoring point is situated downstream of the entry point of a tributary into Coxs River into which water from the Springvale Colliery pit top is discharged (refer to **Figure 4.2**). The Springvale Annual Environmental Management Report noted that during 2001, the water quality in Coxs River was generally not adversely impacted by Springvale Colliery operations.

Monitoring results for 2001 indicate that the pH of the water ranged between 7.4 and 8.6, electrical conductivity ranged between 500 µS/cm and 1400 µS/cm and total suspended solids generally ranged between 0 mg/L and 12 mg/L, with a spike of 38 mg/L. The Australian water quality guidelines for the protection of aquatic ecosystems (ANZECC 1992) are presented in **Table 4.1**. The water quality of Coxs River is within these guidelines.

Table 4.1 - ANZECC Guidelines

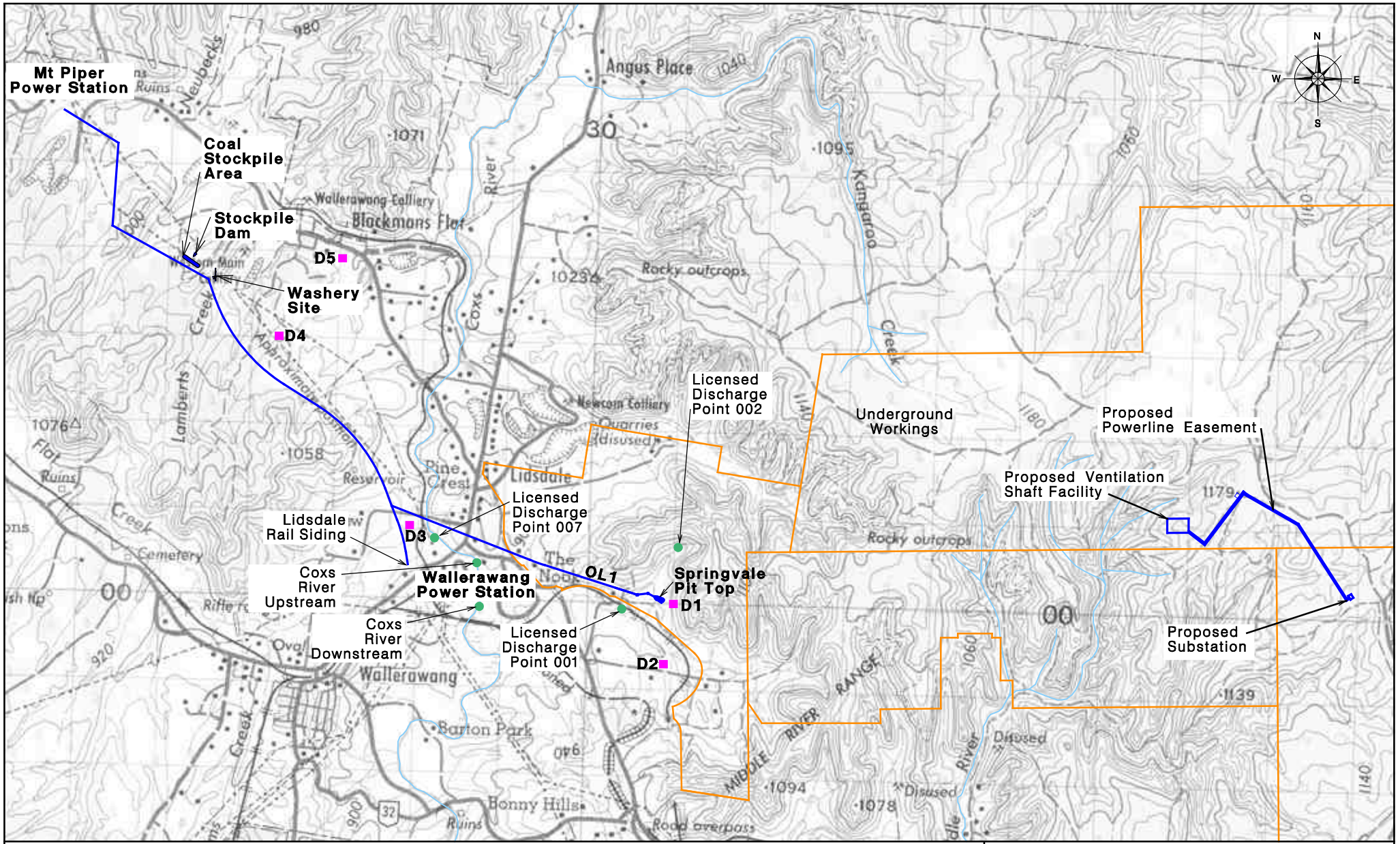
pH	6.5 - 9.0
Salinity	≤ 1500 µS/cm
Suspended particulate matter	<10% change seasonal mean concentration

Source: ANZECC 1992

Details of the current water quality being discharged from Springvale's current dewatering boreholes, based on sampling conducted in 2001, are outlined below in **Tables 4.2** and **4.3** (Springvale, 2002). It is expected that the water quality of the proposed dewatering borehole would be similar to that from the existing dewatering boreholes, however, as discussed in **Section 3.4**, further sampling will be undertaken to confirm discharge water quality prior to seeking approval for discharge.

Table 4.2 - 2001 results of quarterly water quality monitoring for dewatering boreholes LD004 and LD005

Parameter	**Value Range**
Arsenic (mg/L)	<0.001 – 0.005
Barium (mg/L)	0.2 – 0.5
Boron (mg/L)	<0.1 – 0.3
Cadmium (mg/L)	<0.001
Chloride (mg/L)	4.0 – 19.0
Chromium (hexavalent) (mg/L)	<0.005 – 0.01
Copper (mg/L)	<0.1 – 0.2
Cyanide (mg/L)	<0.1



Legend

- Overland Conveyor
- Dust Gauge
- Water Monitoring Point
- Mine Lease Areas
- River / Creek

Umwelt (Australia) Pty Limited
Base Map Source: Wallerawang 1:100 000 Topographic Map, Springvale Coal (2001)

FIGURE 4.2
Location of Monitoring Sites

A4 Scale 1:60 000 | Ref No.:R02_V1/1571_035.dgn

Table 4.2 - 2001 results of quarterly water quality monitoring for dewatering boreholes LD004 and LD005 (cont)

Parameter	Value Range
Fluoride (mg/L)	<0.1 – 0.6
Iron (filterable) (mg/L)	<0.05 – 0.09
Lead (mg/L)	<0.01 – 0.06
Manganese (filterable) (mg/L)	<0.05 – 0.21
Mercury (mg/L)	<0.0005 – 0.0005
MBAS (mg/L)	<0.1 – 0.1
Nitrogen (Ammonia) (mg/L)	0.05 – 0.3
Nitrate plus Nitrite (mg/L)	0.04 – 3.29
Phenolic Compounds (total) (mg/L)	<0.01 – 0.1
Selenium (mg/L)	<0.0005
Silver (mg/L)	<0.005 – 0.02
Sulphate (total as SO_4) (mg/L)	27.0 – 35.0
Zinc (mg/L)	0.08 – 0.55

Table 4.3 - 2001 results of weekly water quality monitoring for dewatering boreholes LD004 and LD005

Parameter	Range	Average
pH	7.1 – 8.0	7.4
Total Suspended Solids (mg/L)	0 – 16	1
Electrical Conductivity (µS/cm)	750 - 830	780
Total Oil & Grease (mg/L)	1.7 – 4.2	2.9

Springvale's current Environment Protection Licence sets limits on pH, Total Suspended Solids and Total Oil and Grease. The water quality results outlined in **Table 4.3** for the current dewatering boreholes meet these limits. In addition, the Environment Protection Licence requires conductivity, filterable iron and filterable manganese to be reported. This condition is satisfied by Springvale's current monitoring regime.

As discussed in **Section 3.4**, Springvale will undertake monitoring of surface water quality in the tributaries of Middle River in the vicinity of the site prior to seeking statutory approvals for the installation and operation of the dewatering borehole. A review of these water quality monitoring results combined with improved knowledge of potential discharge water quality will allow the impacts of the proposed minewater discharge facility to be confirmed and appropriate management strategies to be put in place at that time.

The implementation of appropriate erosion and sediment controls at the site, including the provision of appropriately sized retention basins, will ensure that the proposed development will not significantly impact on the quality of receiving waters.

4.2.1 Springvale Pollution Reduction Program

Springvale has recently entered into a Pollution Reduction Program (PRP) with the EPA to explore the various options available to improve management of the water resulting from Springvale's current dewatering practices. Specifically, the PRP requires Springvale to develop an options study by 15 October 2003 for the handling of mine water obtained by

dewatering the underground operations. This study will be undertaken in consultation with the EPA and any other relevant authorities or agencies, with the recommendations of the options study to be adopted for the planned dewatering borehole facility proposed as part of this development. The dewatering facility is not required until after the finalisation of the options study.

4.3 LAND OWNERSHIP / LAND USE AND PLANNING

4.3.1 Land ownership

The proposed ventilation shaft facility is located in Marangaroo Parish in the County of Cook in Blaxland Shire. All land proposed to be affected is part of the Newnes State Forest.

4.3.2 Zoning

The site is zoned 1(f) Rural (forestry) under the Greater Lithgow City Council Local Environmental Plan (LEP) 1994. The objectives of the zone are:

a. to identify land managed by the Forestry Commission under the Forestry Act 1916;

b. to preserve existing forests within the City of Greater Lithgow, while allowing compatible development; and

c. to prevent pollution of water supply catchments and water quality in major water storages.

The proposed ventilation shaft facility is consistent with the above objectives in that it is compatible development which, although resulting in the clearing of approximately 10 hectares, will not impact on the surrounding forestry land use. The implementation of appropriate water management controls as outlined in **Section 5.2** will ensure that the proposed development will not significantly impact on water quality.

Development for the purposes of extractive industries or mining is permissible under the LEP with development consent from Council.

4.4 FLORA AND FAUNA

A comprehensive flora and fauna assessment was completed for the proposed ventilation shaft facility and is included as **Appendix 3**. A summary of the findings of the assessment is included below.

4.4.1 Flora

The vegetation community which occurs within the proposed development area consists of open forest dominated by Silvertop Ash (*Eucalyptus sieberi*) and Narrow-leaved Peppermint (*E. radiata*), with Ribbon Gum (*E. viminalis* subsp. *viminalis*), Blue Mountains Ash (*E. oreades*) and Brittle Gum (*E. mannifera*) also common. The overstorey vegetation has been subject to logging in the past, and as such very few mature trees were recorded. Overstorey species were generally between 8 and 10 metres, with emergent trees to 20 metres. The understorey of the community supported a high diversity of species with groundcover in the order of 75% to 90 %. Weed infestation was generally very low, with disturbance limited to access tracks and along the edges of the powerline easement.

Three threatened flora species have been recorded within 10 kilometres of the proposed facility (State Forests 2002 - refer to **Figure 4.3**), with two of these species *Persoonia hindii* and *Derwentia blakelyi*, recorded in the development area. *Persoonia hindii* was recorded within the area proposed for the construction of the 11 kV powerline easement and *Derwentia blakelyi* was recorded adjacent and to the south of the proposed easement (refer to **Figure 4.3**). *Persoonia hindii* was recorded in two areas along the proposed easement with the first area comprising a number of individuals within an approximately 20 metre by 20 metre area and the second being a single plant approximately 20 metres further to the east. It is considered that *Derwentia blakelyi* may occur within the area proposed for the easement however it was not recorded. The proposed 11 kV powerline will be designed to ensure that holes dug for the placement of poles will not affect the individuals recorded. This will be achieved by the marking of threatened species locations by a qualified and experienced ecologist as discussed in **Section 5.5**.

Assessments of the potential impacts of the proposal under Part 5A of the Environmental Planning and Assessment Act 1979 are included in **Appendix 3**. These assessments indicate that due to the relatively small area of habitat to be removed by the proposed development and taking into account the extensive areas of adjacent habitat, the proposed development is unlikely to have a significant impact on the two threatened species recorded or on any other locally occurring threatened species. The proposed controls are outlined in detail in **Appendix 3** and are summarised in **Section 5.5**.

4.4.2 Fauna

The open forest community offers potential habitat to a range of endemic fauna species, including a range of bird species and small ground dwelling mammals such as the Yellow-footed Antechinus (*Antechinus flavipes*). The dense nature of the dry heath understorey and the depth of leaf litter present within the site provides suitable habitat for a range of endemic vertebrate and invertebrate fauna, however, habitat structures such as fallen logs and rocky outcrops were generally limited. Arboreal habitats in the study area were generally limited with few mature trees occurring due to past logging activity and bushfires.

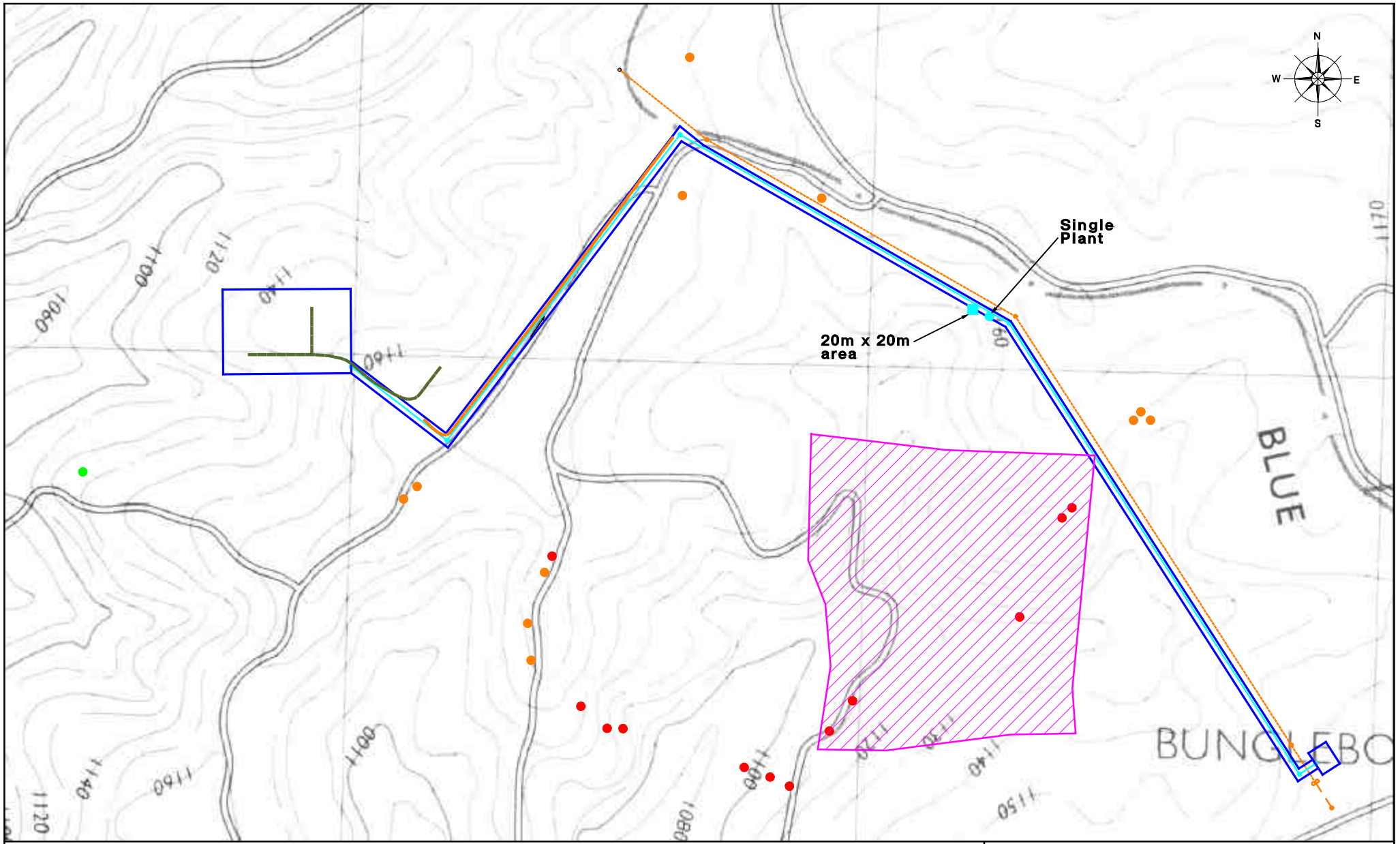
It is expected that the areas of open forest vegetation adjacent to the proposed development provide significant areas of fauna habitat. As the area proposed to be disturbed by the proposed ventilation shaft facility is relatively small (approximately 10 hectares), and taking into account the proximity of substantial areas of similar habitat, the proposed development is not expected to compromise a significant area of fauna habitat.

One threatened species, the Common Bent-wing Bat was recorded during the fauna survey (refer to **Figure 4.3**), with an assessment of the impacts of the proposal on this species and other threatened species considered to potentially occur in the study area included in **Appendix 3**. The assessments conclude that with the implementation of appropriate controls to reduce clearing to the minimum necessary and to ensure that no threatened plants are cleared during construction, the proposed development is unlikely to have a significant impact on any of these species.

An assessment of Koala habitat was undertaken in accordance with SEPP14 and is included in **Appendix 3**. The assessment identified that no core Koala habitat is present at the site, and as such a Koala plan of management is not required for the proposed development.

4.5 NOISE

A comprehensive noise impact assessment was carried out by Richard Heggie Associates and is contained in **Appendix 4**. A summary of the findings of the assessment are included below.



Legend

- Location of Proposed Ventilation Shaft Facility
- Approximate Location of *Derwentia blakelyi* Population (State Forest Survey)
- Probable Occurrence of Common Bent-wing Bat
- Confident Occurrence of Common Bent-wing Bat
- *Persoonia hindii* (State Forests Survey)
- *Derwentia blakelyi* (State Forest Survey)
- *Persoonia chamaepitys* (State Forest Survey)
- *Persoonia hindii* (Umwelt Survey)

0 100 250 500m

Umwelt (Australia) Pty Limited
Base Map Source: 1:25 000 Lithgow Topographic Map (8931-4-S)

FIGURE 4.3
Threatened Species Recordings

A4 Scale 1:10 000 | Ref No.:R02_V1/1571_037.dgn

An ambient noise survey was not undertaken for the noise impact assessment, with a conservative estimate of ambient noise levels made for assessment of the proposed facility. The estimated L_{A90} background noise levels at the nearest residential receiver are:

- 40 dBA during the daytime period (7.00 am to 6.00 pm);
- 35 dBA during the evening period (6.00 pm to 10.00 pm); and
- 30 dBA during the night-time period (10.00 pm to 7.00 am).

The impact assessment was completed on a generally conservative basis with the distance to the nearest residential receiver being adopted as 3.5 kilometres for the purposes of modelling (the actual distance to the nearest residence is approximately 3.8 kilometres), and conservative estimates of construction and operational equipment sound power levels being used. The modelled noise levels outlined below were calculated without taking into account any noise reductions due to the proposed noise controls outlined in **Section 5.4**. The implementation of these controls likely to further reduce the noise levels achieved at the nearest residential receiver.

4.5.1 Construction Phase

Table 4.4 presents the typical construction phase noise levels that would be conservatively expected at the nearest residential receiver with all construction equipment operating simultaneously.

Table 4.4 – Noise Goals and Calculated LA10 (15 min) Construction Noise Levels at the Nearest Residential Receiver with all Construction Equipment Operating

Period	Calculated LA10 (15 minute) Construction Noise Level (dBA)	Assumed Background Level (dBA)	LA10 (15 min) Construction Noise Goal (dBA)		
			Up to 4 weeks	4-26 weeks	Over 26 weeks
Daytime-0700-1800	< 20 - 40	40	60	50	45
Evening-1800-2200		35	Not applicable		40
Night time-2200-0700		30			35

As indicated in **Table 4.4**, predicted construction noise levels with all equipment operating simultaneously would comply with the relevant noise goals for both daytime and evening periods. Construction activities will, however, generally be limited to daytime periods, with the exception of ventilation shaft drilling which may be undertaken 24 hours per day. **Table 4.5** below presents the typical noise levels that would be conservatively expected at the nearest residential receiver with only the ventilation shaft drilling equipment operating.

Table 4.5 – Noise Goals and Calculated LA10 (15 min) Construction Noise Levels at the Nearest Residential Receiver with Shaft Drilling Equipment Operating

Period	Calculated LA10 (15 minute) Construction Noise Level (dBA)	Assumed Background Level (dBA)	LA10 (15 min) Construction Noise Goal (dBA)		
			Up to 4 weeks	4-26 weeks	Over 26 weeks
Daytime-0700-1800	< 12 – 32	40	60	50	45
Evening-1800-2200		35	Not applicable		40
Night time-2200-0700		30			35

As indicated in **Table 4.5**, predicted construction noise levels with only the ventilation shaft drilling equipment operating would comply with the relevant noise goals for daytime, evening and night time periods.

Although it is predicted that construction noise levels will comply with the noise goals, standard noise mitigation strategies will be implemented where practicable and feasible. Noise mitigation strategies that are applicable to the proposed development are outlined in **Section 5.4**.

4.5.2 Operational Phase

As the facility will operate on a 24 hour per day basis, night-time background noise levels would provide the governing noise period, with the Rating Background Level (RBL) at the nearest residential receiver estimated to be at or below 30 dBA. The EPA's Industrial Noise Policy recommends that where the RBL is found to be below 30 dBA it should be set at 30 dBA. On this basis the project intrusive noise goal is set at 35 dBA (RBL + 5 dBA).

The EPA's recommended acceptable noise level for residents located in a 'rural' area are:

- 50 dBA during the daytime period (7.00 am to 6.00 pm);
- 45 dBA during the evening period (6.00 pm to 10.00 pm); and
- 40 dBA during the night-time period (10.00 pm to 7.00 am).

The recommended amenity criteria for the project would therefore be:

- LAeq(11-hour) = 50 dBA – day;
- LAeq(4-hour) = 45 dBA – evening; and
- LAeq(9-hour) = 40 dBA – night

Taking the above into account, a conservative project specific goal for the noise emissions from the proposed facility would therefore be:

- LAeq(15 minute) noise emissions should not exceed 35 dBA at any time of the day at the nearest residential receiver.

The primary noise generating equipment will be the ventilation fans. As the precise fans to be installed at the facility are not currently known, the likely maximum sound power levels was estimated to be 120 dBA per fan, assuming no additional noise attenuation treatment.

During operation of the proposed ventilation shaft facility there are a number of factors that will attenuate noise emissions at the nearest residence, including:

- intervening terrain between the proposed facility and the nearest residence, which will provide a noise reduction of a minimum of 5 dBA;
- air absorption and ground effects over a distance of 3.5 kilometres, which will provide an additional 5 dBA to 10 dBA noise reduction (depending on the frequency components of the noise source of interest); and
- the fan axis alignment will be upward, hence providing an additional noise reduction factor due to directionality (with the receivers being at right angles to the main airflow and fan axis).

On this basis, the resulting noise level contributions at the nearest residential receiver during adverse weather conditions (including an inversion), have been estimated to be:

- 34 dBA from the ventilation fans; and
- less than 20 dBA from all other equipment.

Based on the above contributions, the total noise contribution of the proposed ventilation shaft facility at the nearest residential receiver will be approximately 34 dBA (LAeq(15minute)). On this basis, the project specific noise goal of 35 dBA would be achieved at the nearest residential receiver without the need for site-specific noise mitigation measures.

The assessment also indicates that sleep disturbance will not occur as a result of the proposed development, with no "maximum noise events" occurring during night-time periods.

4.6 AIR QUALITY

Springvale monitors dust deposition at five locations covering the Colliery pit top and coal services area (refer to **Figure 4.2**), with no dust monitoring being undertaken above the current underground extraction areas. Monitoring results for 2001 indicate that the average dust deposition rates at all sites are below the EPA amenity criteria of 4 g/m^2/month, with the average level of insoluble solids being 1.7 g/m^2/month. The two nearest gauges to the site of the proposed conveyor are sites D1 and D2 which recorded average deposition rates of 1.1 g/m^2/month and 1.5 g/m^2/month respectively.

Dust controls currently implemented by Springvale include:

- production of ROM coal with typical moisture content of approximately 7% (Springvale 2001), which is not conducive to dust generation;
- the pit top access road is sealed to restrict vehicular dust generation;
- the use of water sprays to control dust, particularly on unsealed roads around the pit top;
- the use of water carts to water unsealed access roads as required to suppress dust; and
- progressive rehabilitation of disturbed areas.

These measures have resulted in effective control of dust emissions from the existing Springvale operations with similar measures proposed to be implemented at the proposed ventilation shaft facility site to control dust generation (refer to **Section 5.3**).

4.6.1 Impact Assessment

4.6.1.1 Construction Phase

Construction activities for the proposed ventilation shaft facility will result in ground disturbance of up to approximately 4.5 hectares including the shaft site, substation site, access track and small disturbance areas along the proposed powerline. Standard dust generation controls will be implemented during the construction period as outlined in **Section 5.3**.

The implementation of these controls will reduce the potential for the generation of nuisance dust during the construction phase, with construction works envisaged to result in minimal, short-term impacts on existing air quality. The location of the proposed ventilation shaft facility within the Newnes State Forest, approximately 3.8 kilometres from the nearest residence, significantly reduces the potential for dust from construction activities to impact on local residents. The implementation of the above controls during the construction phase will also ensure there are minimal impacts on the flora and fauna communities in the adjacent State Forest areas.

4.6.1.2 Operational Phase

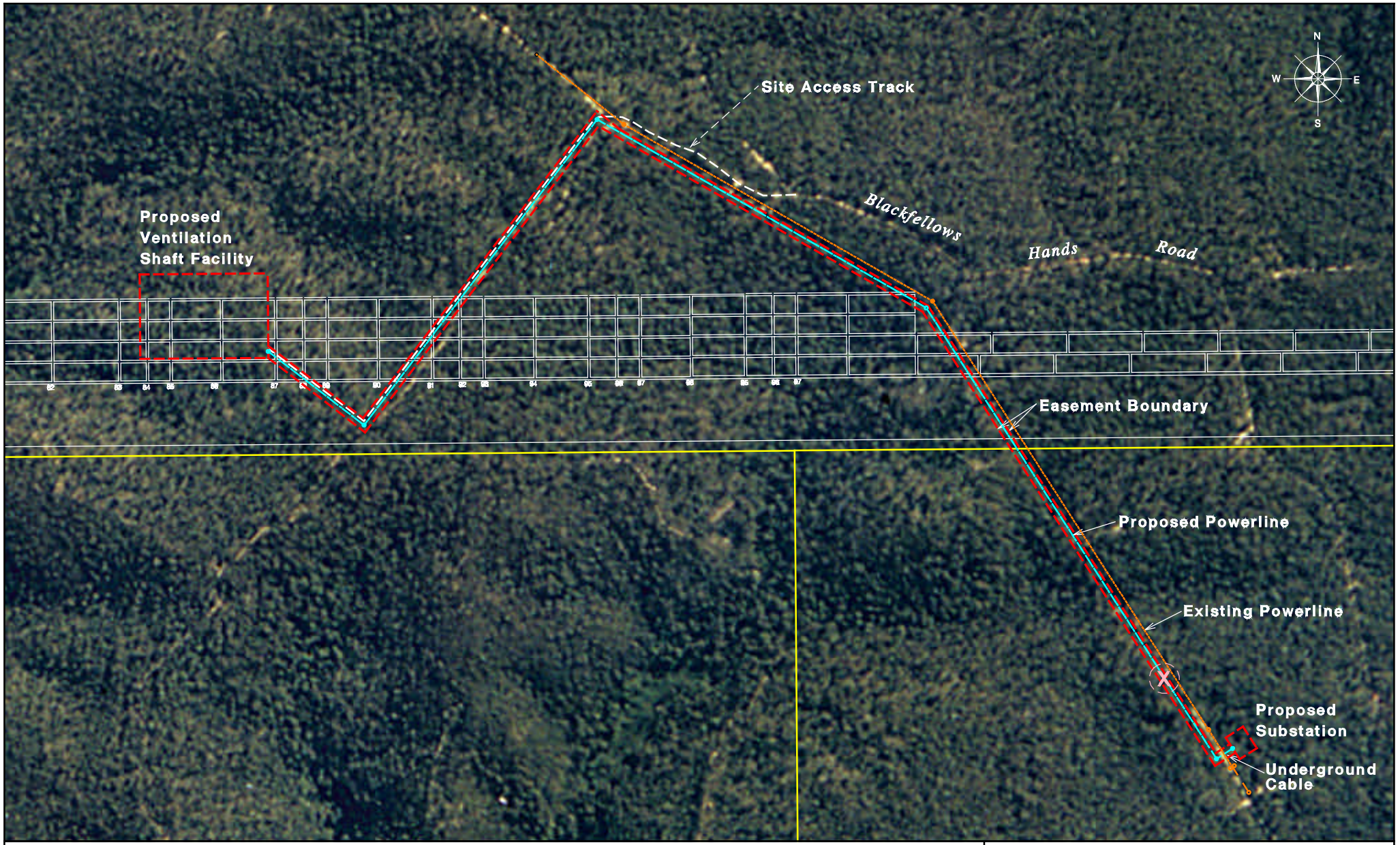
As discussed previously, the site access road, internal roads and hardstand areas will be surfaced with gravel either sourced from drilling operations at the site, or imported to the site as required. The surfacing of these trafficked areas will significantly reduce the potential for dust generation from the site, however, a water cart will be used as required to provide further dust suppression in periods of high site activity. The portions of the site not required for ongoing use during the facilities operational phase will be rehabilitated using cover crops and locally occurring native groundcover species to increase ground cover and reduce the potential for dust generation.

The air to be exhausted from the underground workings once the upcast ventilation shaft becomes operational is essentially fresh air which has higher humidity due to moist underground conditions. Springvale Colliery has very low methane levels and as such, the air vented has minimal methane. Once the ventilation fans are commissioned, the existing upcast ventilation shaft will become downcast, meaning that the volume of air exhausted from the underground operations will remain the same.

4.7 ABORIGINAL HERITAGE

An archaeological survey was undertaken in the proposed ventilation shaft development area over two days, 5 March 2002 and 4 September 2002. The surveys were undertaken by Rick Peters and Warwick Peckham of Bathurst Local Aboriginal Land Council (BLALC), Bill Hardie and Shannon Kennedy of the Gundungurra Tribal Council Aboriginal Corporation (GTCAC) and Leila McAdam of Umwelt. The results of the survey are detailed in the Cultural Heritage Assessment report included as **Appendix 5**. A summary of the findings of the assessment report are outlined below.

One Aboriginal cultural heritage site (or sensitive area) was located during the surveys. Site Springvale 1 (stone arrangement) was located approximately 200 metres from the southern end of the proposed 11 kV powerline easement (refer to **Figure 4.4**). Poor visibility due to vegetation growth in many areas may be a contributing factor to the lack of other sites in the



Legend

- Mining Lease Boundary
- Main Development Headings
- Site Springvale 1

Umwelt (Australia) Pty Limited
Source: Springvale Colliery

0 100 250 500m

FIGURE 4.4
Location of Site Springvale 1

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area. However, in this regard there was a reasonable amount of exposure in Survey Area 2 (refer to **Appendix 5**), yet no sites were located on that section. There were also no sites/artefacts located in areas of visibility on crests and on the access road located parallel and adjacent to Survey Areas 4 and 5 (refer to **Appendix 5**). This overall result suggests there is only a very low probability of sites, such as artefact scatters, being located in the study area.

Site Springvale 1 was located 20 metres southwest of the existing 66 kV powerline and 20 metres north of a deeply incised stream channel (refer to **Figure 4.4**). Two mounds of stone were located on an upper slope, just below the break of slope of a level crest of a spur line. The stone mounds (A and B) were 5 metres apart. Both mounds contained sandstone rocks which averaged 400mm x 200mm x 200mm in size (refer to **Plates 4.1** and **4.2**).

Bill Hardie (GTCAC) indicated that this site was very important because of the ceremonies held in the broader area in the past and that the mounds are most likely direction markers to bora grounds and that this was a male ceremonial site. However, both Warwick Peckham (BLALC) and Leila McAdam (Archaeologist) held reservations about whether Aborigines or Europeans (e.g. surveyors) constructed the mounds. The region has a rich history of European use (settlers, foresters and miners in the past). The vicinity was searched for other distinguishing features that may relate to direction of the two mounds and give some insight into the reasons for the mounds. It was concluded by all present that the two mounds were some kind of marker. Subsequent research has found that no known European boundaries appear to have existed in the area (e.g. local government, Portion or Parish boundaries) giving more credence to the idea that the mounds might be Aboriginal in origin.

The BLALC have assessed Site Springvale 1 as having low significance due to the uncertainty of the authenticity that the site is really an Aboriginal site and not a European site. The GTCAC have placed a high significance value on the site due to the fact that they believe from Aboriginal oral history that the area was used as a trade route and for ceremonies, and that Site Springvale 1 is a male ceremonial site. The site is assessed as having a moderate value for scientific/archaeological significance.

Site Springvale 1 will not be impacted by the proposed development. The proposed 11 kV powerline will be designed to ensure that no clearing or ground disturbance activity occurs within the vicinity of the site. In addition, the site will be temporarily fenced during construction to ensure that it is not inadvertently impacted. A Section 90 Consent to Destroy Permit under the National Parks and Wildlife Act 1974 will therefore not be required for the proposed development.

Based on the findings of the survey and consultation with the Gundungurra Tribal Council Aboriginal Corporation and the Bathurst Local Aboriginal Land Council, Aboriginal heritage issues do not provide any constraints to the proposed development, on the basis that site Springvale 1 will not be impacted and will be managed in the manner outlined in **Section 5.7**.

4.8 EUROPEAN HERITAGE

A review of the heritage items listed on Schedule 1 of the Greater Lithgow City Council Local Environmental Plan 1994, and those identified by the Greater Lithgow Heritage Study 1997-98 identified that there were no previously recorded heritage items in the vicinity of the proposed development. One potential European Heritage site was located in the vicinity of the study area during the Cultural Heritage Assessment, being the stone arrangement discussed in **Section 4.7** above. As discussed previously, there remains some uncertainty about the origins of the stone arrangement and its age, however it is considered that it may

PLATE 4.1
Stone Mound – Site Springvale 1

PLATE 4.2
Stone Mound – Site Springvale 1

be greater than 50 years of age and thus, if of European construction, would be a heritage site. No other potential heritage items were identified in the study area.

As discussed in **Section 4.7**, the stone arrangement will not be disturbed by the proposed development and as such a permit under Section 140 of the Heritage Act 1977 is not required.

4.9 VISUAL ASSESSMENT

The proposed ventilation shaft facility site exists in an area with a predominantly natural visual character, with intermittent occurrences of infrastructure and forestry activities detracting from the natural visual character. The ventilation facility will be located approximately 3.8 kilometres from the nearest residence (refer to **Figure 4.5**) and is shielded from this location by intervening topography as shown on **Figure 4.6**. The proposed development site will be located on the Newnes Plateau at an approximate elevation of 1170 metres, with the nearest residences being located on the valley floor at approximate elevations of 960 metres. On this basis, the proposed ventilation shaft facility is not expected to be visible from any residences, and will not impact on the wider visual landscape.

The ventilation shaft facility and associated infrastructure will, however, be visible from limited locations within the Newnes State Forest by those using forestry trails. Infrastructure visible from major tracks including Blackfellows Hands Road will include limited sections of the 11 kV powerline and the site access track. Both these forms of infrastructure occur at other locations throughout the State Forest and will not significantly detract from the existing visual character of the area. The ventilation shaft facility will only be visible from the dedicated access track to the facility, with vegetation shielding views of the site from the majority of areas along the track.

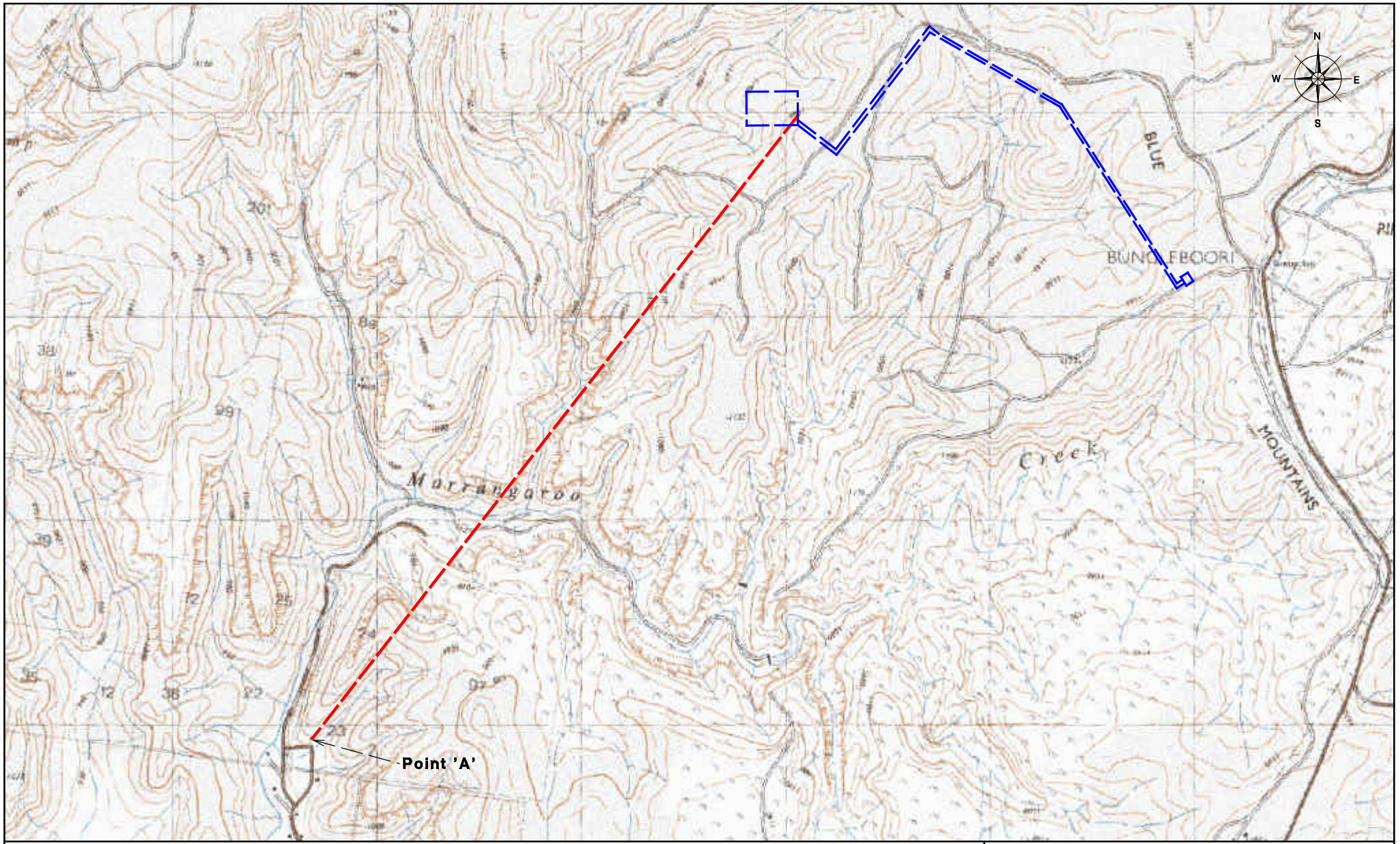
During construction, the presence of large machinery on site such as cranes will increase the visibility of the project. Post construction, the majority of structures on site will be substantially shorter than the surrounding vegetation which extends to a height of approximately 10 metres and will provide visual screening for much of the site. Overall, the proposed development will have a relatively low visual impact.

4.10 ROADS AND TRAFFIC

As discussed previously, access to the ventilation shaft site will be via State Mine Gully Road and then Blackfellows Hands Road or via Clarence and Old Bells Line of Road before joining Blackfellows Hands Road. The potential impacts of the traffic generated by the development can best be addressed as impacts on two existing areas, being sealed roads used to access the State Forest area, and unsealed roads within the State Forest. These areas are discussed separately below.

The expected traffic volumes generated by the development (refer to **Section 3.10**), will not add significantly to the current levels of traffic using sealed roads to access the State Forest area. Some minor roads may be subject to noticeably increased heavy vehicle traffic during peak construction activity periods (such as delivery of construction materials to the site), however these periods would be of short duration, with heavy vehicle deliveries unlikely to exceed 15 per day.

Impacts on unsealed roads will be managed in conjunction with State Forests to ensure that impacts are minimised and roads remain in an acceptable condition. Trucks will be limited to a maximum of 40 km/hr on all unsealed roads, with traffic movements being limited or



Legend

Visual Transect

Proposed Ventilation Shaft Facility

0 0.25 0.5 1km

Umwelt (Australia) Pty Limited
Source: Land and Property Information NSW, 2000

FIGURE 4.5
Location of Visual Transect from Facility to House Shown as Point 'A'

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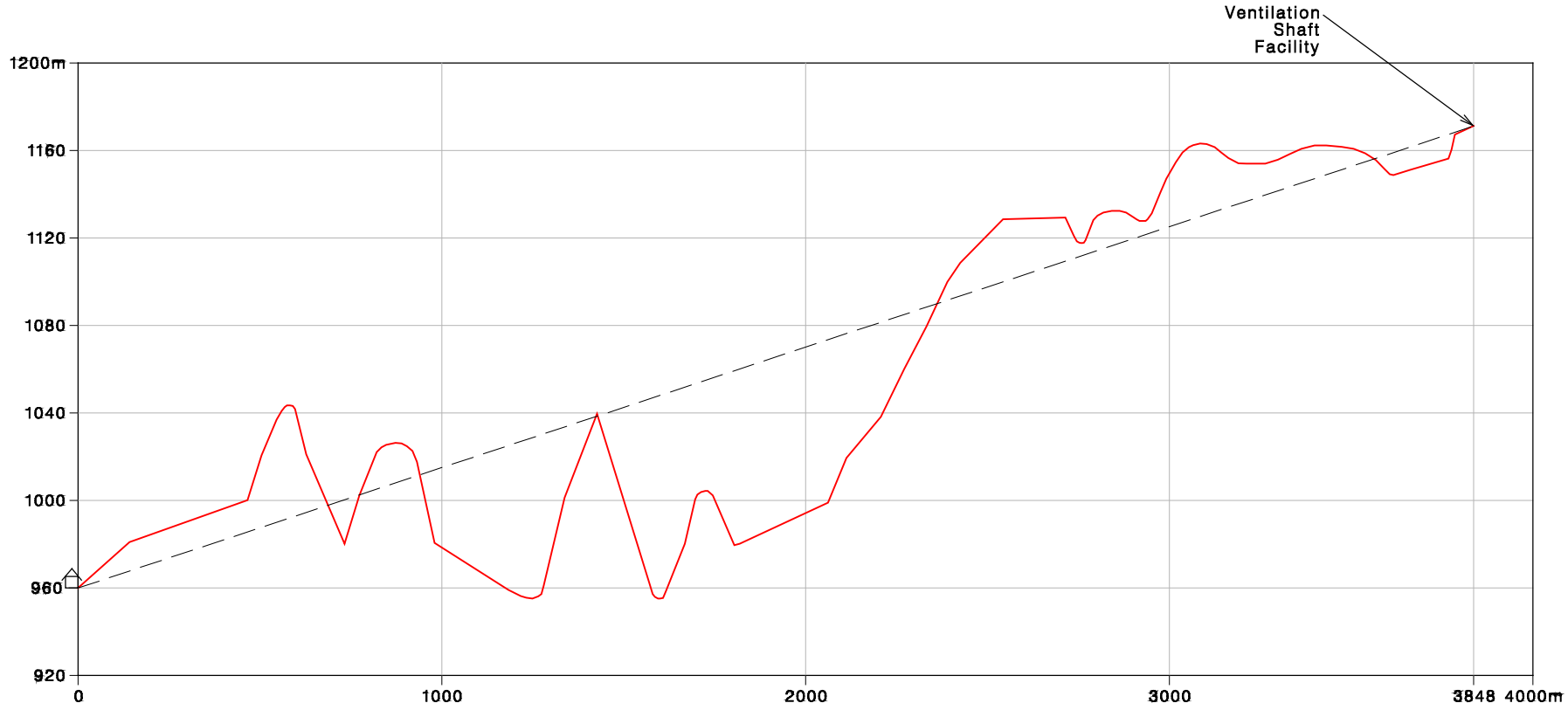

Note:
Refer to Figure 4.5 for transect location

FIGURE 4.6
Visual Transect

Umwelt (Australia) Pty Limited

A4 Not to Scale

Ref No.:R02_V1/1571_023.dgn

ceased in wet periods depending on road conditions. Springvale will co-operate with State Forests to ensure that all roads used to access the site remain in an acceptable condition, with maintenance being undertaken as required.

4.11 BUSHFIRE HAZARD

The proposed ventilation shaft facility site is located in a high risk bushfire area with relatively steep slopes covered by sclerophyll forest. An assessment of the bushfire hazard for the site was undertaken by assessing vegetation types and slopes in the vicinity of the proposed development areas, in accordance with the 'Planning for Bushfire Protection' guide developed by PlanningNSW and the NSW Rural Fire Service. This document outlines the requirements for Asset Protection Zones (APZs) for residential dwellings based on bushfire hazard.

Although the APZ requirements do not specifically apply to this development, as it is not a residential dwelling, they do provide a guide for provision of suitable APZs for protection of site infrastructure. An APZ is comprised of an Inner Protection Zone (IPZ) which should not provide any significant potential fuel for bushfires (e.g. cleared areas with lawn or sealed surfaces) and an Outer Protection Zone (OPZ) which is located adjacent to the hazard but which has reduced fuel loads (e.g. discontinuous trees and reduced shrub layer).

The APZs for the ventilation shaft site, determined in accordance with the above guide, are outlined in **Table 4.6** below.

Table 4.6 - Asset Protection Zones for Bushfire Hazard

Hazard Area Adjacent to Ventilation Shaft Site	Inner Protection Zone (metres)	Outer Protection Zone (metres)	Asset Protection Zone (metres)
North	60	10	70
East	20	10	30
South	60	10	70
West	60	10	70

The APZs provided for the ventilation shaft site are generally in accordance with the APZs specified in **Table 4.6**, with the exception of the area to the south of the site. The entire site will, however, be cleared and will include a 20 metre wide cleared zone surrounding the site. In addition, a 20 metre wide easement will be cleared to provided the proposed 11 kV powerline with bushfire protection, with a 40 metre by 40 metre area being cleared to protect the proposed substation site.

Further details of proposed bushfire hazard management strategies are outlined in **Section 5.6**.

4.12 RECREATION AMENITY

The Newnes State Forest is used for a range of recreational purposes such as bush walking, mountain bike and trail bike riding and four wheel driving. The proposed ventilation shaft facility will have minor impacts on these activities in a localised area, with the facility occupying an area of approximately 4.2 hectares. The site of the proposed ventilation shaft facility is, however, not visible from any existing state forest tracks. It will not therefore have any impact on the majority of recreational activities occurring in the State Forest.

Some recreational activities such as bushwalking, bike riding and four wheel driving which occur along forestry tracks may be affected by the increased heavy vehicle movements along these tracks, however this impact will primarily occur only on a short term basis during construction. As outlined in **Section 5.9**, the delivery of construction materials to the site will be scheduled to primarily occur on weekdays, with the majority of recreational activity occurring on weekends.

The proposed development, due to its restricted nature and taking into account its location away from the majority of recreational activity areas, is considered unlikely to significantly impact on recreational amenity.

4.13 HAZARD AND PUBLIC SAFETY

4.13.1 Hazard Assessment

SEPP 33 – Hazardous and Offensive Development applies to industries that are considered to be potentially hazardous or potentially offensive. The policy provides a link between the assessment process, permissibility of a project, and environmental, safety and pollution control performance objectives. A potentially hazardous industry is one that has the potential to create an off-site risk to people, property or the environment in the absence of location, technical or operational controls.

A potentially offensive industry is "*a development for the purposes of an industry which, if the development were to operate without employing any measures to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would emit a polluting discharge (including for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land, and includes an offensive industry and an offensive storage establishment*".

An application to carry out a potentially hazardous industry must be accompanied by a preliminary hazard analysis. This is presented in the following section.

4.13.2 Assessment of Potential Hazard

The first step in determining whether or not SEPP 33 applies is to carry out an assessment based on the nature, quantity and location of hazardous materials required for the proposal. Hazardous materials fall into the classification of the Australian Code for the Transport of Dangerous Goods by Road and Rail (Australian Dangerous Goods Code). If the project proposes to store quantities of these goods below the relevant threshold, then the proposal is not potentially hazardous.

Greases and lubricants will be used on occasions as a part of the ventilation shaft facilities maintenance regime, however these materials will be brought onto the site in relatively small amounts on a needs basis. The proposal does not include the storage of any dangerous goods. On this basis, the proposal is not a potentially hazardous development.

4.13.3 Assessment of Potential Offensiveness

In order to determine whether or not the proposal is potentially offensive, PlanningNSW recommends consideration of the following issues:

1. Does the proposal require a licence under any pollution control legislation administered by the Environment Protection Authority?

2. Does the proposal require pollution control approval pursuant to any legislation or by-laws administered by Council?

3. Does the proposal cause offence to the surrounding environment?

As discussed in **Section 1.4.2**, the proposal will require modification of Springvale's existing environment protection licence. However, PlanningNSW states that a development would not be considered offensive if a licence can be obtained. The existing Springvale environment protection licence will be appropriately varied to include the operations of this proposal. It is considered that this variation can be obtained and that any potential emissions from the project will not exceed the existing licence conditions. On this basis, the proposal is not a potentially offensive development.

4.14 SOCIO-ECONOMIC AND COMMUNITY

Springvale currently employs approximately 210 persons (Springvale, 2001). The proposed project is expected to create up to approximately 20 construction jobs for a period of up to 15 months. As a result of the creation of the construction jobs, additional (indirect) employment will be generated.

In addition to the construction jobs discussed above, and as outlined in **Section 1.5**, the establishment of the proposed ventilation shaft facility is essential to the ongoing operation of Springvale Colliery. The approval of this project will therefore allow ongoing operation of the Colliery and continued employment for the current workforce.

The 1996 Census in the Lithgow area showed that 7498 people were employed and around 847 were unemployed (approximately 10% unemployment) (statistics from the 2001 Census were unavailable during preparation of this SEE). This is a high rate of unemployment when compared to the unemployment rate of New South Wales which was 4.1 % (Australian Bureau of Statistics, 1996). In light of this, job creation during the construction period will have a positive impact on the local community.

In 2001, the company donated approximately $2,350 to local schools, sporting and community groups. Springvale also operates responsibly in that the company has established a procedure to record and respond to environmental incidents and community complaints. Through the use of this procedure, all enquiries and complaints are kept on file and are formally responded to in a timely manner.

The proposed development will assist Springvale to continue to make a positive socio-economic contribution to the local area.

5.0 ENVIRONMENTAL MANAGEMENT

5.1 EXISTING CONTROL MEASURES UTILISED AT SPRINGVALE COLLIERY

A range of control measures are utilised by Springvale as part of the ongoing development of Springvale Colliery. These measures have proved successful in helping Springvale to meet their environmental responsibilities and include:

- environmental awareness training for all new employees as part of their site induction training program;
- management of complaints / environmental incidents in accordance with Springvale's incident handling procedure;
- ongoing subsidence monitoring and refinement of predictive models;
- preparation and successful implementation of a spontaneous combustion management plan with no spontaneous combustion incidents occurring in 2001 (Springvale, 2002);
- an environmental monitoring program which includes measurement of dust deposition, water quality and noise impacts as required. Springvale also has a weather station which measures rainfall, evaporation, wind speed and direction, humidity, air temperature and solar radiation;
- a site water management system which provides for diversion of clean water and appropriate treatment of dirty water prior to discharge. Dirty water is reused for on-site purposes where possible;
- management of dust generation through the use of water sprays, sealing of high use access roads, use of water carts, provision of three quarter enclosed overland coal conveyors and washing of access roads as required;
- a waste management system which includes waste separation and recycling;
- protection of recorded Aboriginal heritage sites by fencing, as appropriate;
- protection and refurbishment of the 'hospital cottage' which is a European heritage item adjacent to Springvale's overland coal conveyor; and
- ongoing development of Springvale's Environmental Management System (EMS) with the aim of developing an EMS which is generally in accordance with ISO 14001.

These control measures will be utilised by Springvale to manage the environmental performance of the proposed ventilation shaft facility where appropriate.

5.2 SOIL AND WATER MANAGEMENT

5.2.1 Construction Controls

The following general controls will be adopted for any areas disturbed during construction of the proposed ventilation shaft facility:

- clearly identifying those areas required to be disturbed and ensuring that disturbance is limited to those areas;
- construction of diversion drains upslope of areas to be disturbed to convey clean runoff away from disturbed areas;
- constructing earthworks cut and fill batters at slopes of 1V:3H or less, where possible, to maximise long term stability;
- progressively stripping and stockpiling the top 100 mm of topsoil, where suitable, for later use in rehabilitation;
- construction and regular maintenance of sedimentation basins, silt fences and catch drains to contain sediment downslope of disturbed areas;
- the use of water captured in sedimentation basins after rainfall events for on site purposes to ensure that sufficient basin capacity is retained;
- the placement of hay bale check dams in catch drains to reduce water velocity and prevent scouring;
- diversion of surface and road runoff away from disturbed areas;
- regular maintenance of all erosion control works and rehabilitated areas; and
- prompt revegetation of areas as soon as earthworks are complete.

These controls will be designed and constructed to a standard consistent with *Managing Urban Stormwater: Soils and Construction* (NSW Department of Housing 1998) (the Blue Book).

The specific requirements for erosion and sediment controls during construction of the ventilation shaft facility are shown in **Figure 5.1** and include construction of three perimeter sedimentation basins to contain sediment that may be generated during the construction phase of the project. In addition, depending on the ventilation shaft drilling method chosen, up to two drilling sedimentation ponds may also be established (refer to **Figure 5.1**). The perimeter sedimentation basins have been designed to contain runoff from ¼ of the one year average recurrence interval (ARI), time of concentration storm event. This equates to a rainfall intensity of 35.1 mm/h. For a catchment area of 13.9 ha, of which up to 4.2 ha will be disturbed, and an assumed runoff coefficient of 0.5, the design peak runoff is 0.17 m^3/s. As the site is located in the Medlow Bath and Warragamba soil landscapes, which have coarse-grained, non-dispersive soils, Type C basins are appropriate. The total basin volume required to settle these particles is approximately 650 m^3. This design volume will be provided by three basins constructed at the locations shown in **Figure 5.1**. The dirty water catch drains will be designed to convey the peak runoff from the design storm event to one of these basins. Clean water diversion will be required to reduce the dirty water catchment of the site (refer to **Figure 5.1**).

A soil and water management plan will be developed for the proposed development prior to the commencement of construction activities. The plan will detail the controls to be implemented during the construction period, including methods of stabilisation and rehabilitation, and controls proposed for the facilities operational period. An inspection and maintenance schedule will also be included in the erosion and sediment control plan to ensure the implemented controls are effective.

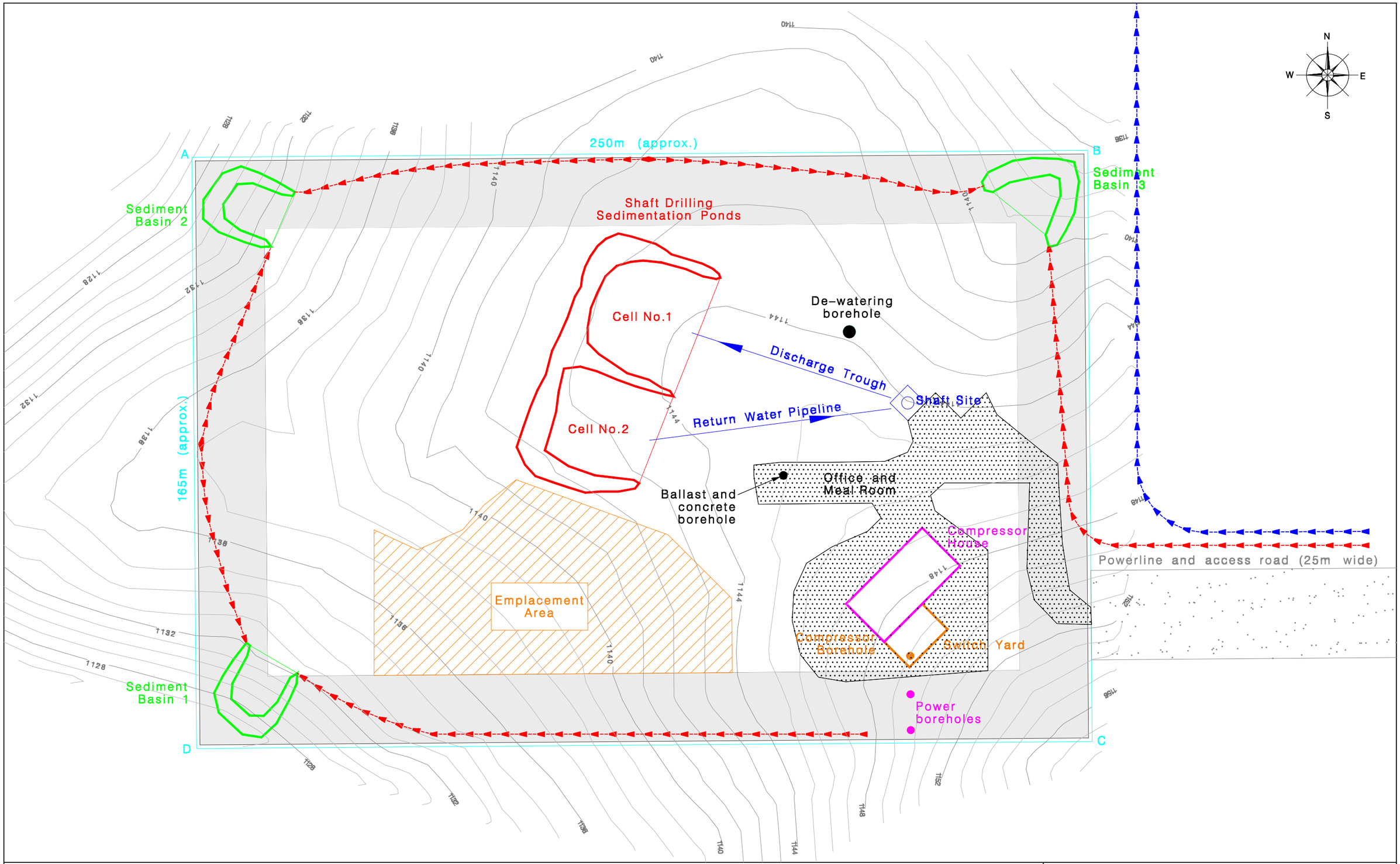

FIGURE 5.1
Erosion & Sediment Control

A3 Scale 1:1000

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5.2.2 Operational Controls

Following the completion of construction, the majority of the site will have been stabilised either as sealed or hardstand areas or through seeding and establishment of groundcover. The controls described for the construction phase above, including the sedimentation basins, catch drains and clean water diversion drains, will be retained to provide ongoing management of site runoff. These structures will be regularly maintained to ensure that they remain effective.

5.2.3 Dewatering borehole

As outlined in **Section 3.4**, the details of the dewatering borehole facility required at the site cannot be accurately determined at this time. Detailed management strategies to be put in place as part of the dewatering facility will be outlined in the supporting information submitted with applications for the required statutory approvals. These strategies will be in accordance with the outcomes of Springvale's current Environment Protection Licence Pollution Reduction Program.

5.2.4 Human effluent

During construction, either a portable chemical toilet or pump-out septic system will be provided on site. The effluent from these systems will be regularly removed from the site by an approved contractor. No human effluent will be treated or disposed of at the site.

No toilet facilities will be provided at the site during operational periods as the facility will not be permanently staffed. Portable facilities may, however, be provided during site intensive operations such as maintenance or emergency repair periods where a number of personnel may be working at the site for a period of up to a few weeks.

5.2.5 Water requirements

There are no facilities proposed for the ventilation shaft site which require water during their operation. There is therefore no need for a permanent water supply at the site with any water required, for example for dust control, being brought on site on an as needs basis.

Water required for the facilities construction phase will primarily be delivered to the site by tanker, with small amounts of water also being sourced from the sedimentation ponds located around the site following rainfall events.

5.3 DUST CONTROL

As discussed in **Section 4.6**, standard dust suppression controls will be implemented during the construction period including:

- restriction of disturbance to the minimum area possible and retention of as much ground cover as possible to reduce the potential for dust generation;
- regular watering of exposed areas by water cart to minimise dry wind blown or traffic generated dust;
- the use of gravel to surface access roads and hard stand areas to reduce the potential for dust generation;

- seeding of topsoil stockpiles with cover crops to reduce the potential for wind blown dust;

- the use of dust suppression sprays on all drill rigs used for borehole sinking to reduce the potential for drilling operations to generate dust;

- the restriction of some site activities (e.g. earthworks) in high dust risk periods as necessary (e.g. dry, windy conditions) to reduce the potential for dust generation; and

- prompt rehabilitation of disturbed areas to increase ground cover and reduce the potential for dust generation.

Operational dust suppression controls implemented at the site will be similar to those currently utilised at the Springvale Colliery pit top and will include:

- gravel surfacing and regular maintenance of site roads and hardstand areas;

- use of a water cart as required to provide further dust suppression in periods of high site activity (e.g. maintenance activities); and

- the rehabilitation of the portions of the site not required for ongoing use using locally occurring native species to increase ground cover and reduce the potential for dust generation.

5.4 NOISE CONTROL

As outlined in **Section 4.5** a comprehensive Noise Impact Assessment has been completed for the proposed development. The assessment report, which is included in **Appendix 4**, outlines a number of management actions to be implemented as part of the proposed development. These actions are that:

- the ventilation fans are to have a maximum sound power level of 120 dBA each, or appropriate silencers are to be fitted to achieve suitable noise attenuation;

- all construction activities except for drilling of the ventilation shaft will be limited to the EPA's recommended standard daytime construction hours (7:00 am to 6:00 pm);

- where possible, construction will be scheduled to avoid the coincidence of noisy plant working simultaneously;

- where possible, maintenance work on all construction plant will be confined to standard daytime construction hours;

- noise emission compliance checks will be undertaken for all plant and machinery used on the project prior to their commencement on site;

- all mobile plant are to have appropriate silencers or exhausts; and

- all plant and machinery used for the project will undergo regular maintenance and will be kept in good working order.

5.5 FLORA AND FAUNA

As outlined in **Section 4.4**, a comprehensive Flora and Fauna Assessment has been completed for the proposed development. The assessment report, which is included in **Appendix 3**, outlines a number of management actions to be implemented as part of the proposed development. These actions are that:

- clearing of vegetation is supervised by a qualified and experienced ecologist, in order to ensure that endemic fauna species are not injured during the clearing process;
- the disturbance area will be flagged to ensure construction activities are restricted to the development area and that adjacent vegetation areas, including nearby populations of *Persoonia hindii* and *Derwentia blakelyi*, are not adversely impacted;
- the location of *Persoonia hindii*, the threatened flora species recorded on the proposed powerline easement will be marked by a qualified and experienced ecologist and the area temporarily fenced during construction to ensure the area is not inadvertently impacted;
- all clearing undertaken within the above temporarily fenced area will be undertaken by hand, with the shrub and ground vegetation layers being left undisturbed. Felled trees will be removed from within the fenced area by an excavator reaching in from outside the fence. A qualified and experienced ecologist is to be present during clearing activity undertaken in this area, with any trees that cannot be removed by the excavator being left in place or otherwise removed as directed by the ecologist; and
- the *Persoonia hindii* occurring within the proposed powerline easement will be monitored at periods of six and twelve months after the completion of clearing, to monitor the impacts of clearing activity on the species. The need for further monitoring beyond this twelve month period will be assessed following the second round of monitoring.

5.6 BUSHFIRE MITIGATION

In accordance with the requirements of NSW State Forests, Springvale will prepare a bushfire management plan prior to commencement of construction on site. This plan will detail the bushfire hazard mitigation strategies to be implemented at the site. The plan will be prepared in consultation with State Forests and will include:

- the provision of appropriate Asset Protection Zones;
- any ongoing hazard reduction requirements applicable to the site;
- the provision of appropriate fire fighting equipment on the site; and
- the provision of an appropriate fire detection system.

5.7 HERITAGE MANAGEMENT

As outlined in **Section 4.7**, a comprehensive Cultural Heritage Assessment has been completed for the proposed development. The assessment report, which is included in **Appendix 5**, outlined a number of management actions to be implemented as part of the proposed development. These actions are that:

- site Springvale 1 will be temporarily fenced during construction of the powerline to avoid its inadvertent destruction/damage during ground disturbing works. The fence will be placed around the site at a distance not less than 10 metres from the site. No ground disturbing works are to be undertaken inside the fenced area. The area is to have a sign stating no access to unauthorised personnel. After construction works are completed the fence will be removed to avoid drawing attention to the site;

- representatives of the BLALC and GTCAC will be afforded the opportunity to be present during any initial ground disturbance work carried out within the study area;

- that a male representative of GTCAC be present when post holes for the power poles are drilled near Site Springvale 1, and a male representative of BLALC be given the opportunity to be present;

- that a male archaeologist only is to undertake any further work near Site Springvale 1;

- if an Aboriginal Cultural Heritage site is uncovered then all work must cease in that area (and for an appropriate distance from that area, as defined by the Aboriginal monitors on-site) until the site can be assessed by NSW NPWS; and

- if human skeletal material is uncovered during construction all works in the area must cease and the NSW Police and the NSW NPWS informed. Work may recommence at a distance approved by the Bathurst LALC and the GTCAC.

These actions will be implemented as part of the proposed development, with site Springvale 1 being fenced in consultation with the GTCAC, BLALC and State Forests. The fence will be constructed of plain wire as opposed to barbed wire to prevent impacts on locally occurring fauna species.

5.8 LANDSCAPING, REHABILITATION AND SITE DECOMMISSIONING

5.8.1 Landscaping and Rehabilitation

All buildings constructed as part of the ventilation shaft facility will be coloured in natural tones (greens and/or browns) to ensure that they blend with the surrounding environment. This measure, combined with the general lack of site visibility, will ensure that the development has a minimal visual impact.

All areas disturbed during construction which are not required for ongoing use during the construction phase will be rehabilitated. This rehabilitation will be undertaken as soon as practicable following the completion of site earthworks, and will consist of seeding reshaped and topsoiled areas with a cover crop and native groundcover species identified in the flora survey carried out for this SEE (refer to **Appendix 3**). Groundcover species suitable for use in rehabilitation works include Kangaroo Grass (*Themada australis*), Wallaby Grass (*Danthonia sp.*), *Stipa pubescens, Chionocholoa pallida, Poa labillardieri, Helichrysum sp., Dianella revoluta, Lomandra longifolia* and *Lomandra multiflora*.

Native shrub and tree species will not be planted as part of the rehabilitation works as the area cleared for the development is to be retained for bushfire protection purposes.

5.8.2 Site Decommissioning

Detailed requirements for site decommissioning will be developed and included as part of Springvale's Mining Operations Plan as required by the DMR. In general, however, the following decommissioning measures will be implemented:

- all site infrastructure will be removed and reused or recycled where possible;
- the ventilation shaft will be refilled using the material emplaced at the site;
- the services boreholes will be refilled and sealed in accordance with DMR requirements;
- the entire site will be recontoured to achieve the pre disturbance landform; and
- the site will be rehabilitated using locally occurring native species in consultation with State Forests.

Following the completion of site decommissioning works, Springvale will undertake ongoing monitoring and maintenance of the site until the site achieves an acceptable level of regeneration, as determined in consultation with State Forests and the DMR.

5.9 TRAFFIC CONTROL

As discussed in **Section 4.10**, the proposed development is considered unlikely to have a significant impact in terms of traffic movements. A number of management measures will, however, be implemented to further reduce traffic impacts where possible. These measures will include:

- scheduling of construction materials deliveries, where possible, to avoid higher impact periods including weekends and night-time periods;
- restriction of non-essential traffic movements during wet periods;
- limiting trucks to a maximum of 40 km/hr on all unsealed roads;
- upgrading of existing unsealed roads where required to an acceptable standard for heavy vehicle traffic; and
- ongoing maintenance of unsealed roads in co-operation with State Forests to ensure they remain in an acceptable standard.

5.10 ENVIRONMENTAL MONITORING

Springvale has a comprehensive environmental monitoring program in place in accordance with its environment protection licence requirements. Springvale's meteorological station records rainfall, evaporation, wind speed and direction, humidity, air temperature and solar radiation. In addition to these parameters, Springvale has a software program that allows for the calculation of evaporation using the appropriate recorded parameters outlined above. The weather station is located on the pit top and the data are reported annually in the Annual Environmental Management Report.

Springvale currently monitors water quality continuously, weekly and monthly. Approved discharge points to tributaries of Coxs River, Wolgan River and Blackmans Flat Creek are

monitored continuously. Coxs River and Blackmans Flat Creek are also monitored both upstream and downstream of the mine on a weekly basis. **Figure 4.2** shows the location of the relevant monitoring sites. As outlined in **Section 3.4**, any specific water quality monitoring requirements relating to the proposed dewatering borehole will be outlined in the supporting information report submitted with statutory approval applications.

A total of five dust monitoring (dust fall out gauges) locations are established over the Springvale pit top and coal services area. The location of these gauges is shown on **Figure 4.2**. The averages for all five dust gauges during 2001 were all below the EPA amenity criteria of 4 g/m^2/month. The existing program will be sufficient to monitor the potential dust impacts from the proposed project, as there are no privately owned properties within proximity of the proposed development.

There is currently no routine noise monitoring carried out at Springvale and none is required by the existing environment protection licence. Due to the low noise emissions expected from this development, specific noise monitoring is not considered necessary apart from compliance monitoring of equipment noise emissions, including the ventilation fan on commissioning.

6.0 ALTERNATIVES TO THE DEVELOPMENT

6.1 ALTERNATIVE LOCATIONS

As discussed previously, the primary purpose of the proposed development is to provide adequate ventilation to the underground workings as the mine develops to the east. The proposed location of the development was chosen in order to best achieve this purpose, with the following factors being considered:

- ventilation studies indicate that the shaft cannot be located further east than the proposed location, otherwise ventilation of the production units will be inadequate;
- the surface topography is suitable at the chosen site, with steep gullies preventing the movement of the shaft site further to the west;
- ventilation studies indicate that the chosen site will provide sufficient ventilating air for mining of the remainder of the Mining Lease at the present scale of operations;
- the chosen location is in line with the present main development headings;
- to choose a location to the north of the main development headings would mean reconfiguring the mine layout and would mean a loss of coal reserves due to the shortening of longwall extraction panels; and
- the ventilation shaft site cannot be moved significantly to the south because of the proximity of the Mining Lease boundary and the old Lithgow State Mine workings. The main development headings are located adjacent to and parallel with this boundary.

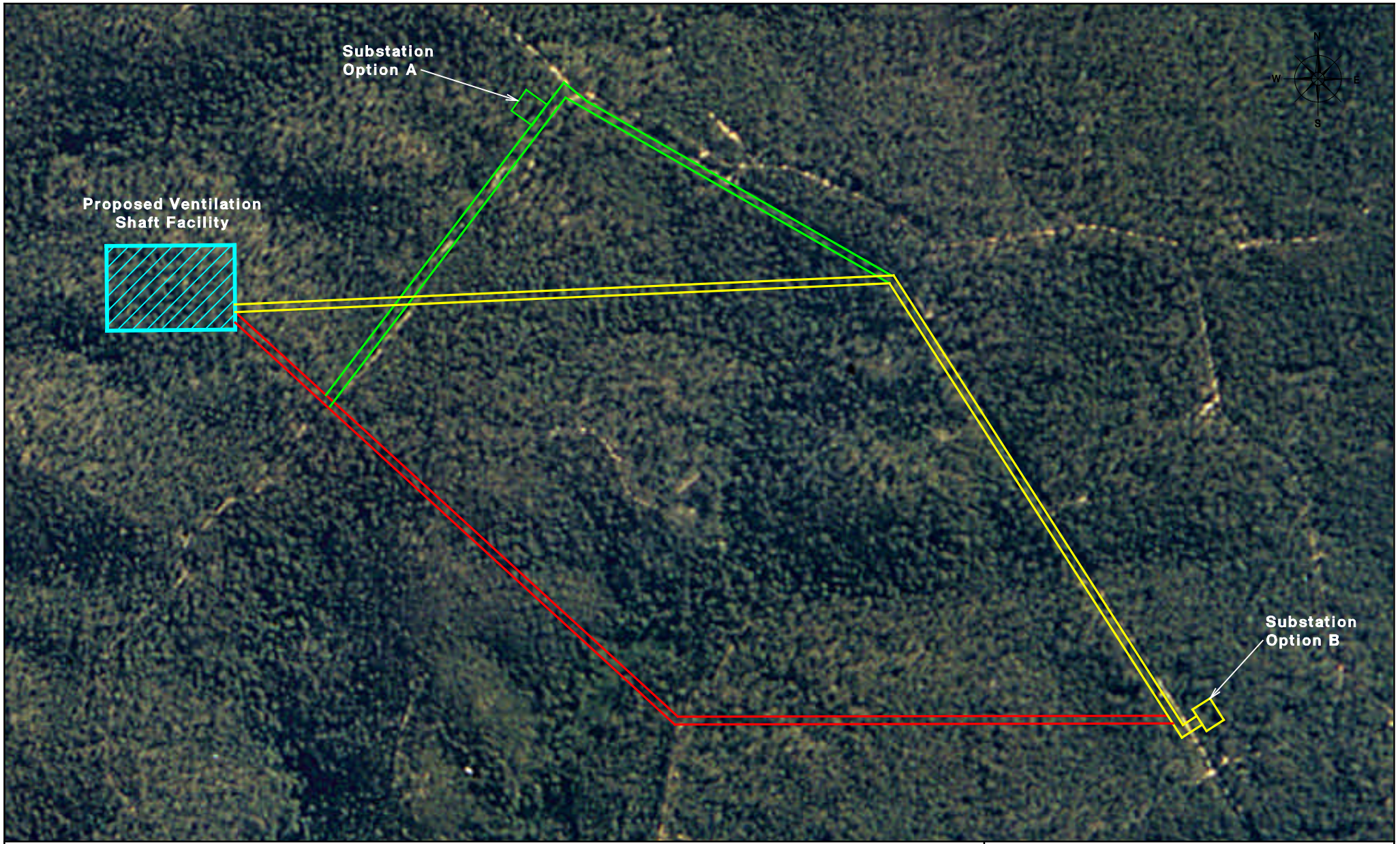
6.2 ALTERNATIVE SITE LAYOUTS

The layout of the ventilation shaft facility area could be reconfigured if required. The layout has been designed based on the currently available results of the geotechnical investigation borehole drilled at the site and for functionality. Any reconfiguration of facilities within the site will not result in the reduction of environmental impacts associated with the development and is not considered to be warranted.

Several different layouts for services associated with the facility were considered during the project development stage. In particular, several different options for provision of power to the site were considered, including two different substation sites and three different transmission line easements. The different options considered are shown on **Figure 6.1**.

The substation site shown as Option A, was originally the preferred location as it significantly reduced the length of 11 kV powerline required to reach the ventilation facility site. The soil properties at this location were, however, not suitable. Very high soil resistivity measurements were recorded, which in turn would make satisfactory earthing difficult. In these circumstances, in the event of a high transfer electrical fault, high transfer voltages could occur with a resulting danger of electrocution to personnel in the vicinity and/or the underground mine workings. The nearest suitable location was Option B, which is the final proposed location.

Three options were considered for the 11 kV powerline easement to deliver power from the substation site to the facility. These three options are shown as Options A, B and C on **Figure 6.1**. Although being the longer of the three, Option A was selected due to it location



Legend

- Option A
- Option B
- Option C

Umwelt (Australia) Pty Limited
Source: Springvale Colliery

0 100 200 400m

FIGURE 6.1
Alternative Facility Service Options

A4 Scale 1:10 000 | Ref No.:R02_V1/1571_043.dgn

adjacent to an existing 66 kV powerline easement which resulted in decreased clearing requirements, and due to its generally lower potential to impact on threatened flora species recorded in the area.

6.3 ALTERNATIVE OF NOT PROCEEDING

The alternative of not proceeding would result in the retention of up to approximately 10 hectares of State Forest vegetation to be cleared under the proposal and would result in the remaining impacts discussed in this document not occurring. As outlined in **Section 1.5**, the establishment of the ventilation shaft facility is essential for the ongoing operation of Springvale Colliery. The alternative of not proceeding would therefore mean that Springvale Colliery could not continue to operate and would result in the loss of approximately 210 direct jobs plus additional indirect employment. This alternative would also result in the cessation of Springvale's contributions to the local and state economies.

7.0 REFERENCES

ANZECC, 1992. *Australian Water Quality Guidelines for Fresh and Marine Waters*.

Council of the City of Greater Lithgow, undated. *Development Control Plan No. 6. Industrial Development*.

Department of Housing, 1998. *Managing Urban Stormwater: Soils and Construction*. Department of Housing, Sydney.

Department of Planning, 1994. *Applying SEPP 33 Hazardous and Offensive Development Application Guidelines*, New South Wales Government.

King, D.P. (1992), *Soil Landscapes of the Wallerawang 1:100 000 Sheet* Report and Map, Department of Conservation and Land Management, NSW.

NSW Rural Fire Service & PlanningNSW (2001), *Planning for Bushfire Protection*.

Springvale Coal (2002), *Springvale Coal Pty Ltd - Annual Environmental Management Report*, prepared with the assistance of ACIRL Ltd.

APPENDIX 1

Development Consents

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

DETERMINATION OF DEVELOPMENT APPLICATIONS PURSUANT TO SECTION 101

I, the Minister for Planning, pursuant to Section 101 of the Environmental Planning and Assessment Act 1979 ("the Act"), determine the development application ("the application") referred to in Schedule 1 by granting consent to the application subject to the conditions set out in the Schedule 2.

The reasons for the imposition of the conditions are:

(i) to minimise the adverse impact the development may cause through noise, visual amenity, air and water pollution;

(ii) to provide for environmental monitoring and reporting;

(iii) to set requirements for infrastructure provision.

Robert Webster
Minister for Planning

Sydney, 27/7/ 1992 File No. S91/06569/001

Schedule 1

Application made by: Clutha Coal Pty Limited on behalf of Springvale Coal Pty Limited ("the Applicant").

To: Greater Lithgow City Council (DA 11/92) ("the Council")

In respect of: Authorisation 409, Mining Purposes Lease Application 384 on land described in Attachment "A".

For the following:
(i) Construction and operation of an underground coal mine.
(ii) Construction and operation of an overland conveyor and coal washery.

NOTE:
(1) To ascertain the date upon which the consent becomes effective, refer to section 101(9) of the Act.
(2) To ascertain the date upon which the consent is liable to lapse, refer to section 99 of the Act.

SCHEDULE OF LAND WITHIN SPRINGVALE COAL PROJECT.

Portion 125, Parish of Lidsdale.
Portion 54, Parish of Lidsdale.
Portion 56, Parish of Lidsdale.
Reserved Road.
Portion 229, Parish of Lidsdale.
Portion 42, Parish of Lidsdale.
Portion 228, Parish of Lidsdale.
Lot 16, Deposited Plan 262515.
Lot 15, Deposited Plan 262515.
Lot 2, Deposited Plan 383126.
Skelly Road.
Lot 1, Deposited Plan 575140.
Lot 1, Deposited Plan 160670.
Lot 3, Deposited Plan 108382.
Lot 8, Deposited Plan 252472.
Portion 63, Parish of Lidsdale.
Duncan Street.
Reserved Road.
Portion 16, Parish of Lidsdale.
Reserved Road.
Lot 2, Deposited Plan 567915.
Reserved Road.
Portion 174, Parish of Lidsdale.
Reserved Road.
Portion 385, Parish of Lidsdale.
Portion 375, Parish of Lidsdale.
Reserved Road.
Ben Bullen State Forest.
Portion 371, Parish of Lidsdale.
Reserved Road.
Portion ML66, Parish of Cox.
Lot 2, Deposited Plan 702619.
Lot 6, Deposited Plan 804929.
Lot 13, Deposited Plan 804929.
Lot 191, Deposited Plan 629212.
Lot 14, Deposited Plan 804929.
Portion 18, Parish of Cox.
Mining Purposes Lease No 384 Orange
Part Coal Lease No 239
Part Coal Lease No.377.
Authorisation Area No 409
Part Authorisation Area No 104

Part Consolidated Coal Lease 733

SCHEDULE 2

1. General

The Applicant shall carry out the development of the Springvale Coal Project generally in accordance with the Environmental Impact Statement (EIS) prepared by Sinclair Knight & Partners Pty Limited in accordance with Section 77(3) of the Environmental Planning and Assessment Act, and certified by Robert Byrnes and supplementary information by the Applicant dated April 1992 and as modified by the following conditions.

2. Duration

The duration of this consent is limited to twenty-one (21) years from the granting of the coal lease.

3. Environment Protection Authority

Prior to the commencement of construction of the proposed development the Applicant shall obtain from the Environment Protection Authority ("EPA") all statutory approvals and licences as may be required under the Clean Air Act 1961, the Clean Waters Act 1970, and the Noise Control Act 1975, together with such other approvals or licences as may be required under future legislation or regulations for the conduct of the proposed development. The Applicant shall conduct the development in accordance with the terms of such approvals and licences.

4. Department of Water Resources

(a) The Applicant shall contribute data to a regional groundwater resource assessment of the Colliery holding made by the Department of Water Resources. Such assessment shall include proposals for monitoring the condition of the relevant aquifers by the Applicant.

(b) The Applicant shall consult with the Department of Mineral Resources and monitor the effects of underground mine development, hydrology and hydrogeology of the colliery holding to the satisfaction of the Department of Water Resources.

5. National Parks and Wildlife Service

(a) The Applicant shall undertake an evaluation of the habitat value of the shrub swamps in the colliery holding and the potential effects of subsidence on hydrology and habitat, to the satisfaction of the National Parks and Wildlife Service.

(b) The Applicant shall undertake further flora surveys over the colliery holding as may be required from time to time in conjunction with the monitoring program.

(c) The Applicant shall undertake further archaeological investigation of:

(i) Carne Creek and its clifflines,

(ii) Site 2 detailed recording of artefacts,

(iii) site 7 excavation, and,

provide a report on consultation with the local Aboriginal Land Council on site management.

(d) The Applicant shall undertake further fauna surveys over the colliery holding prior to longwall mining of areas where sensitive habitats are present, as required by the National Parks and Wildlife Service, in consultation with the Department of Mineral Resources.

6. Construction Stage

(a) The Applicant shall not carry out construction activities on proclaimed public holidays;

(b) The Applicant shall limit construction stage disturbance to the minimum area and install temporary fences, as required by the Council.

(c) The Applicant shall implement dust suppression and erosion control measures to the satisfaction of the Greater Lithgow City Council ("the Council").

7. Coal Transportation

(a) The Applicant shall transport all coal to Mt Piper Power Station by overland conveyor after 1 January 1994.

(b) The Applicant may transport up to 50,000 tpa of coal to local domestic market customers by road haulage;

(c) Notwithstanding (a) and (b), the Applicant may haul 300,000 tonnes of pre-contract coal to Mt Piper Power Station via public roads. Such haulage may be made between 7am and 7pm, Monday to Friday, for period ending 31 December, 1993;

(d) The Applicant shall not transport coal by road under emergency conditions without the prior consent of the Council;

(e) The Applicant shall transport all export coal by rail from Lidsdale Siding.

8. Overland Conveyor

(a) The portion of the conveyor along Duncan Street opposite the existing residences shall be constructed partly below ground level in a fully enclosed steel tube. The remainder of the conveyor shall be constructed at ground level or elevated to suit various crossing requirements for waterways and rail.

(b) The Applicant shall submit designs and specifications for the conveyor crossing of the Mudgee Road to the Roads and Traffic Authority for its approval;

(c) The Applicant shall provide to the Council details of the landscaping treatment of the overland conveyor;

(d) The Applicant shall provide to the Department of Conservation and Land Management in relation to the construction and maintenance of the conveyor details of measures to minimise soil erosion and sedimentation effects, for its advice;

(e) The Applicant shall consult with all affected landowners regarding the location and provision of stock and vehicular crossings over the overland conveyor. The Applicant shall provide such works at his own cost.

9. Roads

(a) The Applicant shall construct the intersection with the Mudgee Road and pit-top access road to the satisfaction of the Roads and Traffic Authority;

(b) The access road shall be sealed to a two lane standard prior to 1 January 1994;

(c) The Applicant shall construct the intersection and access road from the Mudgee Road to the Coal Washery site in accordance with the RTA Interim Design Guide Type 'A';

(d) The Applicant shall seal the coal washery access road for a distance of at least 20m beyond the nearest affected residence;

(e) The remaining section of the coal washery access road shall be constructed to the standard of an all weather gravel road, to the Council's requirements;

(f) The Applicant shall submit detailed plans and specifications for road works to the Council for approval prior to the commencement of works.

10. Coal Washery Reject Disposal

(a) The Applicant shall meet the requirements of the Department of Mineral Resources and provide to the Council the results of a geotechnical investigation and an engineering specification for each emplacement area;

(b) The Applicant shall within six months of this consent investigate the possibility of combining all rejects in one emplacement and report to the Department of Mineral Resources and to advise the Council.

11. Mining Subsidence

The Applicant shall meet the requirements of the Department of Mineral Resources and adopt such reasonable practices and techniques as will minimise disturbance to any surface features within the identified protection zones.

12. Water Management

The Applicant shall submit to the EPA, prior to commencement of construction a water management plan for each site of the development showing all proposed drainage diversion channels, collection pits and sedimentation dams to be constructed. Such plan shall incorporate the principles of Total Catchment Management.

13. Effluent Disposal

(a) The Applicant shall provide to the EPA upon its request details of the design and capacity of the method of effluent treatment and disposal including data on quality of effluent for disposal.

(b) The Applicant shall obtain the approval of the EPA, the Council and the Department of Health for the effluent disposal method selected for both pit top and coal washery.

14. Potable Water

The Applicant shall provide a supply of potable water to the pit top site and washery site, at its own expense, to the satisfaction of Council.

16. Flooding

(a) The Applicant shall obtain the consent of the Department of Conservation and Land Management prior to the destruction of any trees (including sapling, shrubs or scrub) along the bank or within 20m of the bank of the Coxs River;

(b) The Applicant shall undertake an appraisal of the impact of the overland conveyor on the incidence and severity of flooding in the vicinity of Duncan Street, Lidsdale. The results of such an assessment are to be submitted to the Council and the Department of Water Resources, prior to the commencement of construction or such other period as the Council may determine.

17. Landscaping

The Applicant shall submit for the Council's approval at least six months prior to commencement of construction or within such further period as the Council may permit:

(a) a detailed landscaping plan illustrating the establishment of trees and shrubs both prior to and during the construction stage, showing existing stands of vegetation and the location of plantings around the surface facilities and the rejects emplacement area;

This plan shall incorporate appropriate erosion control and sedimentation control practices for any earthworks associated with the development;

(b) proposals for the visual appearance of the structural components of the development including paint colours and specifications. Buildings and structures shall be designed so as to present a neat and orderly appearance and to blend as far as possible within the surrounding landscape;

(c) A comprehensive plan of landscape management, which shall include detailed plans, programs to be undertaken, maintenance of all landscape works and plantings and maintenance of building materials and cladding.

18. Parking Facilities

The Applicant shall meet the requirements of the Council to ensure the adequate provision of unloading, loading, manoeuvring and parking of vehicles within the development.

19. Site Rehabilitation

(a) The Applicant shall prepare, within six months of this consent, a comprehensive plan for the staged rehabilitation of all lands disturbed by the development within the colliery holding and the coal washery and reject emplacement. The plan shall be submitted to the Council for its information and to the Department of Mineral Resources for its approval. The plan shall specify contour earthworks, tree screen plantings, grassed areas, means to control leachate from reject emplacements, soil erosion controls, final contours and proposals for maintenance of rehabilitation areas and management of waste disposal, including long term drainage both during and after the cessation of disposal operations, until such time as considered necessary by the Department of Mineral Resources.

(b) The Applicant shall consult and comply with the requirements of the Department of Conservation and Land Management in respect of the preparation and implementation of rehabilitation plans, revegetation programs, soil erosion controls, and associated works.

(c) The Applicant shall consult with the NSW Agriculture and the Department of Conservation and Land Management concerning selection of appropriate vegetation species, seedling establishment techniques, soil testing and fertilizer selection and application.

20. Lidsdale Road Siding

The Applicant shall undertake a noise impact assessment of the Lidsdale rail siding, according to the requirements of the EPA and implement necessary measures for attenuation of noise.

21. Fire Protection

The Applicant shall:

(a) consult and comply with the reasonable requirements of the Council concerning means to prevent and fight bushfires, including the provision of adequate fire tracks within the colliery holding and the provision of appropriate firefighting facilities and staff;

(b) formulate a program of hazard reduction measures and a detailed contingency plan for coping with bushfires each year, in liaison with the Forestry Commission the Department of Bush Fire Services, the National Parks and Wildlife Service and the Council.

22. Environmental Monitoring

The Applicant shall ensure that the following requirements are met to the satisfaction of the EPA, the Department of Water Resources, Department of Mineral Resources, and the Director of Planning ("the Director"):

(a) Monitoring of air quality (particulate dust and dust concentration), water quality (effluent discharged off site), noise levels (night-time noise emissions at nearest residences), at points to be selected at the mine site and at the coal washery site and agreed upon by the Applicant and the EPA;

(b) Monitoring of water quality and reporting to the reasonable requirements of the EPA, and the Department of Water Resources;

(c) Monitoring of subsidence induced by longwall mining to the requirements of the Department of Mineral Resources and including monitoring of flora of drainage sensitive ecosystems and hydrology.

23. The Applicant shall bear the costs associated with the establishment and operation of all monitoring programs referred to in these conditions, the analysis of data, recording results, and providing information required to all relevant agencies.

24. Annual Report

(a) Within six (6) months of the commencement of the construction of the proposed development, the Applicant shall ascertain the requirements of the Director in relation to an annual report to be submitted to the Director, the EPA the Council and the Department of Mineral Resources in respect of the performance of the

development. Each report shall be in respect of the calendar year ending 31st December and each report shall be submitted by 31st March of the following year. The first report is to be submitted in 1995. The Applicant shall agree to the Council making the reports publicly available.

(b) The annual report shall provide the following information:

i) the performance of the development in relation to the EIS, the statutory requirements of public authorities, in particular the EPA, and in relation to the conditions of development consent;

ii) the implementation and effectiveness of the environmental controls and conditions relating to the development;

iii) results of environmental monitoring in respect of air, water and noise pollution, groundwater variations in the colliery holding, how these results compare with the predictions in the EIS And whether the results indicate compliance with the conditions of consent and information related to discharges of water (other than uncontaminated stormwater) from the mine site;

iv) mining operations undertaken during the preceding 12 months;

v) workforce characteristics of the development;

vi) modifications to mining operations, if any, to mitigate any adverse environmental impacts;

vii) socio-economic impact of the development other than covered in (v) above;

viii) results of subsidence monitoring and subsidence impacts upon the natural environment, and measures implemented to rectify any damage caused.

25. Environmental Officer

The Applicant shall employ or contract the services of an Environmental Officer whose qualifications are acceptable to the Department of Mineral Resources for the proposed development to be responsible for ensuring that all environmental safeguards proposed for the development and as required by this consent and other statutory approvals are enforced and monitored from the commencement of construction.

26. Infrastructure Contribution

The Applicant shall negotiate and pay to the Council a contribution, pursuant to Section 94 of the Environmental Planning and Assessment Act, for Community Services/Facilities for Council to utilise in the upgrading of facilities provided

and to be provided in the City of Greater Lithgow, as a result of the development.

The first payment is due in 1995 on the anniversary of this consent and the remaining three other payments on the successive anniversaries of the Consent.

The basis of the contribution shall be a contribution per employee based on the number of employees on the Company payroll at the anniversary of this Consent in 1995.

The amount of the contribution shall be finalized by 30 September 1992. Condition 29 shall apply for dispute resolution should the parties fail to reach agreement.

27. Rental Housing

The Applicant shall liaise with the Council to monitor local housing demand during the construction stage of the project and in the event of a shortage of rental accommodation liaise with the Council, with a view to provide additional temporary accommodation facilities for use by its construction workforce.

28. Approvals to Council

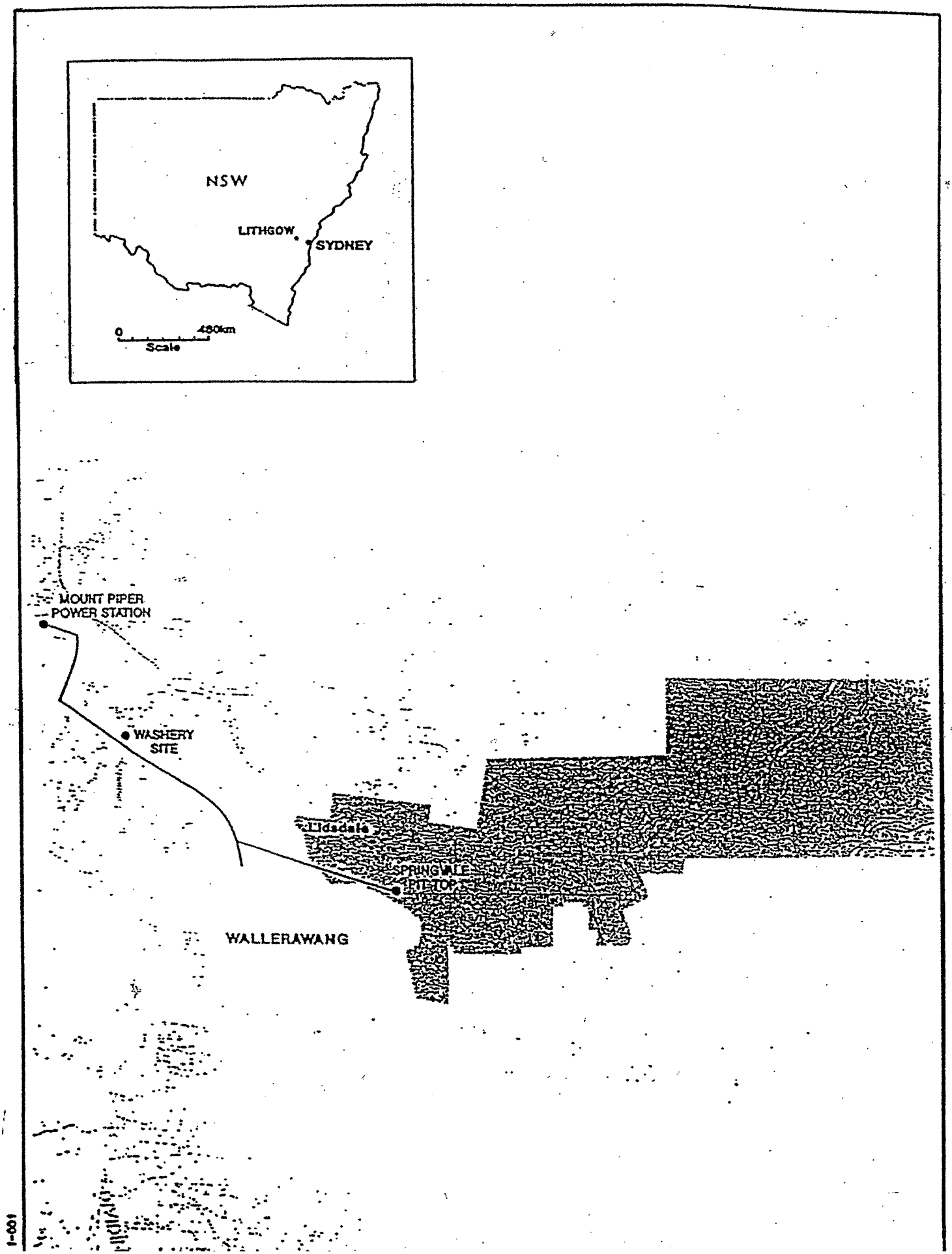
The Applicant shall forward to the Council copies of all environmental and planning approvals of authorities related to the development.

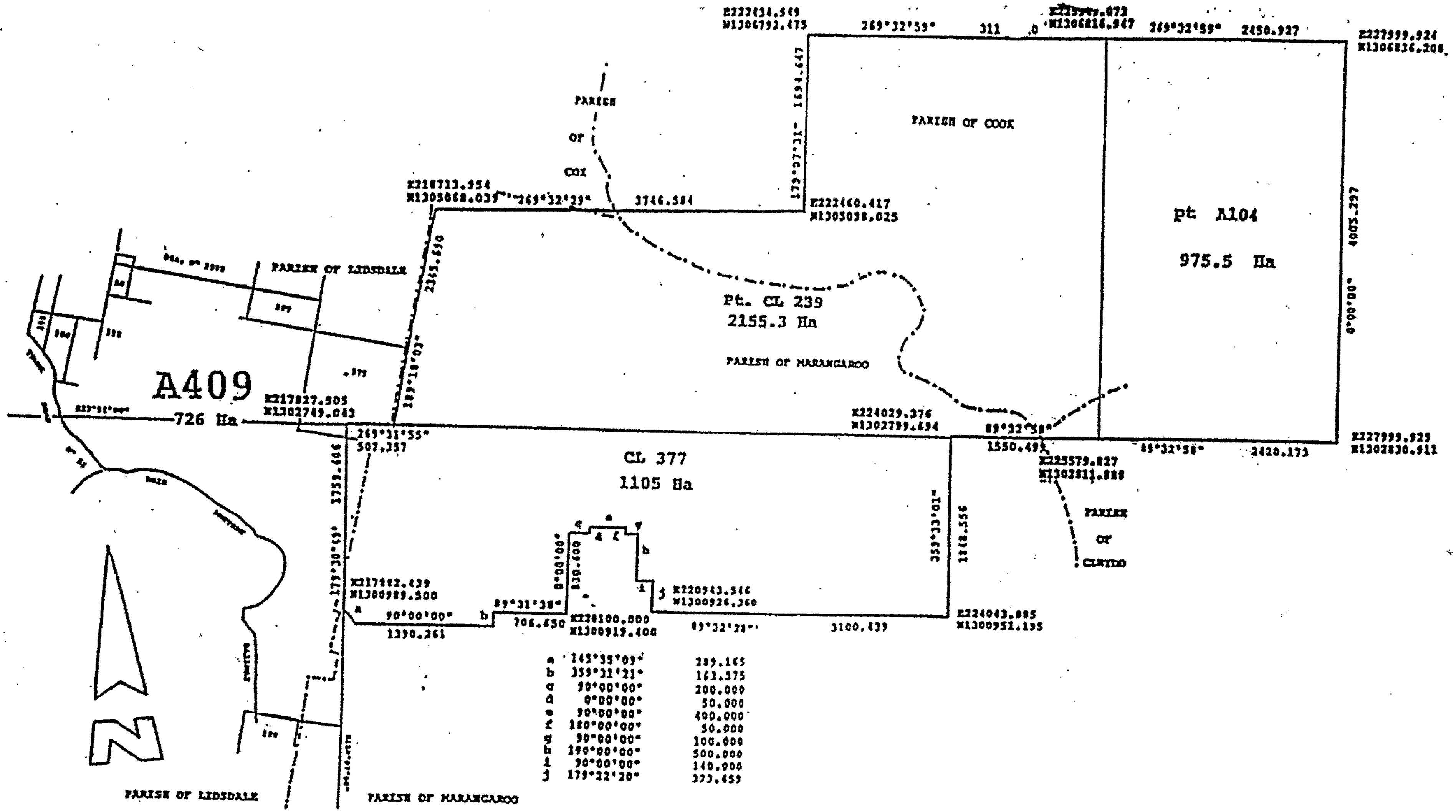
29. Dispute Resolution

Any dispute arising between any of the parties in respect of the above conditions shall be referred to the Minister for Planning for resolution.

NOTE: This approval does not relieve the Applicant of the obligation to obtain any other approval under the Local Government Act, 1919, as amended, the ordinances made thereunder (including approval of building plans), or any other Act.

ATTACHMENT 1





AUTHORISATION N°409

[illegible]

Land District - Lithgow; City - Greater Lithgow
County - Cook; Parishs - Lidsdale and Marangaroo

CLUTHA COAL PTY LIMITED

SPRINGVALE COAL
LEASE AREA

Drawn: P.COLLINS	Revised: 28-4-1992	Drwg No:
A.C.N. 002 594 430	Approved:	SP-55

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

NOTICE OF AMENDMENT OF A DEVELOPMENT CONSENT GRANTED UNDER SECTION 101 OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 PURSUANT TO SECTION 102 OF THE ACT

I, the Minister for Planning, pursuant to Section 102 of the Environmental Planning and Assessment Act, 1979, being satisfied that the development to which the development consent as modified will relate is substantially the same development, and there being no prejudice to objectors to the original development application, modify the consent referred to in Schedule 1 as set out in Schedule 2.

Robert Webster

ROBERT WEBSTER
Minister for Planning

Sydney 29/6/ 1993

S91/06569/Z01

SCHEDULE 1

Consent granted by the Minister for Planning on 27 July 1992, in respect of development application made by the Applicant, Clutha Coal Pty Limited, to Greater Lithgow City Council for the construction and operation of an underground coal mine, overland conveyor and coal preparation facilities, known as Springvale Coal Mine.

SCHEDULE 2

Attachment "A" the land description in Appendix 1.

Condition 1 add at the end of line 7 :-

"with pit top modifications shown in drawing No. SK 5300/G/91 dated 29/10/92, shaft site as modified shown in drawing No. CL-5100-G-03 dated 10/11/92 and modified mine layout as shown in drawing SP18, dated 1/12/92".

Condition 30
Western Main Colliery

a) The Applicant shall undertake all necessary water pollution control measures, to the satisfaction of the EPA, to minimize contaminated water discharge from the site in wet weather conditions.

b) The Applicant shall carry out all practical measures to minimize water pollution and siltation from the Western Main Colliery Site used for the relocated overland conveyor route, according to the requirements of the Department of Conservation and Land Management and the EPA.

Condition 31
Shafts Site

The Applicant shall meet the requirements of Pacific Power in respect of the use of its Ash Dam Access Road for the period of construction and for maintenance of the proposed ventilation shafts.

Condition 32
Revised Pit Top

The Applicant shall carry out water pollution and siltation control measures according to the revised pit top arrangements, to the satisfaction of the EPA and the Department of Conservation and Land Management.

Condition 33
Fish River Water Supply

The Applicant shall forward copies of plans of the overland conveyor for review in respect of the Fish River Pipeline and concurrence if required by the Fish River Water Supply Operations Manager, prior to commencement of construction.

Condition 34
Erosion and Sediment Control Plan

The Applicant shall submit an erosion and sediment control plan (including temporary, operational phase and permanent works) for each phase of the operation prior to commencement of any earthworks to the Department of Conservation and Land Management for concurrence.

Condition 35
Additional Archaeological Survey

The Applicant shall undertake an archaeological survey of the modified conveyor route and the ventilation shaft site, prior to commencement of construction and report results of surveys to the National Parks and Wildlife Service.

ATTACHMENT A

Property Descriptions

Vent Shaft Site

- Portion 52, Lot 1 - DP 383126, Portion 175, 177 and 178, Portion 181, Lot 2 - DP 551636, Portion 182, Portion 352, Portion 353, Lot 1 - DP 525472, Lot 2 - DP 525472, Portion 452 - Pt Newnes State Forest - No 748 (No. 4 Ext.), Parish of Lidsdale, County of Cook.

Conveyor Route

- Portion 501 DP 825541, Portion 13 Lot 13 - DP 751651, Portion 357, Parish of Lidsdale, County of Cook, Portion 18, Lot 14 - DP 804929, Lot 191 - DP 629212, Lot 13 - DP 804929, Lot 2 - DP 702619, Lot 6 - DP 804929, Parish of Cox, County of Cook.

Western Main Washery and Associated Facilities

- Lot 15 DP 804929, Lot 9 - DP 802929, Parish of Cox, County of Cook

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

NOTICE OF AMENDMENT OF A DEVELOPMENT CONSENT GRANTED UNDER SECTION 101 OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 PURSUANT TO SECTION 102 OF THE ACT

I, the Minister for Planning, pursuant to Section 102 of the Environmental Planning and Assessment Act, 1979, being satisfied that the development to which the development consent as modified will relate is substantially the same development, and there being no prejudice to objectors to the original development application, modify the consent referred to in Schedule 1 as set out in Schedule 2.

ROBERT WEBSTER
Minister for Planning

Sydney, 11/4/ 1994 S91/06569/Z01

SCHEDULE 1

Consent granted by the Minister for Planning on 27 July 1992, in respect of development application made by the Applicant, Clutha Coal Pty Limited, to Greater Lithgow City Council for the construction and operation of an underground coal mine, overland conveyor and coal preparation facilities, known as Springvale Coal Mine.

SCHEDULE 2

Attachment "A" (the land description) replace with Attachment 1 Schedule of Land and Tenements.

ATTACHMENT 1

SCHEDULE OF LAND AND TENEMENTS - SPRINGVALE COAL PROJECT

A. SCHEDULE OF LAND

LAND	TITLE
1. SPRINGVALE PIT TOP AREA	
Lot 125, Deposited Plan 751651 (formerly known as Portion 125, Parish of Lidsdale, County of Cook)	F.I. 125/751651
Portion 54, Parish of Lidsdale	Book 3856, No. 465
Lot 561, Deposited Plan 827969	F.I. 561/827969
2. OVERLAND COAL CONVEYOR	
Lot 561, Deposited Plan 827969	F.I. 561/827969
Reserved Road	
Lot 1, Deposited Plan 717025	F.I. 1/717025
Portion 228, Parish of Lidsdale	Book 3346 No. 80
Lot 183, Deposited Plan 751651 (formerly known as Portion 183, Parish of Lidsdale, County of Cook)	F.I. 183/751651
Lot 15, Deposited Plan 262515	F.I. 15/262515
Skelly Road	
Lot 2, Deposited Plan 2383126	F.I. 2/383126
Lot 2, Deposited Plan 575140	Book 3256 No. 753
Lot 1, Deposited Plan 834231	F.I. 1/834231
Lot 31, Deposited Plan 827807	F.I. 31/827807
Lot 1, Deposited Plan 834230	F.I. 1/834230
Lot 2, Deposited Plan 834230	F.I. 2/834230
Lot 3, Deposited Plan 834230	F.I. 3/834230
Lot 4, Deposited Plan 834230	F.I. 4/834230
Lot 5, Deposited Plan 834230	F.I. 5/834230
Lot 6, Deposited Plan 834230	F.I. 6/834230
Lot 7, Deposited Plan 834230	F.I. 7/834230

Lot 8, Deposited Plan 834230	F.I. 8/834230
Lot 9, Deposited Plan 834230	F.I. 9/834230
Portion 63, Parish of Lidsdale	Book 3086 No. 675
PML 11 (Railway) (forming part of Consolidated Coal Lease 770)	
Reserved Road	
Lot 16, Deposited Plan 751651 (formerly known as Portion 16, Parish of Lidsdale, County of Cook)	F.I. 16/751651
Duncan Street	No stratum title will be created for the second crossing of Duncan Street
Lot 8, Deposited Plan 252472	Auto Consol 13329-100
Lot 1, Deposited Plan 252472	Auto Consol 13329-100
Reserved Road	
Lot 2, Deposited Plan 567915	F.I. 2/567915
Reserved Road	
Lot 174, Deposited Plan 751651 (formerly known as Portion 174, Parish of Lidsdale, County of Cook)	F.I. 174/751651
Reserved Road	
Reserved Road	
Lot 385, Deposited Plan 751651 (formerly known as Portion 385, Parish of Lidsdale, County of Cook)	F.I. 385/751651
Lot 375, Deposited Plan 751651 (formerly known as Portion 375, Parish of Lidsdale, County of Cook)	F.I. 375/751651
Reserved Road	
Reserved Road	
Reserved Road	
Lot 502, Deposited Plan 825541	F.I. 502/825541
Lot 371, Deposited Plan 751651 (formerly known as Portion 371, Parish of Lidsdale, County of Cook)	F.I. 371/751651
Reserved Road	

Lot 501, Deposited Plan 825541	F.I. 501/825541
Lot 357, Deposited Plan 751651 (formerly known as Portion 357, Parish of Lisdsdale, County of Cook)	F.I. 357/751651
Lot 13, Deposited Plan 751651 (formerly known as Portion 13, Parish of Lidsdale, County of Cook)	F.I. 13/751651
Reserved Road	
Lot 15, Deposited Plan 804929	Book 3401 No. 315
Lot 9, Deposited Plan 804929	Book 3401 No. 315
Lot 2, Deposited Plan 702619	Book 3604 No. 382
Lot 6, Deposited Plan 804929	Book 3840 No., 223
Lot 13, Deposited Plan 804929	Book 3840 No. 223
Lot 191, Deposited Plan 629212	Book 3604 No. 381
Lot 1, Deposited Plan 803655	F.I. 1/803655
Portion 18, Parish of Cox	Book 3432 No. 26

3. ACCESS ROAD AND VENTILATION SHAFT

Lot 15, Deposited Plan 262515 Lot 1, Deposited Plan 585140	F.I. 15/2625157 Book 3256 No. 753
Lot 182, Deposited Plan 751651 (formerly known as Portion 182, Parish of Lidsdale, County of Cook)	F.I. 182/751651
Lot 2, Deposited Plan 551636	F.I. 2/551636
Lot 1, Deposited Plan 814854	Resumed Road (no current title)
Lot 2, Deposited Plan 525472	F.I. 2/525472
Lot 352, Deposited Plan 751651 (formerly known as Portion 352, Parish of Lidsdale, County of Cook)	F.I. 352/751651
Lot 178, Deposited Plan 751651 (formerly known as Portion 178, Parish of Lidsdale, County of Cook)	Auto Consol 5552-222
Lot 175, Deposited Plan 751651 (formerly known as Portion 175, Parish of Lidsdale, County of Cook)	Auto Consol 5552-222
Lot 177, Deposited Plan 751651	Vol. 1798 Fol. 147
Portion 425, Parish of Lidsdale	Resumed - see NSW Govt. Gazette 30 January 1976
Part Newnes State Forest No. 748	

B. MINING TENEMENTS

(a-c) Clutha Springvale Limited, Samsung Development (Aust) Pty Ltd

(a) SPRINGVALE COAL MINE

1. Exploration Licence No. 4587 (Mining Act 1992)
2. Mining Lease No. 1326 (Mining Act 1992)
3. Coal Lease No. 377 (Coal Mining Act 1973)
4. Mining Lease No. 1303 (Mining Act 1992)

(b) OVERLAND COAL CONVEYOR

5. Mining Purposes Lease No. 314 (Mining Act 1973)
6. Mining Lease Application No. 9 (Orange) (Mining Act 1992)

(c) ACCESS ROAD AND VENTILATION SHAFT

7. Mining Lease No. 1323 (Mining Act 1992)

(d) WESTERN MAIN COLLIERY (Western Main Colliery Pty Limited)

8. Consolidated Coal Lease No. 733 (Coal Mining Act 1973)

Council of the City of Lithgow

180 Mort Street, Lithgow, NSW. 2790. Telephone: (02) 6352 1077

Your Reference:
Our Reference: 17607:100478 GJP:CFC
Contact: Environmental Services

14 September, 1998

Springvale Coal Pty Ltd
PO Box 198
WALLERAWANG NSW 2845

Dear Sir/Madam

DEVELOPMENT CONSENT NO. 110/98, LOT 501 DP 825541, CASTLEREAGH HIGHWAY, LIDSDALE

Please find enclosed a copy of Development Consent No. 110/98 issued in respect of the abovementioned development.

You are advised that the application has been approved subject to the attached conditions.

For any further information on this matter, please contact Mr Greg Prince in Council's Environmental and Planning Services Division.

Yours faithfully

Mr Andrew Muir
PLANNING MANAGER

for

Mr Stuart McPherson
GENERAL MANAGER

enc

Council of the City of Lithgow

180 Mort Street, Lithgow, NSW, 2790. Telephone: (02) 6352 1077

Your Reference:
Our Reference: 17607:100478 GJP:CFC
Contact: Environmental Services

ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979
NOTICE TO APPLICANT OF DETERMINATION OF A DEVELOPMENT APPLICATION

To Springvale Coal Pty Ltd of PO Box 198, Wallerawang, being the applicant in respect of Development Application No. 110/98.

Pursuant to Section 92 of the Act, notice is hereby given of the determination by the consent authority of the Development Application No. 110/98 relating to the land described as follows: Lot 501 DP 825541, Castlereagh Highway, Lidsdale, Parish Lidsdale. Extension of existing open cut mining operations.

The Development Application has been determined by GRANTING OF CONSENT SUBJECT TO THE CONDITIONS SPECIFIED IN THIS NOTICE.

The conditions of consent are set out as follows: SEE ATTACHED SCHEDULE.

The reasons for the imposition of the conditions are set out as overleaf.

Endorsement Date of Consent 14 September 1998

NOTES:

1. Subject to the provisions of Section 93 of the Act, consent shall become effective from the date of endorsement of the consent.
2. Subject to the provisions of Section 99 of the Act, any consent granted shall lapse is such development is not commenced within five (5) years from the date of endorsement.
3. Subject to the provisions of Section 97 of the Act, any applicant who is dissatisfied with the determination by the consent authority may appeal to the Land and Environment Court. The right of appeal may be exercised within twelve (12) months from the date of receipt of the consent notice.

DATED FOURTEENTH DAY OF SEPTEMBER 1998

MR STUART McPHERSON
GENERAL MANAGER

PER: AM

MR ANDREW MUIR
PLANNING MANAGER

IMPORTANT:

(1) It is to be clearly understood that the above consent is **NOT** an approval to carry out any structural work. A formal Building Application must be submitted to Council and be approved before any structural work is carried out to implement the above consent. Also the applicant is not relieved of any obligation to obtain other approval required under any other Act.

att

SCHEDULE OF CONDITIONS:

1 That the development is carried out in accordance with the application, Review of Environmental Factors and subsequent documents submitted with the application.

2 That, to manage concern raised regarding the ground water regime, a ground water assessment or impact, indicating quantities (based upon average rainfall patterns) and quality, with specific consideration of the longer term impacts upon the rehabilitated land (particularly in reference to ground stability and leachate) is provided, Department of Mineral Resources, prior to commencement of operations.

3 That the proponent shall obtain a new pollution control approval from the Environment Protection Authority, with respect to the proposed development.

4 That sediment and erosion control methods stipulated by the Department of Land and Water Conservation are effected to the Department's standards.

5 That the applicant provides a detailed rehabilitation plan to Council for approval prior to the commencement of works. All rehabilitation works are to be conducted in accordance with the approved plan unless otherwise agreed to by Council.

Having regard to the provisions of Section 90 of the Environmental Planning and Assessment Act 1979.

Condition	Section 90(1)
1	(i) any environmental planning instrument; (Section 90(1)(a)(i))
1,2,3,4,5	(b) the impact of that development on the environment (whether or not the subject of an environmental impact statement) and, where harm to the environment is likely to be caused, any means that may be employed to protect the environment or to mitigate that harm. (Section 90(1)(b))
1	(c) the effect of that development on the landscape or scenic quality of the locality. (Section 90(1)(c))
1,5	(m) whether adequate provision has been made for the landscaping of the land to which that development application relates and whether any trees or other vegetation on the land should be preserved. (Section 90(1)(m))
1,2,3,4	(p) any submission made under section 87. (Section 90(1)(p))
1	(q) the circumstances of the case. (Section 90(1)(q))
1	(r) the public interest; and (Section 90(1)(r))

APPENDIX 2

Authority Correspondence

COUNCIL OF THE CITY OF LITHGOW

180 Mort Street, Lithgow, NSW, 2790. Telephone: (02) 6352 1077

NSW – First Learning City

Your Reference:
Our Reference: 21300:102438 MF
Contact: Environmental Services

25 June, 2002

RECEIVED
27 JUN 2002
BY:.....

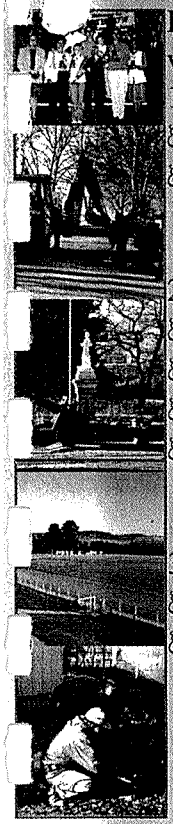
Umwelt (Australia) Pty Limited
PO Box 838
TORONTO NSW 2283

Dear Sir/Madam

DEVELOPMENT APPLICATION FOR PROPOSED VENTILATION SHAFT FACILITY – SPRINGVALE UNDERGROUND COAL MINE.

Thankyou for your letter dated 14th June 2002 regarding the above-mentioned matter. Council would concur that it will be the determining authority for any development approvals required under the Environmental Planning and Assessment Act. It is advisable that you contact all the relevant government authorities prior to the lodgement of the development application. Furthermore, discussions should be made with the Environment Protection Authority and the Department of Land and Water Conservation to see if the application will be deemed as Integrated and will also require their approval.

Discussions with the Sydney Catchment Authority indicate that they do not require to issue their concurrence in relation to this development. However, they did indicate that they would like to receive a copy of the proposal to review. If you have any further questions in relation to the Sydney Catchment Authority and any issues they may prefer to look at, please contact Malcolm Hughes of the SCA on 0247 252139.



Issues that Council would like to see included within any Statement of Environmental Effects would include, but not limited to;

1. Introduction
   - Summarise the proposed development
   - Detail history of the mine including all current development approvals and licenses issued by other government authorities

2. Background of the proposal
   - The need for the development
   - Planning considerations, including any discussions or documentation with Planning NSW
   - The consequences of not proceeding with the development
   - Considerations of any possible feasible alternatives and reasons for selecting the preferred alternative

3. Detail of existing environment
   - Terrain, soils and hydrology
   - Visual amenity – including location of adjacent land tenures, residences, etc

Address Correspondence to: General Manager, PO Box 19, Lithgow, 2790
Fax No.: (02) 6351 4259 • Email: glcc@lithgow.nsw.gov.au
Website: www.lithgow.com

- ξ Conservation or archaeological value
- ξ Specific land use constraints
- ξ Existing infrastructure and site improvements

4. Detailed description of the proposal
- ξ Proposed length of time for construction works
- ξ Detail proposed water management for the entire site. Also include potential sediment movement and erosion controls dealing with the interception of ground waters and containment of runoff
- ξ Proposals for vegetation establishment and landscaping

5. Potential environmental impact/interactions
- ξ Water, air, soil pollution
- ξ Noise impacts
- ξ Visual impacts
- ξ Transportation of materials
- ξ Socio-economic effects
- ξ Flora and fauna
- ξ Hazard and risk to public safety

6. Measures to Mitigate likely Adverse Environmental Impact
- ξ Description of proposed environmental impact prevent and mitigation measures and safeguards during and after construction
- ξ Assessment of effectiveness of the measures proposed. Demonstrate how existing measures have worked and operated with current mining operations
- ξ Proposed on-going monitoring, including reporting procedures and identifying environmental quality standards achieved

7. Results and Conclusions
- ξ Establish relevant approval required for various aspects of the development, ie. Integrated development approvals from other relevant authorities

Please do not hesitate to contact Mr M Fowler on 63 549954 in Council's Environmental and Planning Services Division should you require any additional information in relation to this matter.

Yours faithfully

Mr Ian Rufus
PLANNING & DEVELOPMENT MANAGER
for
Mr Iain Stewart
GENERAL MANAGER

cc Springvale Colliery

NSW
NATIONAL
PARKS AND
WILDLIFE
SERVICE
ABN 30 841 387 271

Barbara Crossley
Director
Umwelt (Australia) Pty Limited
PO Box 838
TORONTO NSW 2283

RECEIVED
- 5 JUL 2002
BY:.....

Our Ref.: SYZ 96/46

Dear Barbara,

RE: PROPOSED VENTILATION SHAFT FACILITY, SPRINGVALE UNDERGROUND COAL MINE

Thank you for your letter dated 27 June 2002 in which you consulted with the NSW National Parks and Wildlife Service (NPWS) on the above proposal.

The NPWS has a statutory responsibility for the protection and care of native flora, native fauna and Aboriginal sites, and for the management of NPWS estate. Accordingly the NPWS has an interest in ensuring that potential impacts to these attributes are appropriately assessed.

To assist you in this regard, it is recommended that the matters referred to in the attached guidelines titled "General Guidelines for Impact Assessment" be addressed in your assessment where appropriate. These guidelines also provide information on any approvals that may be relevant under the *National Parks and Wildlife Act 1974* (NPWA) and a summary of the NPWS' databases which may be of assistance to you in your assessment.

It is requested that any EIS forwarded to the NPWS for comment state the reasons for the referral. The NPWS typically comments on EIS's where there is a statutory concurrence or approval role for the NPWS, or where there is likely to be a threat to NPWS reserves or regionally significant conservation values. The attached guidelines may be used to assist in determining whether the EIS requires referral to the NPWS for comment, concurrence or an approval.

Please contact, Megan Phillips, A/Conservation Planning Officer on (02) 9585 6007 if you have any questions concerning this matter.

Yours sincerely,

Lou Ewins 2/7/02

Lou Ewins
Manager, Conservation Planning Unit
Central Conservation Programs and Planning Division

Conservation Programs
& Planning Division
Central Directorate
Level 6
43 Bridge Street
P.O. Box 1967
Hurstville NSW
2220 Australia
Tel: (02) 9585 6678
Fax: (02) 9585 6442
www.npws.nsw.gov.au

SYDNEY CATCHMENT AUTHORITY

Level 2, 311 High Street Penrith NSW 2750
PO Box 323, Penrith Business Centre, NSW 2751
Phone: 4725 2100 Fax: 4732 3666
Website: www.sca.nsw.gov.au ABN: 36 682 945 185

2 July 2002

Our Reference: 2002/02197

Ms Barbara Crossley
Umwelt (Australia) Pty Ltd
PO Box 838
TORONTO NSW 2283

Dear Ms Crossley

Subject: Springvale Underground Coal Mine
Proposed Conveyor and Ventilation Shaft Facility

I refer to your letters dated 27 June 2002 advising that Umwelt will be preparing, on behalf of Springvale Coal, Statements of Environmental Effects (SEE) for the proposed conveyor and the proposed ventilation shaft facility. Thank you for the opportunity to input at this stage of the process.

As would be aware, these developments are located on land within the hydrological catchment of Sydney's water supply. Consequently the provisions of the *Sydney Water Catchment Management Act 1998* and *State Environmental Planning Policy 58 - Protecting Sydney's Water Supply* (SEPP 58) apply to these lands.

Lithgow City Council is required to consider the matters listed under clause 10 of SEPP 58 when considering development consent. To assist the Council, each SEE should provide an explanation of how the proposed activities will comply with the three matters set out in the clause.

In confirmation of the information provided by Mark Fowler of Lithgow City Council, the concurrence of the Authority is not required for these development applications.

The SEE for the ventilation shaft facility should include, or refer to the preparation of, an appropriate soil and water management plan. I note that the proposed works include a de-watering bore and surface detention basin with a discharge facility. It will be important for there to be sufficient detail regarding the operation of these facilities in order to judge whether the resulting discharge is likely to have a neutral or beneficial effect on water quality.

A soil and water management plan would be broader in scope and more comprehensive than an erosion and sedimentation control plan. Due to the smaller scope of the proposed conveyor, an erosion and sedimentation control plan would be sufficient for that project.

The Authority maintains a 24 hour Incident Management Hotline on phone 02 9751 1988 and each SEE should specify immediate reporting if any spills and incidents occur. Incidents

should also be reported during business hours to Terry Keogh at the Katoomba office on 02 4782 9132.

Each SEE should document how the various safeguards and plans are to be explained to all personnel and how they will be appropriately implemented.

Please forward two copies of each draft SEE to me for comment. If you have any further questions please contact Neil Abraham on 4725 2519.

Yours faithfully

Malcolm Hughes
Manager Development Control

12 July 2002

MINERAL RESOURCES NEW SOUTH WALES

NSW DEPARTMENT OF MINERAL RESOURCES
State Government Offices
Level 3, Block F, 84 Crown Street, Wollongong 2500
(P.O. Box 674), Wollongong, NSW 2520, Australia
Phone (02) 4227 1699 · Fax (02) 4226 3851
www.minerals.nsw.gov.au
ABN: 68 040 288 347

Barbara Crossley
Umwelt (Australia) Pty Limited
PO Box 838
TORONTO NSW 2283

RECEIVED
17 JUL 2002
BY:.....

File N° C97/0339

Dear Barbara

Re: Proposed ventilation shaft at Springvale Coal Mine

In reference to you letter dated 27 June 2002, concerning key issues to be considered in a Statement of Environmental Effects for the proposed Ventilation Shaft, the following advice is provided as requested.

Environmental Issues:

- The appropriate disposal and or utilisation of spoil material (waste rock) from the excavation of the shaft. This material could prove to be suitable to surface access roads and fire trails in the area, subject to approval from Forestry.
- Outline site access issues for men and materials during both the construction and operating stages. It is noted that the facility includes a borehole to deliver concrete and ballast to the underground mine hence traffic impacts must be identified and considered.
- Outline the nature of all proposed water control structures that will be utilised during both the construction and operating stages, along with water usage and water discharge requirements.
- Outline potential noise impacts during both the construction and operating stages, with particular consideration to the shaft being used as an up-cast shaft.
- Detail electric power requirements with appropriate consideration for the installation of power lines, transformers etc.

Occupational Health and Safety Issues:

- Clearly describe the shaft sinking method to be utilised, including both operational and maintenance requirements, especially with respect to men working in or around the shaft excavation.
- All works must be undertaken in compliance with Part 13 of the Coal Mines (underground mine) Regulations 1999.
- Ongoing liaison with the District Inspector of Coal Mines before shaft sinking works commence is essential to ensure that construction and operational aspects are fully evaluated.

I trust that this information is of assistance and should you require any further advice please contact me on (02) 4227 1699.

Yours sincerely

Chris Harvey
Senior Environmental Officer

Your reference
Our reference

664
D.Adshead
Ph: (02) 6330-1027

STATE FORESTS

Umwelt (Australia) Pty Ltd
Attn: John Merrell
PO Box 838
Toronto NSW 2283

24th July 2002

State Forests of New South Wales

Macquarie Region
Cnr Browning & Williams Sts.
PO Box 143
Bathurst NSW 2795
Phone (02) 6331 2044
Fax (02) 6331 5528

Dear John

RE: Development Application for Proposed Ventilation Shaft Facility Springvale Underground Mine

Thank you for forwarding your request for comments on the above proposal. Please note the following:

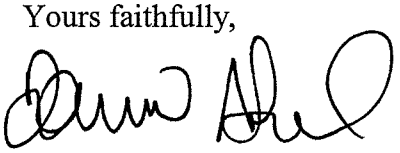
- State Forests recently carried out flora and fauna surveys in the vicinity of the proposal (Compartment 312, Newnes SF) and the threatened species shown on the attached spreadsheet were recorded. *Derwentia blakelyi* and *Persoonia hindi* were found in similar vegetation types to the study area with *Derwentia blakelyi* not restricted to 'wet heath' as stated in the previous Review of Environmental Factors (REF) (Umwelt 2002[1]). The development site and surrounds should be surveyed for threatened species, including *Derwentia blakelyi* and *Persoonia hindi*. Also to the east of the development site is a population of *Derwentia blakelyi*, which may require consideration in your Statement of Environmental Effects (SOEE). Advice may be required to determine the significance of this population as part of your review. SFNSW is happy for Umwelt to use the attached records to assist in the preparation of a SOEE. These records are provided on the understanding that each SFNSW record is credited, they are not to be forwarded on to any third party and Umwelt will reciprocate by providing your records to SFNSW.
- Existing tracks and clearings should be utilised wherever possible in the development of infrastructure and roads.

[1] Umwelt Australia Pty Ltd (April 2002) Review of Environmental Factors for Geotechnical Investigation Borehole – Newnes SF – Springvale Coal

- All road construction, upgrading and use meets the standards and requirements of *SFNSW Forest Practices Code Part Four – Forest Roads and Fire Trails* and *SFNSW Environmental Protection Licence Conditions for Non IFOA Areas*. State Forests is happy to provide copies of these documents to Umwelt and Springvale Coal prior to work starting.
- As per previous proposals, the SOEE must also detail rehabilitation plans for the site.

If you have any questions please contact Dominic Adshead at State Forests Macquarie Regional Office on 6330-1027.

Yours faithfully,



for Dean Anderson
REGIONAL MANAGER

PART 3: SURVEY RESULTS - targeted species / features only

Flora / fauna traverse

MA	State Forest name	SF no.	Cpt no.	Type of record	Target species	Observation type	Zone	Easting	Northing	Source	Surveyor(s)	First date	Last date
Bathurst	Newnes	748	312	Flora	*Persoonia hindii*	Observed	56	238561	6300908	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Persoonia hindii*	Observed	56	238528	6300907	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Persoonia hindii*	Observed	56	238542	6300924	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Derwentia blakelyi*	Observed	56	238411	6300734	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Derwentia blakelyi*	Observed	56	238392	6300714	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Derwentia blakelyi*	Observed	56	238313	6300519	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Derwentia blakelyi*	Observed	56	237460	6300328	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Derwentia blakelyi*	Observed	56	237398	6300620	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Derwentia blakelyi*	Observed	56	237512	6300286	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Derwentia blakelyi*	Observed	56	237543	6300286	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Derwentia blakelyi*	Observed	56	237781	6300215	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Derwentia blakelyi*	Observed	56	237870	6300180	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Derwentia blakelyi*	Observed	56	237832	6300197	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Derwentia blakelyi*	Observed	56	237946	6300289	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Derwentia blakelyi*	Observed	56	237990	6300349	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Persoonia hindii*	Observed	56	237384	6300588	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Persoonia hindii*	Observed	56	237353	6300488	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Persoonia hindii*	Observed	56	237361	6300416	Flora / fauna traverse	O'Halloran, Read, Manusu	19-Jun-02	19-Jun-02
Bathurst	Newnes	748	312	Flora	*Persoonia chamaepitys*	Observed	56	236479	6300767	Flora / fauna traverse	O'Halloran, Read, Manusu	20-Jun-02	20-Jun-02
Bathurst	Newnes	748	312	Flora	*Persoonia hindii*	Observed	56	237132	6300751	Flora / fauna traverse	O'Halloran, Read, Manusu	20-Jun-02	20-Jun-02
Bathurst	Newnes	748	312	Flora	*Persoonia hindii*	Observed	56	237106	6300726	Flora / fauna traverse	O'Halloran, Read, Manusu	20-Jun-02	20-Jun-02
Bathurst	Newnes	748	312	Flora	*Persoonia hindii*	Observed	56	237911	6301329	Flora / fauna traverse	O'Halloran, Read, Manusu	20-Jun-02	20-Jun-02
Bathurst	Newnes	748	312	Flora	*Persoonia hindii*	Observed	56	237639	6301329	Flora / fauna traverse	O'Halloran, Read, Manusu	20-Jun-02	20-Jun-02
Bathurst	Newnes	748	312	Flora	*Persoonia hindii*	Observed	56	237648	6301599	Flora / fauna traverse	O'Halloran, Read, Manusu	20-Jun-02	20-Jun-02

Spotlight

MA	State Forest name	SF no.	Cpt no.	Type of record	Target species	Observation type	Zone	Easting	Northing	Source	Surveyor(s)	First date	Last date
Bathurst	Newnes	748	312	Fauna	Greater Glider	Observed	56	237104	6300702	Spotlight	Read, Manusu, Egan	17-Jun-02	17-Jun-02
Bathurst	Newnes	748	312	Fauna	Greater Glider	Observed	56	238062	6299580	Spotlight	Read, Manusu	20-Jun-02	20-Jun-02

Threatened Species Pre-logging Survey 2002

Compartment 312
Newnes State Forest No 748

Macquarie Region

Planted Forests Division

Produced on: Jul 24, 2002

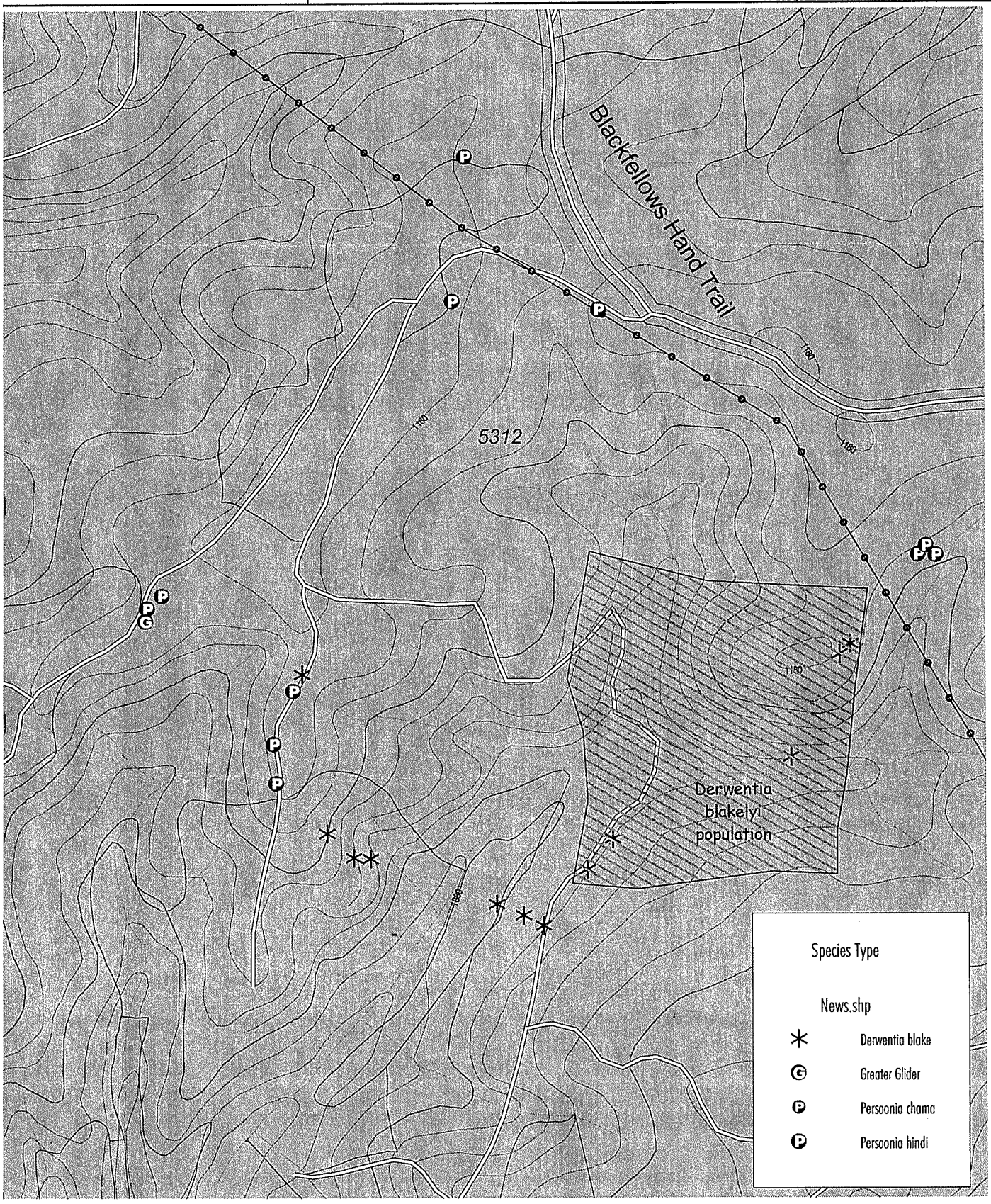
From data valid at: July 18, 2002

Plantation
Other PPA
Service Exclusion
FMZ Special
Clearfall
Environ. Exclusion
Other Exclusion
Powerline
Drainage Line
Major Contour
Minor Contour
(Contour Interval 10 M)
Sealed Road
Major Gravel Road
Minor Gravel Road
Natural Surface Road
Minor Track
Ageclass Area

GN MN 13°

STATE FORESTS

1:10000



Your Reference : /1571/EPA-Clift-270602a-ltr
Our Reference : 260803 / BTF 4562
Contact : Phil English, (02) 63327610

23 August 2002

NSW EPA

Western Regions

Ms Barbara Crossley
Director
Umwelt (Australia) Pty Ltd
Po Box 838
TORONTO NSW 2283

FAXED 23 August 02

Dear Ms Crossley

RE: Development Application for Proposed Ventilation Shaft Facility Springvale Underground Coal Mine

I refer to your letter to the Environment Protection Authority (EPA) dated 27 June 2002 requesting requirements for a Statement of Environmental Effects (SEE) for an additional ventilation and dewatering shaft for the Springvale Colliery.

Included within Attachment A are a number of generic issues that should be considered when addressing such a proposal. These issues take into consideration the Protection of the Environment Operations Act, 1997 (POEO).

I wish to advise that under the POEO any application for the proposal will be Integrated Development for the purposes of the EPA as it is expected that the works will require a variation to environment protection licence 3607. The EPA would like to advise that should the development receive consent, a separate application for Licence Variation should be submitted to the EPA for variation of environment protection licence 3607.

In relation to the physical works that are proposed for the site, the EPA recommends that in undertaking these activities, consideration should be given to ensure that a high standard of sediment and erosion controls and general site management are adopted. For further information on Best Management Practices for sediment and erosion control the EPA refers you to the *Managing Urban Stormwater Guideline – Soils and Construction* available from the Department of Housing.

In addition, the SEE should qualify and quantify the expected water discharge from the proposed discharge point. Relevant documentation that is appropriate and available includes:

(1) the prioritised Management Actions defined in the most appropriate and current version of the Catchment Management Blueprint published by the Department of Land and Water Conservation;
(2) The water quality objectives of the relevant *Water Quality and River Flow Interim Environmental Objectives*;
(3) Ecosystem protection targets as detailed in *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*;
(4) Schedule 2 – Restricted substances of the *Clean Water Regulations 1972*;

Environment Protection Authority
PO Box 1388 Bathurst NSW 2795 Australia
219 Howick Street Bathurst NSW 2795
Telephone 61 2 6332 7600
Facsimile 61 2 6332 2387
ABN 43 692 285 758
www.epa.nsw.gov.au

(5) *Atlas of Classified Waters in New South Wales* (State Pollution Control Commission, January 1980).

Finally, the EPA recently met with Springvale Colliery representatives on the 22 August 2002 in order to discuss wastewater management at the premises. Conceptually, agreement was reached between Springvale and EPA representatives for the investigation of wastewater management at the premises, with the possible addition of a Pollution Reduction Program to environment protection licence 3607.

In preparing the SEE to support the addition of a further ventilation and dewatering shaft at the premises, the EPA advises that the SEE should take into account the possible addition of a PRP to the licence to address the overall wastewater management at the mine. The investigations undertaken as part of the SEE should not, however be limited by the possible introduction of a PRP. The potential impacts from dewatering into the Middle River must be fully quantified.

I hope this information is of assistance. Should you have any further enquiries please do not hesitate to contact Phil English on (02) 63327610.

Yours sincerely

DARRYL CLIFT
Head Regional Operations Unit Central West

Inc: Attachment A – Generic Issues to be addressed within the REF

cc Michael Simes
Mine Manager
Springvale Colliery

FAXED 10.16

3rd October, 2002

LAND & WATER CONSERVATION
Contact: Matt Gray
Phone: 6351.3842
Fax: 6352.2326
mgray@dlwc.nsw.gov.au

Umwelt
P.O. Box 838,
TORONTO, NSW. 2283

Attention: John Merrill

Dear Mr Merrill,

PROPOSED VENTILATION SHAFT – SPRINGVALE COLLIERY

In response to your enquiry asking for the Department of Land and Water Conservation's requirements for the above proposal, I wish to offer the following advice:

1. As this is a ventilation shaft and there will be only minimal de-watering of the mine from this bore hole we do not require any detailed groundwater information at this stage. This requirement may change should there be any significant de-watering of the mine from this location in the future.

2. A Soil and Water Management Plan that deals with any soil disturbance and surface run-off within and from the site should be included in any documents related to the proposal, submitted to Council for approval.

Should you require further information please do not hesitate to contact me on 6351.3842.

Yours sincerely,

Matt Gray
Natural Resource Project Officer
DLWC - LITHGOW

Level 1, 308 High Street Penrith NSW 2750 P.O. Box 651 Penrith 2751
Telephone (02) 4722 1188 Facsimile (02) 4721 0181

APPENDIX 3

Flora and Fauna Assessment

Springvale Coal Pty Limited

Flora and Fauna Assessment Proposed Upcast Ventilation Shaft and Associated Facilities

October 2002

Umwelt
Environmental Consultants

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

A flora and fauna assessment was undertaken over land proposed for an upcast ventilation shaft and associated facilities in Newnes State Forest between 2 and 5 April 2002 and 3 and 5 September 2002 (**Figure 1.1**). The flora and fauna assessment has been conducted for a Statement of Environmental Effects, which will support a Development Application for the proposal.

The facility will include a series of boreholes that will be used to deliver power, compressed air and materials to the underground workings of Springvale Colliery. Associated facilities will include buildings for electrical switchgear and compressors and a dam(s) for the storage and discharge of water pumped from the underground workings. The conceptual layout of the proposed facility is indicated on **Figure 1.2**.

The proposed facility includes the following infrastructure:

- a 3.5 metre (finished diameter) upcast ventilation shaft to a depth of approximately 380 metres (including a 20 metres below-seam water collection sump);
- a 0.35 metre diameter materials borehole for ballast and concrete to a depth of approximately 360 metres;
- two 0.2 metre diameter boreholes for power and communications to a depth of approximately 360 metres;
- a 0.25 metre diameter compressed air borehole to a depth of approximately 360 metres;
- a 0.25 metre diameter dewatering borehole to a depth of approximately 360 metres;
- two 11 kV/415 V transformers for site power supply;
- a compressor housing shed containing up to four 250 kW, 900 cfm compressors; and
- a dewatering dam(s) (with approximate total capacity of 2500 m^3).

Detailed design work for the above proposed facilities has not yet been completed and there may be variations to the above dimensions and capacities, as required to meet site specific requirements.

1.1 STUDY AREA

It is proposed to establish the upcast ventilation facility on an approximately 10 hectare site located on the Newnes Plateau within the Newnes State Forests. The location of the study area is shown on **Figure 1.1**. The study area covered the sites of the proposed ventilation shaft and associated facilities, which include an area of approximately 250 metres by 165 metres, a transmission line easement approximately 2800 metres long and 20 metres wide, and a transformer site covering an approximate area of 40 metres by 40 metres (**Figure 1.2**).

1.2 OBJECTIVES

The objectives of the flora and fauna assessment were to:

- record the flora and fauna communities at the site;

FIGURE 1.1
Location of Study Area

Umwelt (Australia) Pty Limited
Base Map Source: Wallerawang 1:100 000 Topographic Map

A4 Scale 1:80 000

Ref No.:R03_V1/1571_014.dgn

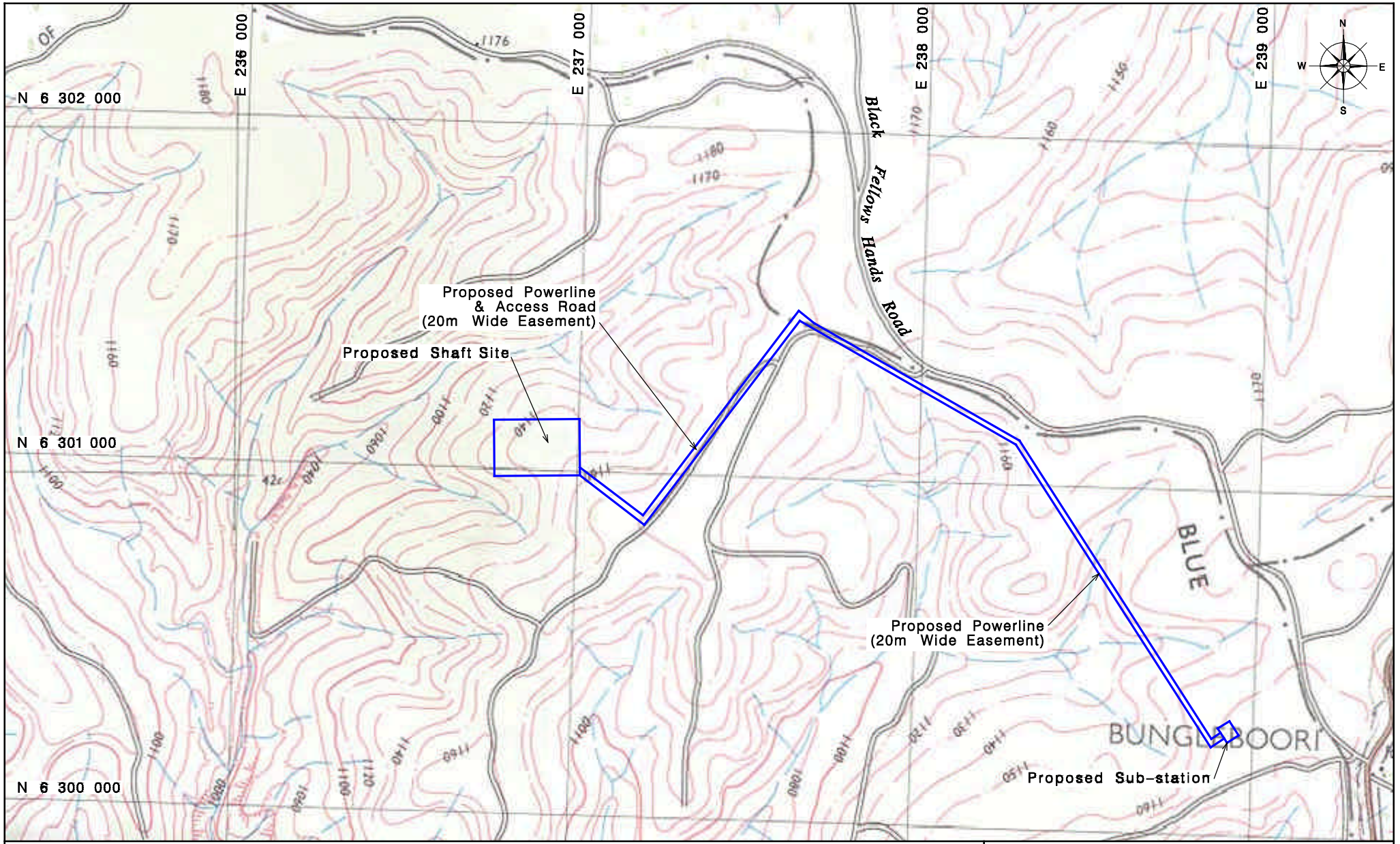


FIGURE 1.2
Layout of Proposed
Ventilation Shaft Facility

Umwelt (Australia) Pty Limited
Source: Springvale Mine

A4 Scale 1:15 000

Ref No.:R03_V1/1571_015.dgn

- identify any threatened or regionally significant flora and fauna, especially those listed on Schedules 1 and 2 of the *Threatened Species Conservation Act 1995*;

- assess the impact that the proposal will have on the flora and fauna communities recorded on the site; and

- provide appropriate management recommendations.

2.0 METHODOLOGY

2.1 FLORA

Prior to the commencement of field studies, a National Parks and Wildlife Service (NPWS) Atlas database search, and a review of existing studies from the local area, were completed to identify locally occurring threatened flora species and general vegetation types. This process identified one vegetation community previously recorded in the study area, Newnes Plateau Woodland (Benson and Keith 1990) and a range of threatened flora species within 10 kilometres of the study area (State Forests 2002).

The flora field survey commenced with five walking transects to determine species composition, level of disturbance of the vegetation and any threatened flora species occurring in the 10 hectare study area. These walking transects were also used to ground-truth the preliminary mapping phase, and to assess habitat quality. The walking transects were up to approximately 150 metres in length.

Following completion of the walking transects, five vegetation survey plots were completed in randomly selected parts of the study area. Five standard 20 metre x 20 metre vegetation quadrats were completed, allowing an accurate assessment of community structure and composition to be undertaken. Within the 20 metre x 20 metre quadrats, ten 1 metre x 1 metre quadrats were assessed to provide information about species abundance and cover, with the information being recorded on standard survey sheets. Each of the species occurring in the larger quadrat area was recorded, with samples of all unknown plant species collected in the field, pressed and dried for later identification. The location of walking transects and vegetation quadrats is shown on **Figure 2.1**.

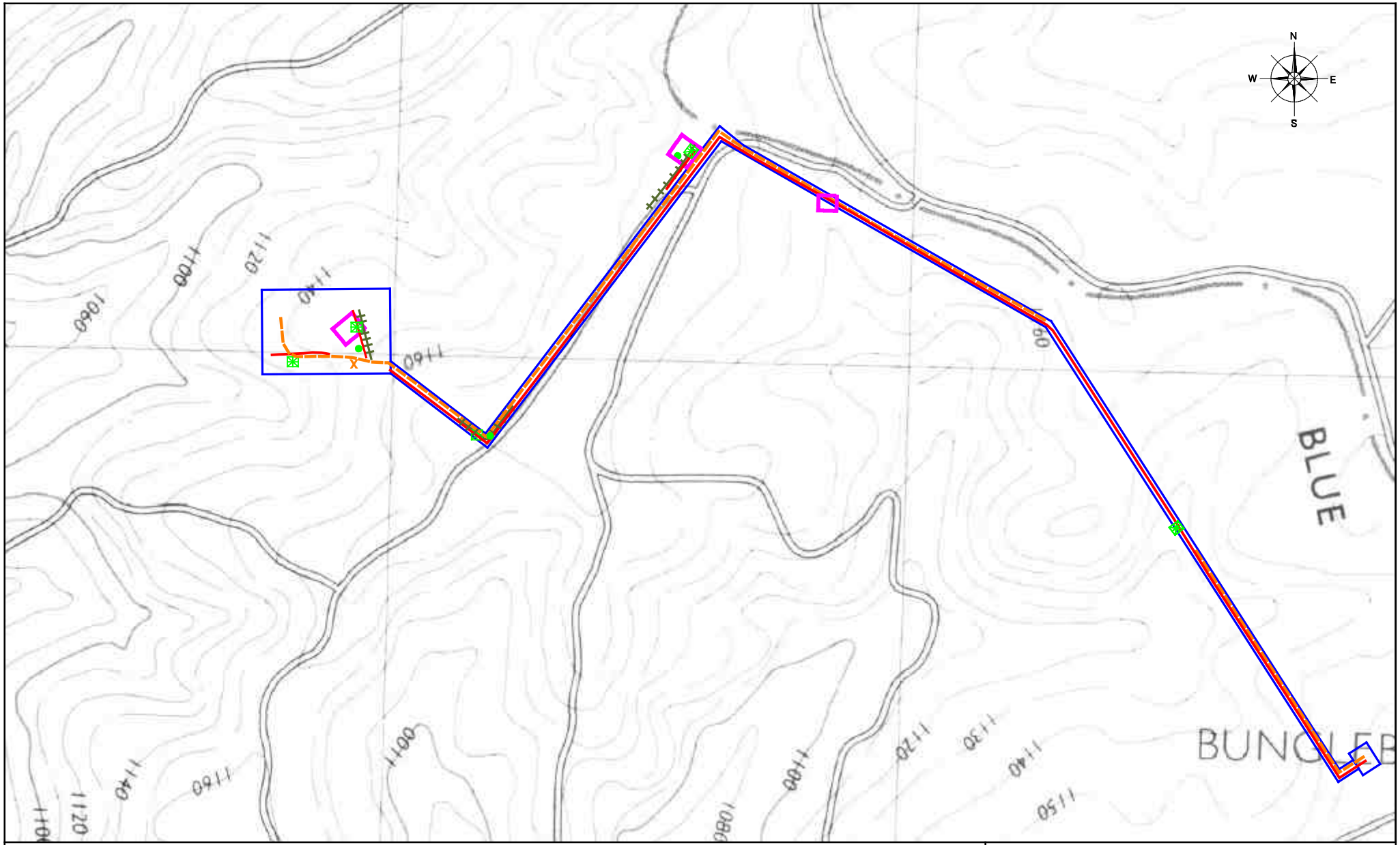
General habitat characteristics such as the level of disturbance, community maturity, erosion and weed infestation were also noted during the walking transects.

2.2 FAUNA

A fauna survey was conducted over the approximately 10 hectare study area on 2 to 5 April 2002 and 3 to 5 September 2002. Prior to fieldwork being completed, a search of the NPWS Atlas database was undertaken to identify fauna species which have previously been recorded within the Newnes Plateau area. Survey methods were designed to include appropriate techniques to identify any threatened species that potentially occurred in the study area. The location of fauna surveys is shown on **Figure 2.1**.

2.2.1 Nocturnal Birds

One owl call playback session was conducted during the survey period, with spotlighting also completed to determine the presence of nocturnal bird species. The call playback session generally followed the method recommended by Forest Fauna Surveys *et al* (1997), and included the calls of the Powerful Owl, Masked Owl, Sooty Owl and Barking Owl. The session commenced with a quiet listening period of approximately 15 minutes, following which the first owl call was played. The broadcast of each owl call was followed by a quite listening period of 5 minutes, and then by



Legend

- Location of Proposed Ventilation Shaft Facility
- Herpetological Survey Area
- 20m x 20m Vegetation Quadrat
- Walking Transect
- Trapline
- Spotlight & Anabat Transect
- Diurnal Bird Census Point
- X Owl Call Playback

0 100 250 500m

Umwelt (Australia) Pty Limited
Base Map Source: 1:25 000 Ben Bullen Topographic Map (8931-4-S)

FIGURE 2.1
Flora and Fauna
Survey Methodology

A4 Scale 1:10 000 | Ref No.:R03_V1/1571_016.dgn

approximately 5 minutes of spotlighting in the vicinity of the owl call playback site. The calls were broadcast using a directional loud hailer at 10 watts. Eight person hours of spotlighting were also completed in the study area, with the spotlighting targeting nocturnal bird species.

2.2.2 Diurnal birds

Diurnal bird surveys were undertaken in both the morning and evening between 2 and 5 April 2002 and in the afternoon of 3 September 2002. Each survey lasted 20 to 30 minutes. Species were identified from characteristic calls and by observation, for a total of 2.5 person hours of surveying.

Opportunistic observations were also recorded during other aspects of the field survey, particularly during the checking of the trap lines each morning.

2.2.3 Herpetofauna

Targeted diurnal searches were conducted for reptile and amphibian species in likely habitat areas throughout the study site. Three diurnal search areas were sampled during the survey period, with the search undertaken by one or two personnel in each area of approximately 0.25 hectares for 30 minutes, resulting in a total sampling effort of 2.5 diurnal person hours. During the search, likely microhabitats were examined including beneath rocks and logs, in tree bark, in ground litter and in wet soak areas. The diurnal survey was conducted in the afternoon between 12.00 pm and 4.30 pm.

2.2.4 Mammals

A range of techniques were used to identify the mammals occurring in the study area. These methods included trapping, hair funnels, spotlighting and ultrasonic bat recordings. **Table 2.1** indicates the total number of traps nights used during the survey.

Table 2.1 - Number of mammal trap nights used during the study

Trap Type	Trap Nights
Elliot class 'A'	90
Elliot class 'B'	30
Cage traps	9
Hair funnels	30
Total Trap Nights	**159**

Elliot 'A' traps and Elliot 'B' traps were set as ground traps in order to sample ground dwelling fauna populations at the site. Traps were set at intervals of 10 to 20 metres along the trap lines. Bedding material was placed in each trap to ensure any captured animals were able to maintain body temperature. Elliot traps were not set on trees to target arboreal fauna due to the general lack of hollow bearing trees within the study area. Arboreal fauna was targeted by the placement of hair funnels within the study area. Hair funnels are a modification of hair tubes, being shaped so as to allow hair from animals of any size to be captured for later analysis.

Elliot 'A' and Elliot 'B' traps and hair funnels were baited with a standard mix of rolled oats, honey, peanut butter and vegetable oil, providing a nutritious meal for any captured mammals. Cage traps were set with a mixture of peanut butter and sardine cat food, with an Elliot 'A' bait also included. A honey emulsion (comprising honey and water) was sprayed daily onto each tree containing a hair funnel. The honey emulsion was also sprayed on nearby trees to act as an attractant.

Spotlighting was primarily conducted on foot using a 50 watt hand-held spotlight, with some areas also covered by spotlight from a slow moving vehicle. A total of ten person hours spotlighting was conducted during the study. Spotlighting was undertaken generally between 6.00 pm and 10.00 pm.

Searches for evidence of mammal use were also conducted, with scats collected and analysed as required. Trees were also examined for scratch marks and other evidence of use by arboreal mammals. All hair analysis, and scat analysis as required, was undertaken by Barbara Triggs of Genoa, Victoria. All opportunistic mammal observations during other aspects of the survey were also recorded.

2.2.4.1 Microchiropteran Bats

Three microchiropteran bat detection walking transects were conducted during the survey period using the Anabat II system developed by Titley Electronics, Ballina NSW. Each of these walking transects was 45 minutes in duration with all detected calls recorded to tape for later analysis. A 50 watt hand-held spotlight was used during the survey to locate any megachiropteran bat species present. All Anabat recordings were analysed by Glen Hoye of Fly by Night Surveys Pty Limited.

3.0 EXISTING FLORA

3.1 VEGETATION OF THE REGION

The vegetation of the region has been mapped by Benson and Keith (1990) who described the natural vegetation of the Wallerawang 1:100000 map sheet. The study area is located within an extensive community described as Newnes Plateau Woodland. Several other communities in the vicinity of the study area have also been described, namely Newnes Plateau Shrub Swamps, Montane Heath and Pagoda Rock Complex.

Newnes Plateau Woodland is dominated, most commonly, by *Eucalyptus sieberii, E. oreades, E. radiata* subsp. *radiata* and *E. dives*. Although characterised as woodland, the community includes a range of structural formations from open forest through woodland to open woodland and occasionally low open woodland. The understorey is generally an open shrub layer 1 to 2 metres high with an intermittent grassy ground cover. Common shrub species are *Acacia dorothea, A. terminalis, Daviesia latifolia, Boronia microphylla, Mirbelia platyloboides, Phyllota squarosa, Monotoca scoparia, Hibbertia obtusifolia, Leptospermum squarrosum, Persoonia laurina, Lomatia silaifolia, Hakea dactyloides* and *Petrophile canescens*. Common ground cover species are *Lomandra multiflora, L. glauca, Dianella revoluta, Lepyodia scariosa* and the grasses *Stipa pubescens, Chionocholoa pallida* and *Poa labillardieri* (Benson and Keith 1990).

Much of the Newnes Plateau Woodland has been cleared for *Pinus radiata* plantations, and most of the remainder is within State Forest and regularly logged.

Narrow, elongate shrub swamps are a conspicuous feature of the eastern half of the Newnes Plateau. The Newnes Plateau Shrub Swamp vegetation varies in structure from open heath to closed heath, with sedgeland dominated by graminoids in very wet sections. Dominant species include *Epacris padulosa, E. microphylla, Grevillia acanthefolia subsp. acanthifolia, Leptospermum grandifolium, Baekea linifolia, B. utilis* and *Boronia deanei*. Dense vegetation along permanent water channels is dominated by *Gleichenia dicarpa* and *Gymnoschoenus sphaerocephalus*. The Newnes Plateau Shrub Swamp is oriented in a NNE-SSW direction (Benson and Keith 1990).

Montane Heath occupies exposed ridgetops with skeletal sandy soils derived from Narrabeen sandstones at elevations above 850 metres. The open heath community is dominated by *Allocasuarina nana, Leptospermum attenuatum, L. arachnoides, Isopogon anemonifolius, Banksia*

ericifolia var. *ericifolia, Hakea dactyloides, H. propinqua, Brachyloma daphnoides, Epacris microphylla* and *Monotoca scoparia*. Sedges and forbs make up the ground cover (Benson and Keith 1990)

The vegetation structure of the escarpments along the margins of the Triassic sandstone plateaus range from open forest to woodland, low woodland, open scrub and open heath. In the sheltered sites open forest of *Eucalyptus piperita* subsp. *piperita, E. sieberi* and *E. oblonga* occurs. With increasing exposure *E. rossii* and *E. punctata* become common, while around the exposed rocky outcrops are mallees of *E. sp.nov.'MOKII'* with *E. oreades* and *E. rossii*. Common understorey species include *Acacia terminalis, A. ulicifolia, A. obtusifolia, Banksia ericifolia, Calytrix tetragona, Phyllota phylicoides, Platysace lanceolata, Boronia microphylla, Isopogon dawsonii, Allocasuarina distyla, Hakea dactyloides* and *Leptospermum sphaerocarpum* (Benson and Keith 1990).

3.2 VEGETATION OF THE STUDY AREA

The vegetation of the study area consists of open forest dominated by Silvertop Ash (*Eucalyptus sieberi*) and Narrow-leaved Peppermint (*E. radiata*) with Ribbon Gum (*E. viminalis* subsp. *viminalis*), Blue Mountains Ash (*E. oreades*) and Brittle Gum (*E. mannifera*) also commonly occurring. The community conforms to the description of Newnes Plateau Woodland described by Benson and Keith (1995) (refer to **Section 3.1**). The overstorey vegetation has been subject to logging in the past, and as such mature trees were not recorded. Overstorey species were generally between 8 and 10 metres, with emergent trees to 20 metres.

The community comprised a dry heath understorey to approximately 0.5 to 1 metre, which included Drumsticks (*Isopogon anemonifolius*), Cone-sticks (*Petrophile sessilis*), Hair-pin Banksia (*Banksia spinulosa*), Crinkle Bush (*Lomatia salaifolia*) and Spiny-headed Mat Rush (*Lomandra longifolia*). Ground cover species included a range of grasses such as *Poa sp.* and *Danthonia sp.* and herbs such as Silky Purple Flag (*Patersonia sericea*). The understorey supported a high diversity of species, with percent cover in the order of 75% to 90%. Weed infestation was generally low, with disturbance limited to access tracks. A flora species list for the study area is provided in **Appendix 1**.

Two threatened flora species were recorded in the study area, *Persoonia hindii* and *Derwentia blakelyi*. *Persoonia hindii* was recorded within the area proposed for the establishment of the powerline easement and *Derwentia blakelyi* was recorded adjacent to the proposed easement. It is considered that *Derwentia blakelyi* is likely to occur within the area proposed for the powerline easement.

4.0 EXISTING FAUNA

4.1 FAUNA HABITAT

The open forest community offers potential habitat to a range of endemic species, including bird species and small ground dwelling mammals such as the Yellow-footed Antechinus (*Antechinus flavipes*). The dense nature of the dry heath understorey and the depth of leaf litter present within the site provides suitable habitat for a range of endemic vertebrate and invertebrate fauna, however, habitat structures such as fallen logs and rocky outcrops are generally limited.

Arboreal habitat is limited within the proposed disturbance area, with less than 10 mature hollow bearing trees identified.

It is expected that the adjacent open forest vegetation provides a significant area of fauna habitat.

4.2 RESULTS OF FAUNA SURVEY

Twenty-nine fauna species were recorded in the study area. No introduced species were recorded. The full list of species recorded in the study area is provided in **Appendix 2**.

4.2.1 Birds

A relatively low species diversity was recorded within the study area during early morning and evening surveys, with 16 species recorded. The most abundant species recorded was the White-throated Treecreeper (*Cormobates leucophaeus*) and Grey Fantail (*Rhipidura fuliginosa*). Other species recorded included the Crimson Rosella (*Platycerus elegans*) and Australian Magpie (*Gymnorhina tibicen*), with a Whistling Kite (*Haliastur sphenurus*) recorded overhead. One nocturnal bird species, the Boobook Owl (*Ninox novaeseelandiae*) were identified in vegetation adjacent to the study area.

4.3 MAMMALS

Eleven mammal species were recorded in the study area. The Eastern Grey Kangaroo (*Macropus giganteus*) and the Swamp Wallaby (*Wallabia bicolor*) were recorded in low numbers. Small mammal trapping resulted in the identification of the Yellow-footed Antechinus (*Antechinus flavipes*). The Common Ringtail Possum (*Pseudocheirus peregrinus*), with four individuals recorded during spotlighting, was the most common arboreal species recorded. One Common Brushtail Possum (*Trichosurus vulpecula*) was also recorded. Scats and burrows of the Common Wombat (*Vombatus ursinus*) were also recorded. The study area includes the habitat resources required to support a diverse range of mammal species.

Six microchiropteran bats were recorded foraging within the study area. The bats identified included Goulds Wattled Bat (*Chalinolobus gouldii*), Chocolate Wattled Bat (*Chalinolobus morio*), Large Forest Bat (*Vespadelus darlingtoni*), Little Forest Bat (*V. vulturnus*), an undescribed species of Mastiff Bat (*Mormopterus sp. 1*) and the Common Bent-wing Bat (*Miniopterus shreibersii*). The Common Bent-wing Bat has been listed as a vulnerable species under the *Threatened Species Conservation Act 1995*. The locations in which the Common Bent-wing Bat (*Miniopterus shreibersii*) was recorded are shown on **Figure 4.1**.

4.4 HERPETOFAUNA

Searches of the study area identified two reptile species the Garden Skink (*Lampropholis guichenoti*) and Grass Skink (*L. delicata*). The identification of potential habitat, such as fallen logs and deep leaf litter indicates that the study area is likely to provide habitat for further reptile species.

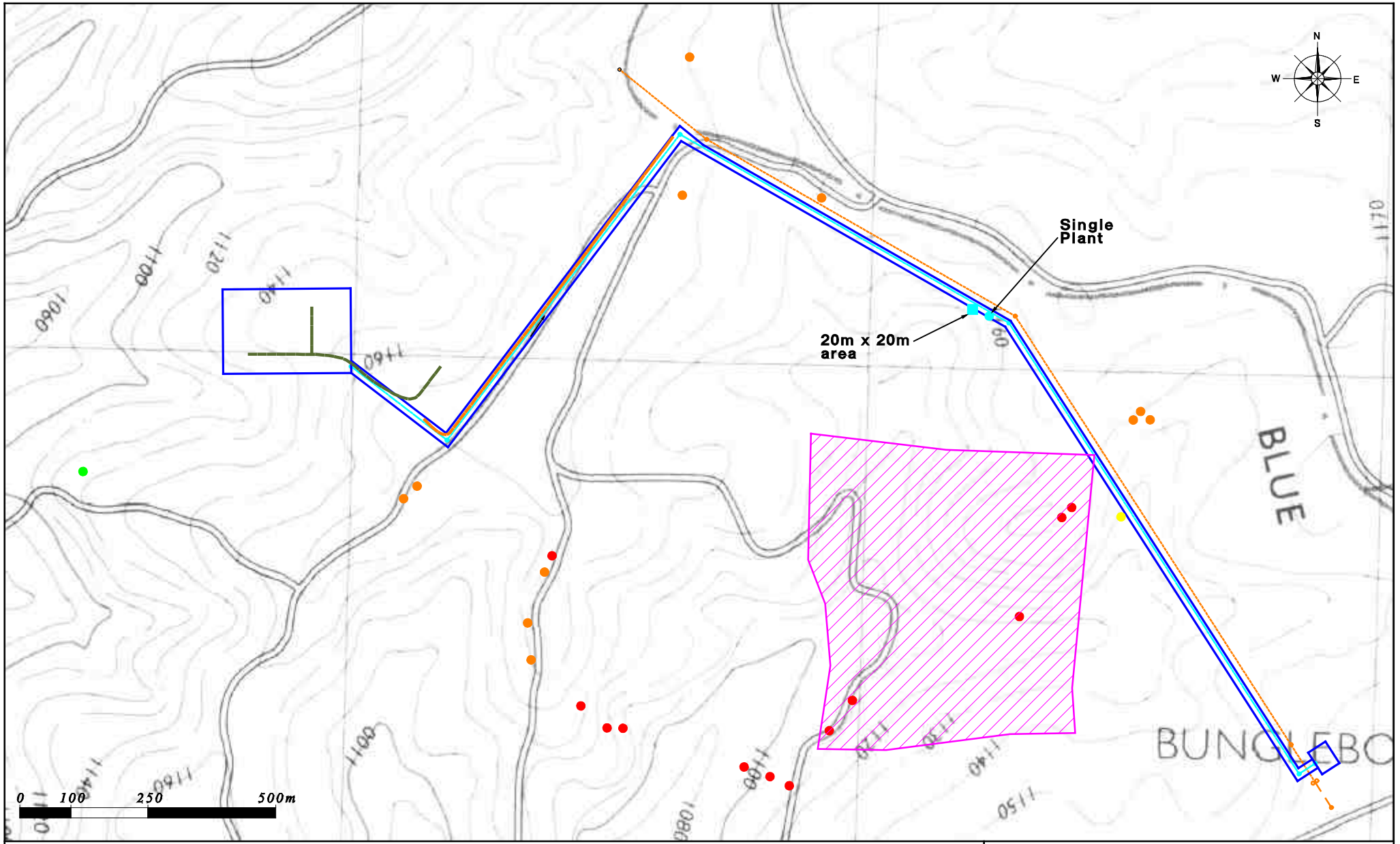
No amphibian species were recorded, with a general lack of preferred habitat.

5.0 THREATENED SPECIES ASSESSMENT

5.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

5.1.1 Threatened Flora

Five threatened flora species are known to occur in the vicinity of the study area. An assessment of each of the threatened flora species recorded on the Wallerawang 1:100,000 map sheets of the NPWS Atlas database within a 10 kilometre radius of the study area is included in **Table 5.1** with



Legend

- Location of Proposed Ventilation Shaft Facility
- Approximate Location of *Derwentia blakelyi* Population (State Forest Survey)
- Probable Occurrence of Common Bent-wing Bat
- Confident Occurrence of Common Bent-wing Bat
- *Persoonia hindii* (State Forests Survey)
- *Derwentia blakelyi* (State Forest Survey)
- *Dewentia blakelyi* (Umwelt Survey)
- *Persoonia chamaepitys* (State Forest Survey)
- *Persoonia hindii* (Umwelt Survey)

Umwelt (Australia) Pty Limited
Base Map Source: 1:25 000 Lithgow Topographic Map (8931-4-S)

FIGURE 4.1
Threatened Species

A4 Scale 1:10 000 | Ref No.:R03_V1/1571_017.dgn

an indication of whether full assessment under Section 5A of the *Environmental Planning & Assessment Act, 1979* is required.

Table 5.1 – Threatened Flora Assessment

Species	Habitat Requirements	Impact Assessment
Eucalyptus cannonii	A tree to 15 metres high with stringy grey to red-brown bark persistent throughout. It is considered by Harden (1991) to be locally frequent but restricted, in sclerophyll woodland on shallow soil on rises. Found from Rylstone to the upper Wolgan Valley.	The species was not identified in the study area and is not expected to occur. No further assessment is required.
Derwentia blakelyi	Small glabrous and glaucous shrub or woody herb to 50 cm high, with one to several erect soft woody stems from a narrow rootstock. The species flowers in summer and is restricted to the western Blue Mountains, near Clarence, near Mt Horrible, Nullo Mountain and the Coricudgy Range. It grows in eucalypt forest often in moist areas.	The species was recorded adjacent to the proposed powerline easement and can reasonably be expected to occur within the study area. Further assessment is provided in **Section 6.3.1**.
Boronia deanei	An erect shrub to 1.5 metres high. The species flowers between September and November and grows in wet heath habitats from Lithgow to the Victorian border.	The lack of wet heath habitats in the study area prevents this species from occurring. No significant impact will occur and no further assessment is required.
Persoonia hindii	Known from only nine locations on the Newnes Plateau in dry sclerophyll forests and woodlands dominated by a variety of eucalypts, including *Eucalyptus sieberi, E. radiata, E. dives, E pauciflora, E. oreades* and *E. gullickii,* on sandstone soils. The grassy understorey is dominated by *Poa spp.* and *Chionochloa pallida.*	An aggregation of this species was recorded in an area of approximately 20 metres by 20 metres within the proposed powerline easement. A further individual was recorded approximately 20 metres from this population (refer to **Figure 4.1**). The species is assessed further in **Section 6.3.2**.
Persoonia chamaepitys	A prostrate shrub which grows in heath or any sclerophyll forest on sandstone, from the Goulburn River valley through the Mellong Range and Blue Mountains to the Wingello district.	Flora surveys conducted for this project and recent surveys in the area by State Forests have not recorded this species within the study area. No significant impact will occur and no further assessment is provided.

References: *Harden, 1991.*

5.1.2 Threatened Fauna

A number of threatened fauna species are known to occur within a 10 kilometre radius of the study area. Several of these species are considered unlikely to occur in the study area, as potential habitat for these species is generally limited. An assessment of each of the threatened fauna species recorded in the relevant portions of the Wallerawang 1:100,000 map sheets of the NPWS Atlas database, is included in **Table 5.2** with an indication of whether full assessment under Section 5A of the *Environmental Planning & Assessment Act, 1979* is required.

A full assessment for those species requiring further assessment under Section 5A of the *Environmental Planning & Assessment Act, 1979* is included in **Section 6.3**.

Table 5.2 – Threatened Fauna Assessment

Species	Habitat Requirements	Impact Assessment
Blue Mountains Water Skink *Eulamprus leuraensis*	The species is known only from restricted areas in the Blue Mountains and on the Newnes Plateau. It inhabits wet heath or hanging swamps.	The preferred habitats for this species were not identified in the study area. No significant impact will occur and no further assessment is required.
Bathurst Copper Butterfly *Paralucia spinifera*	The Bathurst Copper Butterfly is a small butterfly with a thick body and a wing span of 20-30 mm. The species is known from 29 localities and occurs at altitudes over 900 metres. Habitat preferences are for a full sun position, extremes of cold weather, open woodland and open forest vegetation associations with a sparse understorey that is dominated by *Bursaria spinosa* subsp. *lasiophylla.*	*Bursaria spinosa* was not identified in the study area during flora surveys. The dependence on this species by the Bathurst Copper Butterfly indicates that the species will not occur in the study area. No significant impact will occur and no further assessment is required.
Powerful Owl *Ninox strenua*	The Powerful Owl occupies an extensive home range of up to 1000 hectares, generally within 200 kilometres of the coast in southeastern Australia. Habitat preferences include mountain forests; gullies and forest margins; sparser hilly woodlands; coastal forests, woodlands, scrubs; exotic pine plantations; and large trees in private/public gardens. The species breeds between June and September, nesting in a hollow trunk or limb greater than 8 metres high in a tree.	The lack of mature vegetation and lack of hollow bearing trees for nesting indicates that the Powerful Owl would not rely on the habitats of the study area for its breeding requirements. The study area may, however, provide limited foraging habitat and the species is therefore assessed further in **Section 6.3.3**.
Diamond Firetail *Stagonopleura guttata*	The Diamond Firetail inhabits eucalypt woodlands, forests and mallee where there is a grassy understorey. Firetails build bottle-shaped nests in trees and bushes, and forage on the ground, largely for grass seeds and other plant material, but also for insects	The study area does not have the grassy understorey required for this granivorous species. No significant impact will occur and no further assessment is required.
Koala *Phascolarctos cinereus*	Habitat consists of eucalypt forest and woodlands containing particular species including Red Gum, Grey Gum, Manna Gum, Tallowwood, and Swamp Mahogany.	Assessment under SEPP 44 has indicated that the study area does not contain core Koala habitat (refer to **Section 5.2**). No significant impact will occur and no further assessment is required.
Yellow-bellied Glider *Petaurus australis*	The Yellow-bellied Glider is the largest of all gliders and prefers tall, mature forests in regions of high rainfall. The species roosts in a den in a hollow branch, usually in a living, smooth-barked eucalypt. In southern Australia up to 24 species of eucalypt are used as food trees, with a variety of tree species required to provide year round foraging resources for the species' large home range of between 30 and 65 hectares.	The Yellow-bellied Glider occurs in tall, mature forests, preventing this species from occurring in the study area. The proposed development will not significantly impact this species and no further assessment is required.

Table 5.2 – Threatened Fauna Assessment (cont)

Species	Habitat Requirements	Impact Assessment
Squirrel Glider *Petaurus norfolcensis*	Occurs in wet and dry sclerophyll forests and woodlands. Nests in tree hollows and has a home range of 20 to 30 hectares. Feeds on insects, acacia gum and eucalypt sap released by incising the bark.	The study area includes a small number of hollow bearing trees suitable for this species. Further assessment is provided in **Section 6.3.4**.
Large-eared Pied Bat *Chalinolobus dwyeri*	Occurs in dry sclerophyll forests and woodlands. Roosts in caves, mine tunnels and the abandoned, bottle-shaped mud nests of Fairy Martins. Forages for small flying insects below the forest canopy.	This species was not recorded in the study area but potential habitat was identified. This species is assessed further in **Section 6.3.5**.
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	This species is known from few records but has been shown to be tree roosting. The size and shape of the species' wings indicate that it is probably highly mobile, with a comparatively large foraging range. It is not very manoeuvrable and probably forages above the forest canopy, in open woodland or over water.	This species was not recorded during fauna surveys but potential habitat was identified. The species is therefore assessed further in **Section 6.3.6**.
Common Bent-wing Bat *Miniopterus schreibersii*	Occurs in wet and dry sclerophyll forests and rainforests. This species generally hunts above the forest canopy, and roosts in caves, buildings and mine tunnels.	This species was recorded in the study area. Further assessment is provided in **Section 6.3.5**.
Greater Broad-nosed Bat *Scoteanax ruepellii*	The Greater Broad-nosed Bat is a tree-roosting species that inhabits the gullies and river systems draining the Great Dividing Range. Habitats range from woodland through to moist and dry eucalypt forest to rainforest.	Potential habitat was identified in the study area for this species, however the species was not identified during surveys. Further assessment is provided in **Section 6.3.6**.

References: *Cronin, 1991; Pizzey & Knight, 1997; Strahan, 1998; and Swan, 1990.*

5.2 SEPP 44 ASSESSMENT – KOALA HABITAT PROTECTION

The proposal is subject to assessment under *State Environmental Planning Policy (SEPP) No. 44 (Koala Habitat Protection)* as it lies in a local government area listed in Schedule 1 of the policy. SEPP 44 aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for the Koala, to ensure permanent free-living populations over their present range and to reverse the current trend of population decline. Any development application in an identified local government area, affecting an area one hectare or greater, must be assessed under the policy.

Assessment under SEPP 44 is based on an initial determination of whether the land constitutes potential Koala habitat. This is determined by assessing whether the eucalypt species present in Schedule 2 constitute 15% or more of the total number of trees in the upper or lower stratum of the tree component. If potential Koala habitat is present, the area must be further assessed to determine if the land is core Koala habitat.

The species listed in Schedule 2 of the policy are:

Scientific Name	Common Name
Eucalyptus tereticornis	Forest Red Gum
Eucalyptus microcorys	Tallowwood
Eucalyptus punctata	Grey Gum
Eucalyptus viminalis	Ribbon or Manna Gum
Eucalyptus camaldulensis	River Red Gum
Eucalyptus haemastoma	Broad Leaved Scribbly Gum
Eucalyptus signata	Scribbly Gum
Eucalyptus albens	White Box
Eucalyptus populnea	Bimble Box or Poplar Box
Eucalyptus robusta	Swamp Mahogany

One Koala food tree listed in Schedule 2, *Eucalyptus viminalis*, was recorded in the study area. While the species was not considered to constitute 15% or more of the canopy across the whole site, the species is locally frequent and in some areas the proportion of the canopy exceeds 15%. As a result the site is considered to contain potential Koala habitat and further assessment under SEPP 44 is required.

As potential Koala habitat occurs in the study area, the policy requires that it must be determined whether the area forms core Koala habitat. Core Koala habitat is defined as; "*an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population*". Comprehensive diurnal searches were conducted throughout the study area comprising potential Koala habitat and no Koalas were recorded. Searches were also conducted in the study area to locate any indications of Koala use of the site, including examination of trunks for scratch marks, and searches for scats. No such indications were found during the surveys. Consequently, it was concluded that there is not a resident population of Koalas in the study area.

Existing NPWS Atlas database records for the Newnes Plateau area were also examined to determine whether there were any records of a historical population occurring in the study area. Fourteen historical Koala records exist in the Wallerawang 1:100,000 map sheet area, with three records within 10 kilometres of the study area. The closest records to the survey area are approximately 7.1 kilometres to the north, 9.0 kilometres to the south and 9.6 kilometres to the southeast. There are no records for the study area or adjoining areas (Atlas database, 2002). Therefore, although there are sparse historical Koala records for the Wallerawang map sheet region, there are no recorded sightings of Koalas in the study area.

The fauna surveys undertaken for this assessment have determined that there is currently no resident population of Koalas occurring in the study area and no evidence of Koala use of the area was observed. There are also no historical records of Koalas occurring in the study area, although limited regional historic records do exist. The area is therefore not considered to be core Koala habitat as defined under SEPP 44 and the preparation of a Koala Plan of Management is not required. SEPP 44 does not, therefore, place any constraints on the proposed ventilation shaft facility.

5.3 COMMONWEALTH LEGISLATION

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), approval of the Commonwealth Minister for the Environment is required for any action that

may have a significant impact on matters of national environmental significance. These matters are:

- World Heritage properties;
- Ramsar wetlands;
- Cetaceans, migratory species, threatened species, critical habitats or ecological communities listed in the EPBC Act;
- Commonwealth land, marine areas or reserves; and
- Nuclear actions.

One migratory species listed under the EPBC Act, the Whistling Kite (*Haliastur sphenurus*) was identified over the study area. No threatened species were recorded. The proposed development will not modify, destroy or isolate an area of important habitat for the Whistling Kite. Important habitat is defined under the EPBC legislation as:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, or
- habitat utilised by a migratory species which is at the limit of the species' range, or
- habitat within an area where the species is declining.

It is not considered that the study area provides an important area of habitat, as defined under the legislation, for the Whistling Kite (*Haliastur sphenurus*) as no nesting sites were identified in the study area and only a relatively small area of foraging habitat will be removed. The loss of approximately 10 hectares of potential foraging habitat is not expected to be significant and approval from the Commonwealth Minister for the Environment is not required.

6.0 IMPACT ASSESSMENT

6.1 IMPACT ON FLORA SPECIES AND VEGETATION COMMUNITIES

The proposed upcast ventilation shaft and associated facilities will not result in the removal of significant endemic vegetation from the study area, with approximately 10 hectares to be removed under the proposal.

Two threatened flora species were recorded in the study area and surrounding areas by recent State Forest surveys (2002) and by surveys conducted for this report, *Persoonia hindii* and *Derwentia blakelyi*. *Persoonia hindii* was recorded within the area proposed for the construction of the powerline easement and *Derwentia blakelyi* was recorded adjacent and to the south of the proposed easement (refer to **Figure 4.1**). It is considered that *Derwentia blakelyi* may occur within the area proposed for the establishment of the easement. The management measures outlined in **Section 7.0** have been formulated to reduce the impact on these species such that a significant impact will not occur.

A range of impact mitigation measures has been designed in order to limit the potential for threatened flora species to be impacted by the proposal. The area identified as providing habitat for *Persoonia hindii* and *Derwentia blakelyi* will be flagged and clearing of vegetation supervised by an appropriately experienced and qualified ecologist to assure the impact is as minimal as possible.

Within this identified area canopy species will be hand-lopped with all shrub and groundcover vegetation being retained. Lopped portions of trees will be removed by an excavator operating from the currently existing 66 kV powerline easement, or left in place if it is deemed that removal of the trees will cause adverse damage to the identified threatened species.

The disturbance of the study area will not result in the isolation of areas of remnant vegetation.

The relatively small amount of vegetation to be cleared for the proposed development, the proximity of the site to the surrounding State Forest and the range of impact mitigation measures outlined in **Section 7.0** ensures that the impact of the proposed development on flora is unlikely to be significant from a local or regional perspective.

6.2 IMPACT ON FAUNA SPECIES AND COMMUNITIES

The proposed upcast ventilation shaft and associated facilities will not significantly impact on fauna species or communities identified or considered likely to occur on the site. The disturbance area for the site is approximately 10 hectares and the study area is connected to extensive areas of vegetation associated with Newnes State Forest.

The fauna habitats recorded on site provide foraging habitat for the threatened Common Bent-wing Bat (*Miniopterus shreibersii*), however, the site is not considered to provide significant or critical habitat for this or other endemic species (refer to **Section 6.3.5**). The proposed development will not have a significant impact on habitat for regionally significant or threatened species or their habitats.

6.3 ASSESSMENT OF SIGNIFICANCE - 8 PART TEST

Flora and fauna surveys conducted over the area proposed for an upcast ventilation shaft and associated facilities identified one threatened fauna species, the Common Bent-wing Bat. Several of the threatened species are, however, considered to potentially occur in the study area. The potential impacts of the proposed development on each of these species is assessed below in accordance with Section 5A of the *Environmental Planning & Assessment Act, 1979.*

6.3.1 *Derwentia blakelyi*

a) In the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable population of the species is likely to be placed at risk of extinction.

Derwentia blakelyi occurs on the Newnes Plateau in dry sclerophyll forests and woodlands, often in moist areas (NPWS 2000). The species flowers in summer and is restricted to the western Blue Mountains, near Clarence, near Mt Horrible, Nullo Mountain and the Coricudgy Range. Three *Derwentia blakelyi* individuals were recorded in close proximity to the proposed easement (refer to **Figure 4.1**) and flora surveys undertaken by State Forests (2002) have identified the species in close proximity to the proposed development site.

The proposed development will result in the disturbance of approximately 10 hectares of potential habitat for this species. While the species was not recorded in the study area it is considered that the species may potentially occur within the powerline easement.

Mitigation measures have been designed for the project to mitigate the impact of the proposal on threatened species including *Derwentia blakelyi*. The area adjacent to where *Derwentia blakelyi* was identified which provides potential habitat for the species will be flagged to prevent

inadvertent access by machinery and to ensure that no clearing is undertaken without supervision by a qualified ecologist. Within this identified area canopy species will be hand-lopped to ensure threatened species are not impacted by clearing activities. The lopping of canopy species will not impact *Derwentia blakelyi* as the species is a low growing shrub, rarely exceeding 50 cm. Lopped portions of trees will be removed by an excavator operating from the currently existing 66 kV powerline easement, or if it is deemed that removal of the trees will cause adverse damage to the identified threatened species, they will be left to provide ground fauna habitat. All clearing activities are to be supervised by an appropriately qualified and experienced ecologist to ensure the potential for impact on threatened species is minimised.

No construction activity will occur in the area in which *Derwentia blakelyi* was recorded, with no recorded occurrences being disturbed by the proposed development.

The range of impact mitigation measures designed for the proposal will ensure that the construction and operation of the proposed upcast ventilation shaft and associated infrastructure will not significantly impact on *Derwentia blakelyi*. The restricted nature of the proposal will ensure that known populations occurring in the vicinity of the study area will not be impacted. A viable population of *Derwentia blakelyi* is not expected to be placed at risk of extinction by the proposed development.

b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.

Derwentia blakelyi does not form part of an endangered population.

c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed.

The proposal will not result in the removal of known habitat of *Derwentia blakelyi*, however, a relatively small area of potential habitat will be affected. The proposal will not involve the removal of a significant proportion of potential habitat from a local or regional perspective.

d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas for a threatened species population or ecological community.

The proposal will not result in the isolation of potential habitat from currently interconnecting or proximate areas. Habitat surrounding the proposed ventilation shaft will remain contiguous with vegetation associated with Newnes State Forest.

e) Whether critical habitat will be affected.

No areas of critical habitat will be impacted under the proposal.

f) Whether a threatened species, population or ecological community, or their habitats are adequately represented in conservation reserves (or other similar protected areas) in the region.

Derwentia blakelyi is known only from the Newnes Plateau. The presence of the species within State Forest is not considered to provide adequate conservation and therefore the species is considered to be inadequately conserved.

g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process.

The clearing of native vegetation that results in a loss of biodiversity has recently been listed as a key threatening process. The removal of approximately 10 hectares of vegetation as a result of the proposal cannot be classed as a key threatening process, as it will not result in a loss of biodiversity, with similar, and much higher quality vegetation widely distributed in the Newnes State Forest.

h) Whether any threatened species, population or ecological community is at the limit of its known distribution.

Derwentia blakelyi is restricted to the Newnes Plateau and therefore known populations located within the Newnes State Forest are considered to be at the limit of the species' distribution.

6.3.2 *Persoonia hindii*

a) In the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable population of the species is likely to be placed at risk of extinction.

Persoonia hindii occurs on the Newnes Plateau in dry sclerophyll forests and woodlands dominated by a variety of eucalypts, including *Eucalyptus sieberi, E. radiata, E. dives, E. pauciflora, E. oreades* and *E. gullickii,* on sandstone soils. The grassy understorey is dominated by *Poa spp.* and *Chionochloa pallida.* The species was identified as a dense aggregation in an area of approximately 20 metres by 20 metres, with an additional individual approximately 20 metres to the east (refer to **Figure 4.1**). Flora surveys undertaken by State Forests (2002) have identified the species in close proximity to the proposed ventilation shaft site. The closest records to the proposed ventilation shaft site are approximately 100 metres to an individual to the east of the site, with additional individuals approximately 150 metres to the north and approximately 300 metres to the east (State Forests 2002, **Figure 4.1**).

A population of *Persoonia hindii* was identified within the area proposed for the construction of the 11kV powerline easement. The population occurs in an area adjacent to current clearing associated with the maintenance of the 66 kV powerline and therefore is currently subject to the edge effects associated with linear disturbance areas, including greater potential for weed infestation and altered hydrological and light conditions. As a result, it is unlikely that the removal of canopy species in the vicinity of the population will result in a significant impact.

A range of mitigation measures have been identified to mitigate the impact of the proposal on threatened species including *Persoonia hindii*. The extent of clearing will be marked to ensure the minimum area possible is cleared. The area in which *Persoonia hindii* was identified will be flagged to prevent inadvertent access by machinery and to ensure that no clearing is undertaken without supervision by a qualified ecologist. Within this identified area, canopy species will be hand-lopped to minimise impact on *Persoonia hindii*. The lopping of canopy species will not impact *Persoonia hindii* as the species is a low growing shrub. Lopped portions of trees will be removed by an excavator operating from the currently existing 66 kV powerline easement, or if it is deemed that removal of the trees will cause adverse damage to the identified threatened species, they will be left to provide ground fauna habitat. All clearing activities are to be supervised by an appropriately qualified and experienced ecologist to ensure the potential for impact on threatened species is minimised.

The local population of *Persoonia hindii* is unlikely to be placed at risk of extinction as a result of the proposed development, due to the implementation of appropriately designed impact mitigation measures and the relatively small area to be impacted. Similarly, other individuals known to occur in the vicinity of the study area are not expected to be impacted as no clearing will be undertaken in

these areas and drainage will not be directed towards known occurrences. The disturbance area will be flagged and construction personnel restricted to the flagged area to ensure accidental disturbance to nearby populations does not occur.

b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.

Persoonia hindii does not form part of an endangered population.

c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed.

The proposal will result in the removal of a small area of known habitat of *Persoonia hindii*, however, in the area affected only the canopy layer will be removed with the shrub and ground layers remaining intact. The area of known habitat proposed to be affected by the development is not considered to be significant from either a local or regional perspective given the extensive areas of surrounding habitat.

d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas for a threatened species population or ecological community.

The proposal will not result in the isolation of known habitat from currently interconnecting or proximate areas. Habitat surrounding the proposed ventilation shaft facility will remain contiguous with vegetation associated with Newnes State Forest.

e) Whether critical habitat will be affected.

No areas of critical habitat will be impacted under the proposal.

f) Whether a threatened species, population or ecological community, or their habitats are adequately represented in conservation reserves (or other similar protected areas) in the region.

Persoonia hindii is known only from the Newnes Plateau. The presence of the species within State Forest is not considered to provide adequate conservation and therefore the species is considered to be inadequately conserved.

g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process.

The clearing of native vegetation that results in a loss of biodiversity has recently been listed as a key threatening process. The removal of approximately 10 hectares of vegetation as a result of the proposal cannot be classed as a key threatening process, as the development will not result in a loss of biodiversity as similar and much higher quality vegetation communities are widely distributed in the Newnes State Forest.

h) Whether any threatened species, population or ecological community is at the limit of its known distribution.

Persoonia hindii is restricted to the Newnes Plateau and therefore known populations located within the Newnes State Forest are considered to be at the limit of their distribution.

6.3.3 Powerful Owl *Ninox strenua*

a) In the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable population of the species is likely to be placed at risk of extinction.

The Powerful Owl was not recorded during fauna surveys, however, it is considered that the study area may contain potential foraging habitat for this species. The Powerful Owl occupies an extensive home range of up to 1000 hectares, generally within 200 kilometres of the coast in southeastern Australia. Habitat preferences include mountain forests; gullies and forest margins; sparser hilly woodlands; coastal forests, woodlands, scrubs; exotic pine plantations; and large trees in private/public gardens. The species breeds between June and September, nesting in a hollow trunk or limb greater than 8 metres high in a tree. No potential nesting resources for the species are present within the study area.

The loss of approximately 10 hectares of potential foraging habitat will not constitute a significant impact on potential foraging habitat for the Powerful Owl and therefore a viable population of the species will not be placed at risk of extinction.

b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such the viability of the population is likely to be significantly compromised.

The Powerful Owl does not form part of an endangered population.

c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed.

The proposed development will result in the removal of approximately 10 hectares of 'potential' but not 'known', habitat of the Powerful Owl. The study area is not considered likely to provide roosting and breeding habitat for the owl species due to the lack of suitable nesting trees. Significant areas of potential habitat are likely to occur within Newnes State Forest. A significant area of known habitat will not be disturbed by the proposed development.

d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas for a threatened species population or ecological community.

The proposed development area does not provide known habitat, however, it is considered to potentially provide foraging habitat for the Powerful Owl. The foraging habitat located within the proposed development area is currently connected to surrounding vegetation communities and the small nature of the development will ensure the proposal will not result in the isolation of currently interconnecting or proximate areas.

e) Whether critical habitat will be affected.

No areas of critical habitat will be impacted under the proposal.

f) Whether a threatened species, population or ecological community, or their habitats are adequately represented in conservation reserves (or other similar protected areas) in the region.

It is considered likely that the Powerful Owl is not adequately represented in conservation areas in the region. The Powerful Owl is know from records in Wollemi National Park and Yengo National Park.

g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process.

The clearing of native vegetation that results in a loss of biodiversity has recently been listed as a key threatening process. The removal of approximately 10 hectares for the proposed upcast ventilation shaft and associated infrastructure cannot be classed as a key threatening process as the development will not result in a loss of species, ecosystem or genetic diversity, which are the three broad components that comprise biodiversity.

h) Whether any threatened species, population or ecological community is at the limit of its known distribution.

Powerful Owls are distributed in southeastern Australia, confined to forests of the Great Dividing Range from the coast at the Victorian - South Australian border to Rockhampton in Queensland. The species is also found in Central Victoria. It is not at the limit of its known distribution in the study area.

6.3.4 *Petaurus norfolcensis* – Squirrel Glider

a) In the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable population of the species is likely to be placed at risk of extinction.

The Squirrel Glider occurs in wet and dry sclerophyll forests and woodlands. The species nests in tree hollows and has a home range generally between 20 to 30 hectares, however, home ranges are known to be as little as 6-8 hectares in Lake Macquarie. Squirrel Gliders live in family groups comprising one mature adult male, one or more adult females and their associated offspring. The species feeds on insects, acacia gum and eucalypt sap released by incising the bark.

It is considered that the study area provides potential habitat for the Squirrel Glider, as less than 10 suitable tree hollows were observed. It is not expected that the removal of endemic vegetation for the development of the proposed upcast ventilation shaft and associated facilities will significantly affect this species, as an extensive area of vegetation occurs adjacent to the study area as part of the Newnes State Forest. A viable population of the species is not expected to be placed at risk of extinction as a result of the proposed development.

b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.

The Squirrel Glider does not form part of an endangered population.

c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed.

A significant area of potential Squirrel Glider habitat will not be removed as a result of the proposal, with an area of only 10 hectares being disturbed. The study area does not comprise known habitat for this species and therefore a significant area of known habitat will not be compromised by the proposal.

d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas for a threatened species population or ecological community.

The study area does not constitute known habitat of the Squirrel Glider, but is considered to provide potential habitat. The proposal will not result in the isolation of potential habitat, as vegetation will be retained on all sides of the proposed development area.

e) Whether critical habitat will be affected.

No areas of critical habitat will be affected under the proposal.

f) Whether a threatened species, population or ecological community, or their habitats are adequately represented in conservation reserves (or other similar protected areas) in the region.

The conservation status of the Squirrel Glider is not adequately known, however, the species has been recorded in Blue Mountains National Park (NP), Brisbane Water NP, Tooloom NP, Border Ranges NP, Mount Warning NP, Warrumbungle NP and Binnaway Nature Reserve.

g) *Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process.*

The clearing of native vegetation that results in a loss of biodiversity has recently been listed as a key threatening process. The removal of vegetation for the proposed upcast ventilation shaft facility cannot be classed as a key threatening process as the development will not result in a loss of species, ecosystem or genetic diversity, which are the three broad components that comprise biodiversity. Significant areas of vegetation surround the proposed development area and only 10 hectares of vegetation is to be lost under the proposal.

h) Whether any threatened species, population or ecological community is at the limit of its known distribution.

The Squirrel Glider is sparsely distributed along the east coast and immediate inland areas from western Victoria to north Queensland. The species is found inland as far as the Grampians in Victoria and the Pilliga and Coonabarabran areas of New South Wales. The species is not at the limit of its distribution in the study area.

6.3.5 Threatened Cave Roosting Microchiropteran Bats

***Miniopterus schreibersii* - Common Bent-wing Bat**
***Chalinolobus dwyeri* - Large-eared Pied Bat**

a) In the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable population of the species is likely to be placed at risk of extinction.

The Common Bent-wing Bat is a cave roosting species, which is typically found in well-timbered valleys where it forages above the tree canopy (Dwyer, 1998). During spring, adult females move from scattered roosts to specific nursery caves that provide high temperature and humidity throughout the year. Disturbance of these nursery caves may place the survival of widespread populations in jeopardy (Dwyer, 1998). The species is also vulnerable to disturbance of roosts used for hibernation, with any such disturbance potentially increasing winter mortality (Dwyer, 1998). The Common Bent-wing Bat was recorded during microchiropteran bat surveys undertaken for this assessment (**Figure 4.1**).

The Large-eared Pied Bat typically roosts in caves, mine tunnels, and the abandoned, bottle-shaped mud nests of Fairy Martins. It is found in a variety of drier habitats, including the dry sclerophyll forests to the east and west of the Great Dividing Range. Isolated records from sub-alpine woodland and on the edge of rainforest and moist forest suggests that it may occupy a greater diversity of habitats than has so far been recorded. This species was not identified in the survey area, but potential foraging habitat was found to occur.

The proposed upcast ventilation shaft and associated facilities will not have a significant impact on the life cycle of the Common Bent-wing Bat or Large-eared Pied Bat. The Common Bent-wing Bat and Large-eared Pied Bat are cave roosting species and no potential roosting habitat is provided within the study area. The loss of approximately 10 hectares of foraging habitat is not expected to significantly impact the Common Bent-wing Bat or the potentially occurring Large-eared Pied Bat. On this basis, viable populations of these species will not be placed at risk of extinction.

b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.

The Common Bent-wing Bat and the Large-eared Pied Bat are not listed as endangered populations.

c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed.

The proposal will result in the removal of known foraging habitat of the Common Bent-wing Bat. The removal of approximately 10 hectares of foraging habitat will not significantly impact on the foraging habitat available to these species, as an extensive area of foraging habitat is provided by Newnes State Forest. The loss of approximately 10 hectares of habitat is not considered to comprise a significant proportion of habitat from a local or regional perspective.

No known habitat of the Large-eared Pied Bat occurs in the study area. However, a significant area of potential foraging habitat will not be affected by the proposed development.

d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas for a threatened species population or ecological community.

The proposal will not result in the isolation of any known or potential foraging habitat areas in the study area from currently interconnecting or proximate areas. The threatened cave roosting microchiropteran bat species are highly mobile and able to exploit the foraging resources of the adjacent vegetation communities. The proposal will not isolate currently connected or proximate areas.

e) Whether critical habitat will be affected.

No areas of critical habitat will be impacted under the proposal.

f) Whether a threatened species, population or ecological community, or their habitats are adequately represented in conservation reserves (or other similar protected areas) in the region.

The conservation status of cave roosting microchiropteran bats is inadequately known. Available records indicate that the Common Bent-wing Bat is not adequately represented in conservation

reserves in the region, however, the species has been recorded in low numbers in the Kanangra Boyd and Yengo National Parks (NSW NPWS Website).

The Large-eared Pied Bat has been recorded in low numbers in the Kanangra Boyd and Yengo National Parks (NSW NPWS Website). This species is not considered to be adequately represented in conservation reserves in the region.

g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process.

The clearing of native vegetation that results in a loss of biodiversity has recently been listed as a key threatening process. The potential removal of approximately 10 hectares of vegetation as a result of the proposal cannot be classed as a key threatening process, as the development will not result in a loss of biodiversity as similar and much higher quality vegetation communities are widely distributed in the Newnes State Forest.

h) Whether any threatened species, population or ecological community is at the limit of its known distribution.

The Common Bent-wing Bat occurs throughout the coastal strip of Eastern Australia, extending from Cape York to Adelaide. The species is also found in the northern regions of the Northern Territory and Western Australia (Dwyer, 1998). The species is not at the limit of its known distribution in the study area.

The Large-eared Pied Bat occurs from near Rockhampton in central coastal Queensland to Bungonia in southern New South Wales. The species is not at the limit of its distribution in the study area.

6.3.6 Threatened Tree Roosting Microchiropteran Bats

***Scoteanax ruepellii* - Greater Broad-nosed Bat**
***Falsistrellus tasmaniensis* - Eastern False Pipistrelle**

a) In the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable population of the species is likely to be placed at risk of extinction.

The Greater Broad-nosed Bat was not recorded during fauna surveys, however, it is expected that the study area provides potential foraging habitat for the species. The species' habitat preferences include gullies and rivers systems along the Great Dividing Range. Little is known of the reproductive cycle of the species, however, females appear to exclude males for the birth and raising of young (Hoye and Richards, 1995). The survey area provides potential habitat for this species.

The Eastern False Pipistrelle is highly manoeuvrable and probably forages above the forest canopy, in open woodland or over water. The Eastern False Pipistrelle is a tree roosting species which, due to the size and shape of its wings, could be expected to be highly mobile, with a comparatively large foraging range (Phillips, 1995). The survey area provides potential habitat for this species.

The proposed development will result in the disturbance of approximately 10 hectares of potential foraging habitat and removal of a small number of potential roosting resources. The small disturbance area and the proximity of extensive areas of suitable foraging and potentially roosting habitat throughout the Newnes State Forest will ensure that a viable population of threatened tree roosting microchiropteran bats potentially occurring within the study area will not be placed at risk of extinction.

b) In the case of an endangered population, whether the lifecycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.

The threatened tree roosting microchiropteran bats considered to potentially occur in the study area are not listed as endangered populations.

c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed.

The proposal will not result in the removal of known habitat of the Greater Broad-nosed Bat or Eastern False Pipistrelle. The proposal will not involve the removal of a significant proportion of habitat from a local or regional perspective.

d) Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas for a threatened species population or ecological community.

The proposal will not result in the isolation of foraging habitat from currently interconnecting or proximate areas. The threatened tree roosting microchiropteran bat species are highly mobile and able to exploit the foraging resources of the adjacent vegetation communities. The proposal will not isolate currently connected or proximate areas.

e) Whether critical habitat will be affected.

No areas of critical habitat will be impacted under the proposal.

f) Whether a threatened species, population or ecological community, or their habitats are adequately represented in conservation reserves (or other similar protected areas) in the region.

The conservation status of microchiropteran bats is inadequately known. Available records indicate that the Eastern False Pipistrelle is not considered to be adequately reserved, recorded in only low numbers in Yengo National Park and Gardens of Stone National Park.

The Greater Broad-nosed Bat has been recorded in low numbers in the Kanangra Boyd and Yengo National Parks (NSW NPWS Website). This species is not considered to be adequately represented in conservation reserves in the region.

g) Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process.

The clearing of native vegetation that results in a loss of biodiversity has recently been listed as a key threatening process. The potential removal of approximately 10 hectares of vegetation as a result of the proposal cannot be classed as a key threatening process, as the development will not result in a loss of biodiversity as similar and much higher quality vegetation communities are widely distributed in the Newnes State Forest.

h) Whether any threatened species, population or ecological community is at the limit of its known distribution.

The Greater Broad-nosed Bat occurs from the Atherton Tableland in tropical Queensland to northeastern Victoria, with the species' stronghold in the gullies and river systems of the Great Dividing Range (Hoye and Richards, 1995). The species is not at the limit of its distribution in the study area.

The Eastern False Pipistrelle occurs along the coastal strip of New South Wales, extending south to southern and eastern Victoria and north to southeastern Queensland (Phillips, 1995). The species is not at the limit of its distribution in the study area.

7.0 MANAGEMENT RECOMMENDATIONS

The proposed upcast ventilation shaft and associated facilities will not require the removal of a significant area of endemic vegetation. One threatened fauna species, the Common Bent-wing Bat, and one threatened flora species, *Persoonia hindii* were identified in the study area. An additional threatened flora species, *Derwentia blakelyi*, was identified adjacent to the study area. Further populations of these threatened flora species have been identified in close proximity to the study area.

A range of mitigation measures have been designed for the project to mitigate the impact of the proposal on threatened flora species. The area in which *Persoonia hindii and Derwentia blakelyi* were identified will be flagged to prevent inadvertent access by machinery and to ensure that no clearing is undertaken without supervision by a qualified ecologist. Within this identified area canopy species will be hand-lopped to ensure threatened species are not impacted by clearing activities. *Persoonia hindii* is a low growing, prostrate shrub which will not require disturbance in the construction of the powerline easement. Similarly, *Derwentia blakelyi* is a low growing shrub which rarely exceeds 50 cm in height. Clearing is therefore not expected to impact on the threatened species recorded or considered likely to occur within the proposed disturbance area. Lopped portions of trees will be removed by an excavator operating from the currently existing 66 kV powerline easement, or if it is deemed that removal of the trees will cause adverse damage to the identified threatened species, they will be left to provide ground fauna habitat. All clearing activities are to be supervised by an appropriately qualified and experienced ecologist to ensure the potential for impact on threatened species is minimised.

In addition to the clear marking of threatened species habitat, the limits of the entire disturbance area will be flagged to prevent clearing of adjacent vegetation and threatened species.

It is also recommended that clearing of vegetation is supervised by a qualified and experienced ecologist, in order to ensure that threatened flora species and endemic fauna are not injured during the clearing process.

During construction, implementation of appropriate erosion and sediment controls is required to ensure there is no impact on adjacent vegetation communities and fauna habitats as a result of the development.

Hollow bearing trees occurring in the study area should be carefully cleared in order to prevent injury to hollow dependant fauna. Depending on site conditions, hollow bearing trees should either be slowly pushed over using a bulldozer, with care taken to avoid damage to hollows, or preferably, hollow bearing trees should be slowly pushed over while being supported by a wire rope, which should control the speed of the falling tree. Hollows are to be inspected for injured fauna, and any injured species taken to the nearest veterinarian or WIRES for treatment.

8.0 REFERENCES

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APPENDIX 1

Flora Species List

FLORA SPECIES LIST

The following is a list of the flora species recorded in the study area during the flora survey completed in October 2002.

Introduced – Refers to exotic species that have been introduced to the study area.

No flora species listed in the *Threatened Species Conservation Act 1995* are present in the study area.

Nomenclature is consistent with Harden (1991, 1992, 1993, 2000).

Family Name	Scientific Name	Common Name
Asteraceae	*Helichrysum sp.*	Yellow Everlasting Daisy
Cyperaceae	*Caustis flexuosa*	Old Mans Beard
Dilleniaceae	*Hibbertia obtusifolia*	Grey Guinea Flower
Dennstaedtiaceae	*Pteridium esculentum*	Bracken
Euphorbiaceae	*Poranthera micropylla*	
Fabaceae	*Mirbelia platylobioides*	
	Hovea linearis	
	Daviesia ulicifolia subsp. ulicifolia	
	Daviesia alata	Bitter Pea
	Dillwynia sp.	Egg and Bacon Pea
	Gompholobium huegeli	
	Leucopogon sp.	
	Phyllota squarrosa	Dense Phyllota
	Monotoca scoparia	
Haloragaceae	*Gonoarpu tetragynus*	
Lomandraceae	*Lomandra longifolia*	Spiny-headed Matt Rush
	Lomandra multiflora	Many-headed Matt Rush
Mimosaceae	*Acacia buxifolia*	Box-leaved Wattle
	Acacia spectabilis	Mudgee Wattle
	Acacia longifolia	Sydney Golden Wattle
Myrtaceae	*Eucalyptus sieberii*	Silvertop Ash
	Eucalyptus viminalis	Ribbon Gum
	Eucalytus radiata	Narrow-leaved Peppermint
	Eucalytus oreades	Blue Mountain Ash
	Eucalytus mannifera	Brittle Gum
	Laeptospermum ap.	Tea Tree
Phormiaceae	*Dianella revoluta subsp. revoluta*	
Poaceae	*Poa sp. (labillardiera?)*	Tussock Grass
	Stipa pubescens	
	Danthonia sp.	Wallaby Grass
Proteaceae	*Isopogon anemonifolius*	Drumsticks
	Petrophile sessilis	Cone-Sticks
	Banksia spinulosa	Hair-pin Banksia
	Hakea dactyloides	Finger Hakea
	Persoonia hindii	
	Persoonia myrtilloides subsp. myrtilloides	
	Persoonia laurina	Golden Geebung
	Lomatia silaifolia	Crinkle Bush
Rgamnaceae	*Cryptandra amara var. amara*	Bitter Cryptandra
Rutaceae	*Boronia microphylla*	
Santacaceae	*Omphacomeria acerba*	Leafless Sour Bush
Scrophulariaceae	*Derwentia blakelyi*	
Thymelaeceae	*Pimelia linifolia*	Rice Flower

APPENDIX 2

Fauna Species List

FAUNA SPECIES LIST

Note: The fauna list has been compiled from NPWS Atlas database records for the area. These species have been recorded within a 10 kilometre radius surrounding the study area. The Umwelt Survey column records those species identified during the fauna surveys conducted during April 2002.

X = Species recorded by Umwelt in the study area
E1 = Endangered under Schedule 1 of the *Threatened Species Conservation Act, 1995* (TSC Act)
V = Vulnerable under Schedule 2 of the *Threatened Species Conservation Act, 1995*
P = Protected under the *National Parks and Wildlife Act 1979*
U = Unprotected

Scientific Name	Common Name	Legal Status	Umwelt Survey
Amphibians			
Crinia signifera	Common Eastern Froglet	P	
Limnodynastes dumerilii	Eastern Banjo Frog	P	
Limnodynastes fletcheri	Long-thumbed Frog	P	
Limnodynastes peronii	Brown-striped Frog	P	
Limnodynastes tasmaniensis	Spotted Grass Frog	P	
Uperoleia laevigata	Smooth Toadlet	P	
Litoria dentata	Bleating Tree Frog	P	
Litoria peronii	Peron's Tree Frog	P	
Oedura lesueurii	Lesueur's Velvet Gecko	P	
Reptiles			
Pygopus lepidopodus	Common Scaly-foot	P	
Amphibolurus muricatus	Jacky Lizard	P	
Pogona barbata	Bearded Dragon	P	
Tympanocryptis diemensis	Mountain Dragon	P	
Bassiana platynota	Red-throated Skink	P	
Cryptoblepharus virgatus	Wall Lizard	P	
Ctenotus taeniolatus	Copper-tailed Skink	P	
Egernia whitii	White's Skink	P	
Eulamprus heatwolei		P	
Eulamprus leuraensis	Blue Mountains Water Skink	E1	
Eulamprus quoyii	Eastern Water Skink	P	
Lampropholis delicata	Grass Skink	P	X
Lampropholis guichenoti	Garden Skink	P	X
Pseudemoia entrecasteauxii	Tussock Skink	P	
Tiliqua nigrolutea	Blotched Blue-tongued Lizard	P	
Tiliqua scincoides	Eastern Blue-tongued Lizard	P	
Austrelaps ramsayi	Highland Copperhead	P	
Birds			
Alectura lathami	Australian Brush-turkey	P	
Anas rhynchotis	Australasian Shoveler	P	
Anas superciliosa	Pacific Black Duck	P	
Biziura lobata	Musk Duck	P	
Chenonetta jubata	Australian Wood Duck	P	
Poliocephalus poliocephalus	Hoary-headed Grebe	P	
Phalacrocorax melanoleucos	Little Pied Cormorant	P	
Egretta novaehollandiae	White-faced Heron	P	
Aquila audax	Wedge-tailed Eagle	P	
Elanus axillaris	Black-shouldered Kite	P	
Falco berigora	Brown Falcon	P	

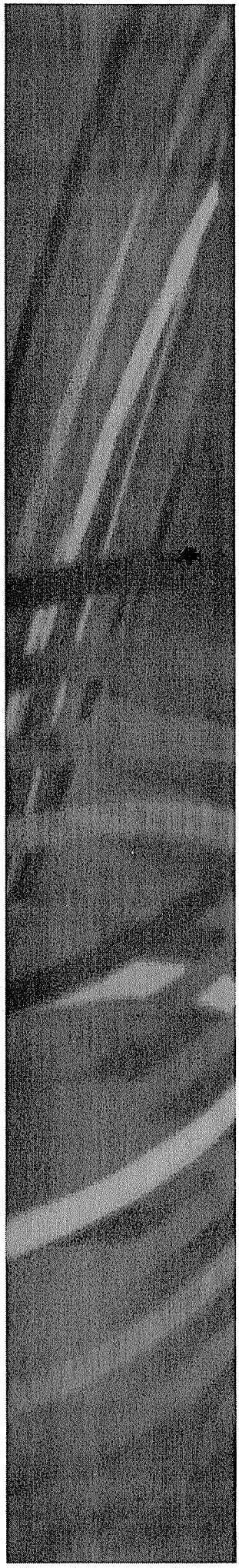
Scientific Name	Common Name	Legal Status	Umwelt Survey
Haliastur sphenurus	Whistling Kite	P	X
Leucosarcia melanoleuca	Wonga Pigeon	P	
Cacatua galerita	Sulphur-crested Cockatoo	P	
Callocephalon fimbriatum	Gang-gang Cockatoo	P	
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo	P	X
Alisterus scapularis	Australian King-Parrot	P	
Platycercus elegans	Crimson Rosella	P	X
Platycercus eximius	Eastern Rosella	P	
Ninox novaeseelandiae	Southern Boobook	P	X
Ninox strenua	Powerful Owl	V	
Podargus strigoides	Tawny Frogmouth	P	
Eurostopodus mystacalis	White-throated Nightjar	P	
Aegotheles cristatus	Australian Owlet-nightjar	P	
Hirundapus caudacutus	White-throated Needletail	P	
Dacelo novaeguineae	Laughing Kookaburra	P	X
Menura novaehollandiae	Superb Lyrebird	P	
Cormobates leucophaeus	White-throated Treecreeper	P	X
Malurus cyaneus	Superb Fairy-wren	P	
Malurus lamberti	Variegated Fairy-wren	P	
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	P	X
Acanthiza lineata	Striated Thornbill	P	
Acanthiza pusilla	Brown Thornbill	P	X
Origma solitaria	Rockwarbler	P	
Pardalotus punctatus	Spotted Pardalote	P	
Pardalotus striatus	Striated Pardalote	P	
Pycnoptilus floccosus	Pilotbird	P	
Sericornis frontalis	White-browed Scrubwren	P	
Acanthagenys rufogularis	Spiny-cheeked Honeyeater	P	
Acanthorhynchus tenuirostris	Eastern Spinebill	P	
Anthochaera carunculata	Red Wattlebird	P	
Anthochaera chrysoptera	Little Wattlebird	P	X
Lichenostomus chrysops	Yellow-faced Honeyeater	P	
Lichenostomus leucotis	White-eared Honeyeater	P	
Lichenostomus penicillatus	White-plumed Honeyeater	P	
Manorina melanocephala	Noisy Miner	P	
Melithreptus brevirostris	Brown-headed Honeyeater	P	
Melithreptus lunatus	White-naped Honeyeater	P	
Philemon corniculatus	Noisy Friarbird	P	X
Phylidonyris nigra	White-cheeked Honeyeater	P	
Phylidonyris novaehollandiae	New Holland Honeyeater	P	
Phylidonyris pyrrhoptera	Crescent Honeyeater	P	
Eopsaltria australis	Eastern Yellow Robin	P	
Petroica multicolor	Scarlet Robin	P	X
Petroica rosea	Rose Robin	P	
Cinclosoma punctatum	Spotted Quail-thrush	P	
Psophodes olivaceus	Eastern Whipbird	P	
Daphoenositta chrysoptera	Varied Sittella	P	X
Colluricincla harmonica	Grey Shrike-thrush	P	
Pachycephala pectoralis	Golden Whistler	P	
Pachycephala rufiventris	Rufous Whistler	P	
Grallina cyanoleuca	Magpie-lark	P	
Myiagra rubecula	Leaden Flycatcher	P	
Rhipidura fuliginosa	Grey Fantail	P	X
Rhipidura leucophrys	Willie Wagtail	P	X

Scientific Name	Common Name	Legal Status	Umwelt Survey
Rhipidura rufifrons	Rufous Fantail	P	
Coracina novaehollandiae	Black-faced Cuckoo-shrike	P	
Artamus cyanopterus	Dusky Woodswallow	P	
Cracticus torquatus	Grey Butcherbird	P	X
Gymnorhina tibicen	Australian Magpie	P	X
Strepera graculina	Pied Currawong	P	X
Strepera versicolor	Grey Currawong	P	
Corvus coronoides	Australian Raven	P	X
Corcorax melanorhamphos	White-winged Chough	P	X
Ptilonorhynchus violaceus	Satin Bowerbird	P	
Anthus novaeseelandiae	Richard's Pipit	P	
Neochmia temporalis	Red-browed Finch	P	X
Stagonopleura guttata	Diamond Firetail	V	
Carduelis carduelis	European Goldfinch	U	
Hirundo ariel	Fairy Martin	P	
Hirundo neoxena	Welcome Swallow	P	
Pycnonotus jocosus	Red-whiskered Bulbul	U	
Zosterops lateralis	Silvereye	P	
Zoothera lunulata	Bassian Thrush	P	
Mammals			
Antechinus flavipes	Yellow-footed Antechinus	P	X
Antechinus stuartii	Brown Antechinus	P	
Phascolarctos cinereus	Koala	V	
Vombatus ursinus	Common Wombat	P	X
Trichosurus vulpecula	Common Brushtail Possum	P	
Petauroides volans	Greater Glider	P	
Petaurus australis	Yellow-bellied Glider	V	
Petaurus breviceps	Sugar Glider	P	
Petaurus norfolcensis	Squirrel Glider	V	
Pseudocheirus peregrinus	Common Ringtail Possum	P	X
Macropus giganteus	Eastern Grey Kangaroo	P	X
Macropus robustus	Common Wallaroo	P	
Macropus rufogriseus	Red-necked Wallaby	P	
Petrogale penicillata	Brush-tailed Rock-wallaby	V	
Wallabia bicolor	Swamp Wallaby	P	X
Mormopterus planiceps	Little Mastiff-bat	P	
Mormopterus sp 1	undescribed mastiff-bat	P	X
Nyctinomus australis	White-striped Mastiff-bat	P	
Chalinolobus dwyeri	Large-eared Pied Bat	V	
Chalinolobus gouldii	Gould's Wattled Bat	P	X
Chalinolobus morio	Chocolate Wattled Bat	P	X
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	
Miniopterus schreibersii	Common Bent-wing Bat	V	X
Nyctophilus gouldi	Gould's Long-eared Bat	P	
Scoteanax rueppellii	Greater Broad-nosed Bat	V	
Scotorepens orion	Eastern Broad-nosed Bat	P	
Vespadelus darlingtoni	Large Forest Bat	P	X
Vespadelus regulus	Southern Forest Bat	P	
Vespadelus vulturnus	Little Forest Bat	P	X
Rattus fuscipes	Bush Rat	P	

Scientific Name	Common Name	Legal Status	Umwelt Survey
Introduced Species			
Sturnus vulgaris	Common Starling	U	
Mus musculus	House Mouse	U	
Oryctolagus cuniculus	Rabbit	U	
Canis familiaris	Dingo and Dog (feral)	U	
Vulpes vulpes	Fox	U	
Bos taurus	Cattle (feral)	U	
Invertebrates			
Paralucia spinifera	Bathurst Copper Butterfly	E1	

APPENDIX 4

Noise Impact Assessment



REPORT 10-2497-R2

Proposed Ventilation Shaft Facility Springvale Underground Coal Mine Noise Impact Assessment

Prepared for

Umwelt (Australia) Pty Ltd
PO Box 838
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10 October 2002

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Proposed Ventilation Shaft Facility
Springvale Underground Coal Mine
Noise Impact Assessment

Reference	Status	Date	Prepared	Checked	Authorised
10-2497R2	Revision 0	10 October 2002			

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1 INTRODUCTION

Springvale Underground Coal Mine (Springvale Mine) is proposing to establish a New Ventilation Shaft Facility approximately 6 km east of the Springvale Pit Top location near Wallerawang. The proposed Facility would be located within Newnes State Forest almost due north of Lithgow and would be approximately 3.6 km from the nearest residential receiver.

A Statement of Environmental Effects (SEE) is being prepared by Umwelt (Australia) Pty Ltd, on behalf of Springvale Mine, to assess the potential impacts of the proposed Facility. Richard Heggie Associates Pty Ltd (RHA) has been engaged by Umwelt to prepare a Noise Impact Assessment report to accompany the SEE.

2 DESCRIPTION OF LOCALITY AND PROJECT

2.1 Project Site

Springvale Mine is proposing to establish a New Ventilation Shaft Facility, involving the relocation of existing ventilation equipment or new similar sized units. The current Springvale Colliery ventilation system employs two fan units with an airflow capacity of 120 m^3/sec.

The site of the proposed facility is over 8 km north of Lithgow within Newnes State Forest and is characterised by rugged terrain and steep hills. The elevation of the immediate area is almost 200 m higher than the flatter plain areas to the south (Lithgow) and west (Wallerewang).

A layout plan of the proposed Facility is shown in **Appendix A**.

2.2 Proposed Facility

Key characteristics of the proposed New Ventilation Shaft Facility include the following:

- The actual ventilation shaft would be 3.5 m in diameter and located within a rectangular site compound 250 m by 165 m.
- Fans for the shaft would be either the existing Springvale ventilation system fans (2 off) or new similar configuration fans.
- In addition to the ventilation shaft and associated fans, the site compound would include a dewatering borehole and dewatering pond, power supply and compressed air boreholes, ballast and concrete borehole, power boreholes, compressors and a transformer.
- A powerline and access road (20 m easement) would be built to connect the ventilation compound with a sub-station located approximately 2 km to the southeast.
- Construction of the proposed facility is expected span up to ten months and involve the following:
  - Up to 20 workers on-site at any one time.
  - Drill Rig for the ventilation shaft: at the present time final selection of the drilling technique has not been made and would involve a choice of either of a raise boring or blind hole drilling technique.
  - Drill Rig for the other boreholes (power, compressed air, etc).
  - Bulldozer (D6), Excavator and Compactor for site establishment, site compound and access road construction.
  - Dump trucks for spoil haulage.
  - Maximum of two cranes on site.
  - Other mechanical equipment (compressors, pumps, etc).

3 AMBIENT NOISE ENVIRONMENT AND NOISE CRITERIA

3.1 Introduction

The control of noise emission in NSW is vested in Local Government and the Environment Protection Authority (EPA). Accordingly, noise emissions from the proposed development have been assessed in accordance with:

- Springvale Coal's EPA licence conditions (refer EPA Licence 3607).
- The EPA's "Industrial Noise Policy" (INP), for stationary noise emissions (usually associated with mechanical plant).
- The EPA's "Environmental Noise Control Manual" (ENCM), for construction noise emissions and in relation to sleep disturbance. The issue of sleep disturbance is also covered in the EPA's "Environmental Criteria for Road Traffic Noise" ECRTN.

Springvale Coal's EPA licence conditions (refer EPA Licence 3607) do not contain explicit noise criteria – refer Licence Sub-Section L6. The licence does however state a requirement to record and respond to any complaints relating to pollution associated with the operations covered by the licence, which would include noise emissions from the mine's ventilation systems.

3.2 Ambient Noise Environment

In order to be able to assess noise emissions from the proposed development against the criteria recommended in the above policies and manuals, it is usually necessary to measure the existing ambient noise environment at the potentially nearest affected residential receiver locations.

The nearest residence however is located over 3.5 km to the southwest of the centroid of the proposed ventilation site compound.

Accordingly, an ambient noise survey at the nearest residential receiver was not undertaken, and instead, a conservative estimate of ambient noise levels was made for assessment of the proposed Facility.

Since the proposed facility would be able operate on a 24 hour-per-day basis, night-time background noise levels would provide the governing noise period for the assessment and the following assumption has been made:

- The Rating Background Level (RBL) during the night-time period at the nearest affected residential receiver may be at or below 30 dBA.

Section 3.1 of the EPA's INP recommends that:

> Where the RBL is found to be below 30 dBA, it should be set at 30 dBA.

3.3 Noise Criteria - Operational Noise Emissions

Criteria governing noise emissions for the proposed Facility are found in the EPA's Industrial Noise Policy (INP), with the following broad objectives:

- Controlling intrusive noise impacts.
- Maintaining noise level amenity for particular land uses over the medium to long-term.

Intrusiveness Criterion

In setting an "Intrusive" noise goal, a statistically rigorous estimate of the ambient (background) L_{A90} noise level, termed the RBL, needs to be established at the nearest sensitive receivers. An "RBL plus 5 dBA" criterion is then applied to the 15-minute L_{Aeq} noise emissions of the noise source in question at the receivers of interest (normally at their property boundary or 30 m from the most exposed façade of the residence concerned for larger properties as can be encountered in rural areas).

> **Intrusive Design Goal:** $L_{Aeq(15minute)} \leq RBL + 5$ dBA

Amenity Criterion

The EPA's INP "Amenity" noise goal seeks to place a limit on noise emissions according to how existing industrial-related noise levels relate to recommended noise levels for the type of area involved, ie rural, urban, etc.

The resulting amenity criterion placed upon noise emissions of a new facility then depends upon whether existing industrial-related $L_{Aeq(period)}$ levels are lower or higher than the recommended amenity level.

- In areas where existing industrial-related noise levels are already high, the amenity noise goal acts to limit new industrial noise emissions so that the cumulative impact of all industrial noise emissions does not increase.
- Conversely, in areas where there is no existing industrial noise, the amenity noise goal would be set at a level which allows new industrial noise emissions up to the recommended amenity levels for the area.

The EPA's recommended acceptable noise level for residents located in a "Rural" area is:

- 50 dBA during the daytime period (7.00 am to 6.00 pm)
- 45 dBA during the evening period (6.00 pm to 10.00 pm)
- 40 dBA during the night-time period (10.00 pm to 7.00 am)

On the assumption that there are no industrial noise sources of significance in the vicinity of the nearest residential receiver, the recommended amenity criteria for the project would be:

Amenity Design Goals:	$L_{Aeq(11\text{-hour})}$	= 50 dBA	day
	$L_{Aeq(4\text{-hour})}$	= 45 dBA	evening
	$L_{Aeq(9\text{-hour})}$	= 40 dBA	night

Project-Specific Noise Goal

On the basis of the above, the following criteria represent INP noise goals for the development:

- The Intrusive Goal recommends that L_{Aeq} noise levels remain below 35 dBA on a continuous 15-minute basis, throughout the day including the night-time 10.00 pm to 7.00 am period.
- The Amenity Goal recommends that L_{Aeq} noise levels remain at or below 40 dBA during the 9-hour night-time (10.00 pm to 7.00 am) period.

Accordingly, a conservative project specific goal for noise emissions from the proposed Facility (covering all criteria) would be:

> $L_{Aeq(15minute)}$ noise emissions should not exceed 35 dBA (any time of the day) at the nearest residential receiver.

Sleep Disturbance

For residential properties, a sleep disturbance criterion is provided in Chapter 19 of the EPA's Environmental Noise Control Manual (ENCM), namely:

- $L_{A1(60s)}$ noise levels should not exceed the L_{A90} background noise level by a margin of more than 15 dBA during night-time period (10.00 pm to 7.00 am). Sleep disturbance should be assessed at a resident's bedroom window.

The EPA's *"Environmental Criteria for Road Traffic Noise"* (ECRTN) also provides guidance as to the likelihood of sleep disturbance. The ECRTN points out the following:

- There are no universally accepted criteria governing the likelihood of sleep disturbance. In other words, at the current level of understanding, it is not possible to establish absolute noise level goals that would correlate to levels of sleep disturbance (for all or even a majority of people).

- The ECRTN suggests that:
  - Maximum internal noise levels below 50 dBA to 55 dBA are unlikely to cause awakening reactions.
  - One or two events per night, with maximum internal noise levels of 65 dBA to 70 dBA, are not likely to affect health and wellbeing significantly.
  - At locations where the dominant noise sources (such as road traffic) are continuous rather than intermittent, the $L_{Aeq(9hour)}$ target noise level should sufficiently account for sleep disturbance impacts.
  - However, where the emergence of L_{Amax} noise levels over the ambient L_{Aeq} noise level is equal to or greater than 15 dBA, the $L_{Aeq(9hour)}$ criteria may not sufficiently account for sleep disturbance impacts.

Thus, the ECRTN recommends that the assessment of sleep disturbance should include a consideration of the number of maximum noise level exceedances occurring per given period and the emergence of these exceedances (ie the degree to which the criterion adopted is exceeded) and not simply the possibility that L_{Amax} noise levels exceed ambient L_{Aeq} noise level by a margin greater than 15 dBA in an overall sense.

3.4 Noise Criteria - Construction Noise Emissions

The EPA has published guidelines in its *"Environmental Noise Control Manual"* (ENCM) for the control of construction works noise. Chapter 171-1 of the EPA's ENCM recommends the following approaches to mitigating adverse noise impacts from construction sites:

Noise Emission Objectives

The EPA recommends that the $L_{A10(15\ minute)}$ noise levels arising from a construction site and measured within the curtilage of an occupied noise-sensitive premises (ie at boundary or within 30 m of dwelling, whichever is the lesser) should not exceed the levels indicated in **Table 3.4.1**. These noise goals are consistent with community reaction to construction noise.

Table 3.4.1 Recommended EPA Noise Goals for Construction Works

Period of Noise Exposure	$L_{A10(15minute)}$ Construction Noise Goal
Cumulative noise exposure period not exceeding 4 weeks	$L_{A90(15minute)}$ plus 20 dBA
Cumulative noise exposure period of between 4 weeks and 26 weeks	$L_{A90(15minute)}$ plus 10 dBA
Cumulative noise exposure period longer than 26 weeks	$L_{A90(15minute)}$ plus 5 dBA

Preferred Hours of Construction

The EPA guidelines recommend confining permissible work times as outlined in **Table 3.4.2.**

Table 3.4.2 Preferred EPA Daytime Construction Hours

Day	Preferred Construction Hours
Monday to Friday	7.00 am to 6.00 pm
Saturdays	7.00 am to 1.00 pm (if inaudible at residences) Otherwise, 8.00 am to 1.00 pm.
Sundays or Public Holidays	No construction

Works Undertaken Outside of Preferred Construction Hours

Where it is necessary for construction works to be undertaken outside the EPA's preferred daytime construction hours, the condition normally applied is that:

- $L_{A10(15minute)}$ noise levels emitted by the works should not exceed the L_{A90} level during the relevant evening or night-time period by a margin of more than 5 dBA, *independent* of the duration of the construction activity.

Silencing

All practical measures should be used to silence construction equipment, particularly in instances where extended hours of operation are required.

Impulsive and/or Tonal Noise

For plant or operations with impulsive or tonal noise characteristics, such as rock hammers, a noise penalty of up to 5 dBA (depending on degree of impulsiveness or tonality) should be added to measured or predicted $L_{A10(15minute)}$ noise levels when comparing L_{A10} noise levels from construction works to the limits presented in **Table 3.4.1**.

Sleep Disturbance

In order to minimise the risk of sleep disturbance during night-time construction activities, the EPA's ENCM recommends the use of the $L_{A1(60seconds)}$ criterion discussed in **Section 3.3**.

4 PREDICTED NOISE LEVELS - OPERATIONAL PHASE

4.1 Mechanical Noise Emissions

Details are as yet unavailable as to the precise plant and equipment which will be specified for the proposed Facility. Plant selection will take place during the detailed design phase of the project. The following assumptions have therefore been made regarding the maximum sound power levels of the assumed plant.

- On the basis of sound power level measurements of ventilation systems previously made by RHA, likely maximum sound power levels of the ventilation fans would be approximately 120 dBA each, assuming no special noise attenuation treatment. Such fans could be equipped (if necessary) with silencers which could provide up to (at least) a 25 dBA reduction at source.
- Sound power levels assumed for remaining items of significant noise generating capacity are:
  - Compressors - 90 dBA each
  - Transformer - 90 dBA (dominant tonal component at 100 Hz)
  - Pumps - 87 dBA each.

Resulting Noise Levels at Nearest Residential Receiver

Resulting noise levels at the nearest residential receiver would depend upon:

- the layout of the equipment associated with the proposed Facility and any directionality effects associated with equipment noise emissions, especially the fans
- the distance to the nearest receiver (just over 3.5 km), and
- nature of the intervening terrain between source and receiver.

An exact account has not been made of the precise effect of intervening hills in terms of a noise barrier effect, although this is likely to be significant, providing say a minimum 5 dBA noise reduction. At a distance of 3.5 km, air absorption and ground effects would provide an additional 5 dBA to 10 dBA noise reduction (depending upon the frequency components of the noise source of interest). The fan axis alignment will be vertical (upward) hence providing an additional noise reduction factor due to directionality (with the receivers being at right angles to the main airflow and fan axis).

Working against the noise reductions described above would be the potential for noise enhancement due to temperature inversion and adverse wind speed effects. At a distance of 3.5 km such effects can produce a noise increase of around 5 dBA under strong inversion and weak wind speed conditions.

On the basis of the above considerations, the resulting noise level at the nearest residence from all equipment operating has been estimated as being:

- 34 dBA from the ventilation fans.
- less than 20 dBA from all other equipment (including two compressors, one transformer and two pumps).

The ventilation fans will dominate the resulting (combined) noise emissions, with all other sources combined being greater than 10 dBA lower than the noise emissions from the fans alone.

4.2 Compliance with the EPA's INP Criteria

A review of the calculated $L_{Aeq(15minute)}$ noise levels estimated in **Section 4.1** indicates the following noise contribution at the nearest affected residence to the site:

- A combined $L_{Aeq(15minute)}$ noise level of approximately 34 dBA from all mechanical equipment at the Ventilation Shaft Facility.

The project goal for the facility is that $L_{Aeq(15minute)}$ noise emissions from the facility should not exceed 35dBA (on a continuous basis at any time of the day).

The above estimated noise levels indicate that compliance with the project specific noise goal would be just achieved at the nearest residential receivers without the need for site-specific noise mitigation measures, and on the basis of the assumed noise levels of the dominant noise generating equipment. The above calculations were based on assumed sound power levels for the ventilation fans (120 dBA sound power level each).

We therefore recommend that the sound power levels of the fans to be employed at the Facility be confirmed during the detailed design phase of the project.

Should the ventilation fan sound power levels be higher than those assumed, attenuation should be considered. As stated above, the fans could be equipped with silencers which could provide up to (at least) a 25 dBA reduction at source. If the selected fans do in fact require any noise attenuation, it is likely to be minimal in nature (say 5 dBA) and hence the silencer design will be very straightforward, involving modest-sized (commercially available) silencer designs.

4.3 Compliance with the EPA's Sleep Disturbance Criteria

A review of potential maximum noise events associated with the equipment utilised at the ventilation facility indicates that, even during the night-time period, the incidence of "maximum noise events" (ie instances where the L_{Amax} level exceeds the ambient L_{Aeq} level by more than 15 dBA) would be nil. Sleep disturbance is therefore not indicated.

5 CONSTRUCTION NOISE AND VIBRATION IMPACT AND MITIGATION

5.1 Construction Noise Emission Objectives

Table 5.1.1 presents typical repeated minimum L_{A90} background noise levels that would be expected at the nearest residential receiver based on conservative assumptions regarding likely ambient noise levels.

Table 5.1.1 Ambient L_{A90} Background Noise Levels and Corresponding Construction Noise Emission Objectives

Period	Assumed L_{A90} Background Noise Level (dBA)	L_{A10} Noise Objectives (dBA)		
		Up to 4 Weeks	4 to 26 Weeks	Over 26 Weeks
Daytime [1] - 7:00 am to 6:00 pm	40	60	50	45
Evening - 6:00 pm to 10:00 pm	35	not applicable		40
Night-time - 10:00 pm to 7:00 am	30			35

Note 1 This is the EPA's preferred construction period

5.2 Construction Noise Emissions Database

Construction plant and equipment which would likely be utilised for the present project includes drill rigs, cranes, excavation and earthmoving machines such as bulldozers, scrapers, graders and front-end loaders and other equipment such as compressors and pumps. Likely mobile plant would include dump trucks and water tankers.

Typical maximum expected Sound Power Levels of these construction plant items (with units operating at maximum load) are shown in **Table 5.2.1**.

The sound power levels given in **Table 5.2.1** are maximum noise emission levels. To apply the construction noise criteria for the project, it is necessary to convert these levels to equivalent L_{A10} noise emissions. From numerous field studies on large construction projects, the measured difference values between the L_{Amax} and L_{A10} noise level has been found to be between 4 dBA and 10 dBA. In the present study, a conservative 4 dBA adjustment has been applied to convert the L_{Amax} noise levels shown in **Table 5.2.1** to L_{A10} noise levels for comparison with the construction noise design objectives.

Table 5.2.1 Summary of Sound Power Levels used for Construction Equipment

Plant Item	LAmax Sound Power Level (re 1 pW)
Asphalt Paver	114 dBA
Bulldozer CAT D7, D9	110 dBA to 113 dBA
Compactor	110 dBA
Compressor 600 CFM	100 dBA
Concrete Pump	109 dBA
Concrete Saw	118 dBA
Concrete Truck	108 dBA
Crane Mounted Drilling Rig	115 dBA
Crane (Truck Mounted)	110 dBA
30-Tonne Crane	110 dBA
Drill Rig (General)	115 dBA
Dump Truck	120 dBA
Excavator	111 dBA
Generator (220 kVA)	112 dBA
Grader	110 dBA
Jackhammer	110 dBA
Multi-tyred Rollers	111 dBA to 115 dBA
Rockbreaker	122 dBA
Scraper	111 dBA
Tipper	108 dBA
Water Truck	110 dBA to 112 dBA

5.3 Construction Noise Assessment at Nearest Affected Residences

In order to assess the noise impact of the construction phase for the proposed Facility, noise emission calculations were carried out for the nearest receiver location for peak construction activities. The calculated noise levels were then compared to the standard criteria used for construction noise based on the assumed background noise levels at the relevant receiver.

Predicted construction noise levels will inevitably depend upon the number of plant items and equipment operating at any one time and their precise location relative to the receiver of interest. Therefore, a range of values is predicted at each receiver representing "minimum" and "maximum" estimated L_{A10} levels.

The minimum and maximum noise levels represent the expected variation in construction noise depending upon:

- The location of the particular construction activity, ie if the plant of interest (graders, trucks, etc) was as close as possible or further away from the receiver of interest, and
- The likelihood of all of the equipment of interest operating simultaneously.

The maximum calculated noise levels therefore represent *worst case scenarios*. For large periods of time, in particular when all plant items are not operating simultaneously, noise levels are likely to be lower than the maximum (and possibly even the minimum) calculated levels.

Finally, when reviewing predicted noise levels it should be borne in mind that these levels do not take into account any noise mitigation strategies or treatments recommended in this report to be implemented by the Project Contractor.

Construction noise goals for the nearest residential receiver and calculated $L_{A10(15minute)}$ construction noise levels are shown in **Table 5.3.1** and **Table 5.3.2,** representing scenarios involving (i) all potential equipment operating, and (ii) only the equipment required for the shaft drilling operating, respectively.

Table 5.3.1 Calculated $L_{A10(15minute)}$ Construction Noise Levels at Nearest Residential Receiver All Equipment Operating

Period	Calculated $L_{A10(15minute)}$ Construction Noise Level	$L_{A10(15minute)}$ Construction Noise Goal		
		< 4 Weeks	4 to 26 Weeks	> 26 Weeks
Daytime: 7am to 6pm	< 20 dBA to 40 dBA	60 dBA	50 dBA	45 dBA
Evening: 6pm to 10pm		not applicable		40 dBA
Night-time: 10pm to 7am				35 dBA

Table 5.3.2 Calculated $L_{A10(15minute)}$ Construction Noise Levels at Nearest Residential Receiver Only Equipment Involved in Shaft Drilling Operating

Period	Calculated $L_{A10(15minute)}$ Construction Noise Level	$L_{A10(15minute)}$ Construction Noise Goal		
		< 4 Weeks	4 to 26 Weeks	> 26 Weeks
Daytime: 7am to 6pm	< 12 dBA to 32 dBA	60 dBA	50 dBA	45 dBA
Evening: 6pm to 10pm		not applicable		40 dBA
Night-time: 10pm to 7am				35 dBA

Predicted construction noise levels would comply with ENCM noise goals:

- For daytime and evening periods for all activities envisaged for the site.
- For daytime, evening and night-time periods for the activities required for ventilation shaft drilling.

The above indicates that drilling of the ventilation shaft should be allowed to proceed on a 24-hour per day basis. It is noted that the equipment and processes involved in shaft drilling are continuous in nature and do not involve impulsive or tonal noise emissions.

Accordingly, during the night-time period, the incidence of "maximum noise events" (ie instances where the L_{Amax} level exceeds the ambient L_{A90} level by more than 15 dBA) would be nil. Sleep disturbance is therefore not indicated.

5.4 Noise Mitigation of Proposed Construction Activities

It is predicted that construction noise levels would comply with ENCM noise goals. Nevertheless, given the likelihood that the shaft drilling may take place on a 24-hour-per-day basis, it is recommended that standard noise mitigation strategies be implemented where practical and feasible during the construction works.

AS 2436-1981 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites*" sets out numerous practical recommendations to assist in mitigating construction noise emissions.

Examples of strategies that could be implemented on the present project are listed below, including the typical noise reduction achieved, where applicable.

Operational Strategies:

- An important aspect of the control of noise impacts during all construction phases would be adherence to the EPA's recommended standard daytime construction hours (refer **Section 3**), especially for noise intensive activities such as rockbreaking. This excludes drilling of the main 3.5 m ventilation shaft which can continue through the night-time period.
- Avoiding the coincidence of noisy plant working simultaneously would also result in reduced noise emissions.
- As far as possible, maintenance work on all construction plant should be confined to standard daytime construction hours.

Source Noise Control Strategies:

- Engines and exhausts are typically the dominant noise sources on mobile plant such as bulldozers, cranes, graders, excavators, trucks, etc. In order to reduce noise emissions, residential-class silencers or exhausts could be fitted providing up to 5 dBA of attenuation (relative to the noise levels provided in **Table 5.2.1**).
- Regular maintenance of all plant and machinery used for the project will assist in minimising noise emissions.
- Noise compliance checks of noise-intensive equipment upon arrival on-site.

Community Consultation:

- Active community consultation and the maintenance of positive relations with local residents would assist in alleviating concerns and thereby minimising complaint.

5.5 Construction Vibration

With the nearest residential receiver over 3.5 km from the construction site, vibration emissions from all potential sources include bulldozers ripping rock strata, rockbreakers, vibratory rollers, etc, would be well below human perception levels (and hence even further below structural damage levels) at the nearest residential receivers.

6 CONCLUSION

The aim of the present study has been to assess the potential noise impacts resulting from the proposed New Ventilation Shaft Facility to be employed by Springvale Colliery. The noise emissions assessed from the site include:

- Operational noise emissions from the proposed Facility.
- Construction phase noise emissions.

The noise impact assessment was conducted in accordance with:

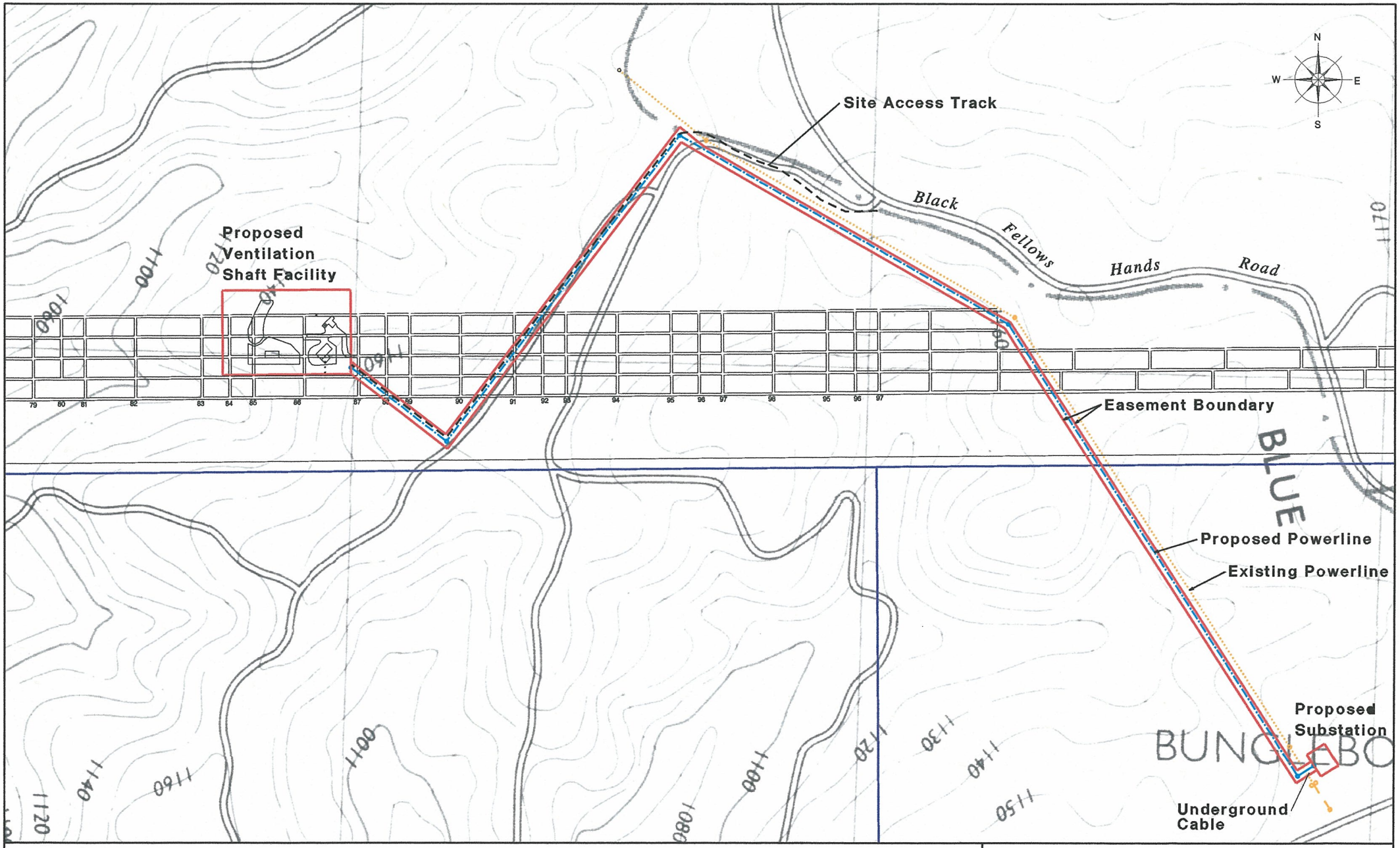
- The EPA's Industrial Noise Policy (INP) for mechanical noise emissions,
- The recommendations set out in the EPA's Environmental Noise Control Manual (ENCM) and the ECRTN for sleep disturbance associated mainly with truck-related noise events (reversing alarms) and people movements within the carpark at night-time.

The study shows that operational compliance with all relevant criteria can be achieved on a 24-hour-per-day basis at the nearest affected residence to the site without the need for site-specific noise mitigation strategies (eg noise walls, restrictions on hours of operation, etc), due to a combination of the following factors:

- Buffer distance - the development is over 3.5 km from the nearest residence at its closest point.
- Source-to-Receiver noise attenuation effects - noise attenuation will also occur due to the barrier effect of intervening terrain, air absorption and ground effects.

The sound power levels of the fans to be employed at the Facility should be confirmed during the detailed design phase of the project and compared to the assumed levels within this report.

Similarly, due to the large buffer distance to the nearest residential receiver, construction stage noise emissions should lie well within relevant EPA noise goals. In particular, calculations indicate that drilling of the ventilation shaft should be allowed to proceed on a 24-hour per day basis.



Legend

- Mining Lease Boundary
- Main Development Headings

Umwelt (Australia) Pty Limited
Base Map Source: 1:25 000 Lithgow Topographic Map (8931-4-S)

0 100 250 500m

APPENDIX A
Proposed Ventilation Shaft Facilities

A4 Scale 1:10 000

Ref No.:R02_A4/1571_049.dgn

APPENDIX 5

Cultural Heritage Assessment

Springvale Coal Pty Limited

Archaeological Assessment of Proposed Ventilation Shaft Facility for Springvale Colliery, Newnes State Forest, NSW

October 2002

Umwelt
Environmental Consultants

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FIGURES

PLATES

APPENDICES

1.0 INTRODUCTION

This report documents the results of the archaeological survey and assessment for the proposed ventilation shaft facility, which will be part of the continuing development of Springvale Colliery. The area to be impacted is approximately 10 hectares, including 4.1 hectares for the ventilation shaft facility (lease application area MLA206) and the remainder for the power supply corridor to the site. Umwelt (Australia) Pty Limited (Umwelt) has been commissioned by Springvale Coal Pty Limited to prepare a Statement of Environmental Effects for the proposed development. This archaeological assessment is part of that project.

1.1 LOCATION OF THE STUDY AREA

The study area is situated within the Newnes State Forest which is located on the Newnes Plateau, in the western Blue Mountains, west of Sydney, Central New South Wales (**Figure 1.1**). The site is on the western side of Black Fellows Hand Road, approximately 9 kilometres north of Lithgow and 8 kilometres east of Wallerawang. The eastern boundary of the study area is approximately 500 metres west of Bungleboori Rest Area.

1.2 BACKGROUND TO CURRENT INVESTIGATION

Springvale Colliery plans to continue longwall mining operations in an easterly direction. The ventilation shaft that now services the underground mining is considered too far west of future operations to be effective and a new ventilation shaft has been proposed to service the future longwall area.

The proposed development will involve the construction of an upcast ventilation shaft and fan, several service boreholes, a substation, power line and access road (**Figure 1.2**). Initially, the area proposed for the shaft site was approximately 165 metres by 250 metres in size with an access road and power line of approximately one kilometre in length (25 metre wide easement) and a substation site approximately 50 metres by 50 metres in area. The area to be impacted was 7.25 hectares. In August, the site for the proposed substation was relocated due to the poor earthing potential of the original site and the route for the access road and power line extended to a total length of approximately 3 kilometres. The revised area for the substation will be 40 metres by 40 metres. The additional 2 kilometres of power line will run adjacent and west of an existing power line, extending the existing width of easement to a total of 40 metres in that section. An easement of 20 metres in width was left to be surveyed in the second phase. At present, the total area to be developed is approximately 10 hectares.

1.3 IMPACT HISTORY

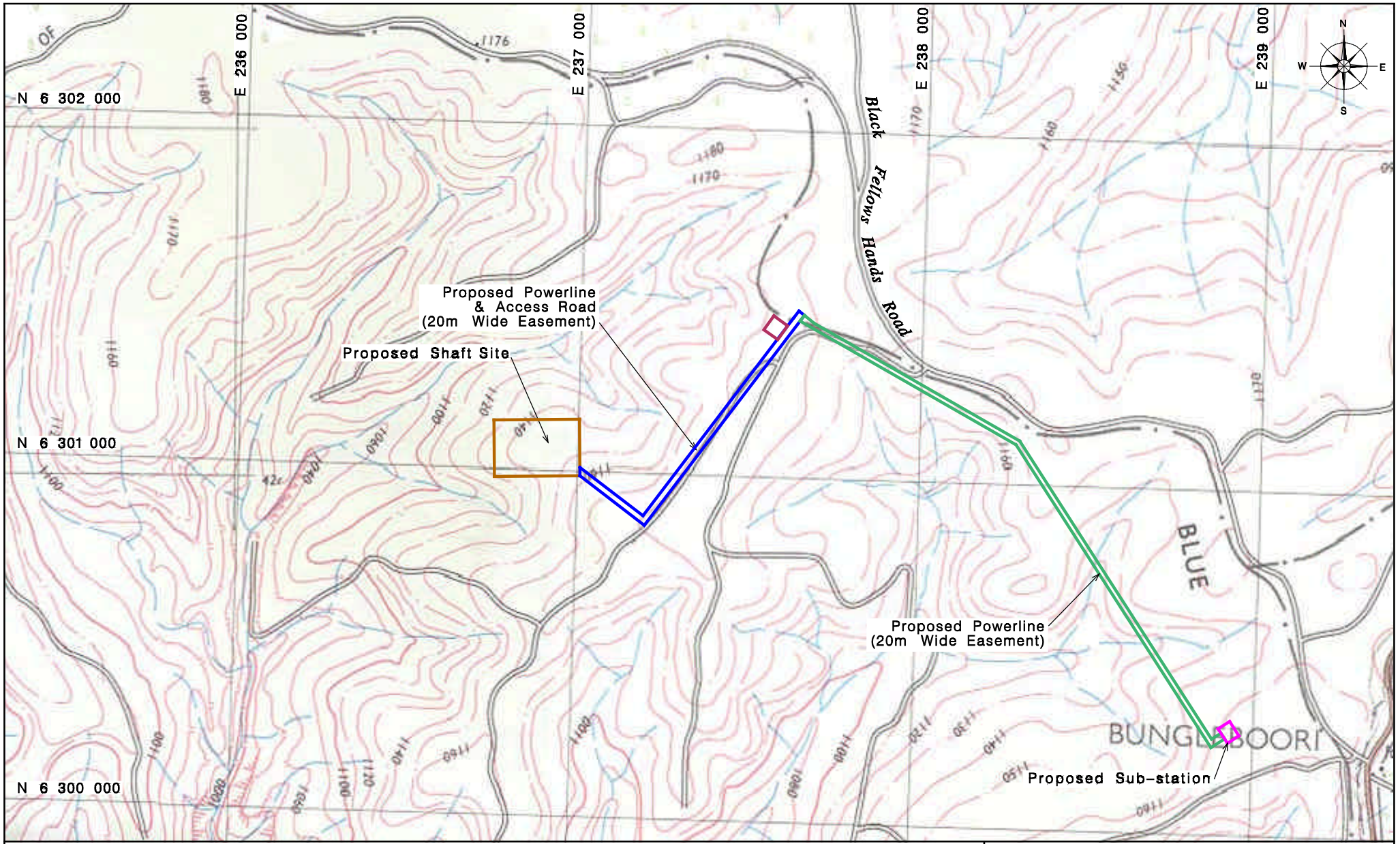
The Newnes State Forest has been logged in the past, with the timber used for railway sleepers and housing (McIntyre 1990: 9). The area is now under the management of the NSW State Forests and large areas have been replanted with Radiata pine forests. The area is used for recreation with the Bungleboori Camping Reserve being situated approximately 2.5 kilometres southwest of the proposed ventilation shaft facility and approximately 500 metres east of the eastern end of the power line. An unsealed road (Black Fellows Hand Road) starts at Bungleboori Camping Reserve.

FIGURE 1.1
Location of Study Area

Umwelt (Australia) Pty Limited
Base Map Source: Wallerawang 1:100 000 Topographic Map

A4 Scale 1:80 000

Ref No.:R04_V2/1571_005.dgn



Legend

- Survey Area 1
- Survey Area 2
- Survey Area 3
- Survey Area 4
- Survey Area 5

Umwelt (Australia) Pty Limited
Source: Springvale Mine

0 200 400 800m

FIGURE 1.2
Study Area

A4 Scale 1:15 000 | Ref No.:R04_V2/1571_006.dgn

1.4 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT ON CULTURAL HERITAGE

The proposed development will impact on the study area through clearing of vegetation and ground disturbance associated with the construction of the substation, site infrastructure, boreholes, ponds, access roads and footings for power lines. These activities have the potential to destroy any surface and sub-surface Aboriginal Cultural Heritage sites that might occur within the area of impact.

1.5 OBJECTIVES OF THIS STUDY

This report addresses Aboriginal cultural heritage management issues within the current study area. The objectives of the study in relation to Aboriginal heritage are:

- to encourage active participation by the appropriate local Aboriginal communities in the assessment and management of Aboriginal sites;
- to identify and record Aboriginal archaeological sites and sites of Aboriginal significance that may be affected by the proposed development;
- to assess the potential impact to Aboriginal heritage sites from the proposed development;
- to address issues of concern to the Aboriginal community representatives participating in the survey;
- to advise the Company on the appropriate management of all sites (if any) identified within the survey area; and
- to satisfy the National Parks and Wildlife Service (NPWS) cultural heritage assessment requirements.

1.6 RELEVANT LEGISLATION

1.6.1 National Parks and Wildlife Act 1974

Section 90 of the *National Parks and Wildlife Act 1974* (NPW Act) provides statutory protection for all Aboriginal relics (any material evidence of the indigenous occupation of NSW). It is an offence under Section 90 of the NPW Act to knowingly damage, disturb or destroy relics, without the prior written consent of the Director General of the NPWS. Section 84 of the NPW Act provides protection for 'Aboriginal places (areas of cultural significance to the Aboriginal community)' (NPWS 1997: 2).

1.7 PARTICIPANTS

Participants in the archaeological assessment included Ms Leila McAdam (Archaeologist) representing Umwelt, Mr Richard Peters and Mr Warwick Peckham representing the Bathurst Local Aboriginal Land Council (Bathurst LALC), and Mr Bill Hardie and Mr Shannon Kennedy representing the Gundungurra Tribal Council Aboriginal Corporation. Leila McAdam prepared this report.

1.8 STRUCTURE OF THE REPORT

The structure of this report follows the NPWS 'Aboriginal Cultural Heritage Standards and Guidelines' (1997) for archaeological reporting.

Section 2 of the report discusses the Aboriginal involvement in the project.

Section 3 details the environmental context of the study area including information related to the topography, geology, soils, climate, water resources, vegetation and fauna. This information is used to provide a background to the Aboriginal resources of the area, and is useful when constructing the predictive model for site location.

Section 4 of the report summarises the previous archaeological research undertaken within 6 kilometres of the study area. This information is used to produce a predictive model for site location and to suggest what site types these are likely to be and what site contents can be expected (e.g. what artefact types, what raw material types).

Section 5 of the report summarises the survey methodology used for the project.

Section 6 presents the results of the surveys. The results are discussed in relation to the Aboriginal resources located during the surveys. The predictive model for the area is discussed in relation to the results of the survey.

Section 7 of the report documents the Aboriginal and archaeological significance/sensitivity of the study area and of any sites located during the fieldwork.

Section 8 provides management options for the site located during the surveys.

Section 9 provides recommendations based on the results of the significance assessment.

2.0 ABORIGINAL CONSULTATION AND INVOLVEMENT

NPWS is the State government regulatory authority responsible for the management of Aboriginal heritage sites in NSW under the NPW Act. The NPWS Aboriginal Cultural Heritage Guidelines (1997) outlines three principles behind the collaborative approach to Aboriginal heritage survey and site management required by the Service. These principles include the following:

- Aboriginal culture is a living culture;
- Aboriginal communities are the rightful owners of Aboriginal cultural heritage information; and
- NPWS decision making on Aboriginal cultural heritage issues is transparent.

Umwelt supports the principles underlying the NPWS approach and aims to involve the relevant Aboriginal community/communities in all its heritage assessments.

First Field Survey (5 April 2002)

The initial fieldwork for this project was undertaken in April 2002. At that time, the study area was known to be in the area of interest of the Bathurst Local Aboriginal Land Council (BLALC). Mr Warwick Peckham, Coordinator for the BLALC, was informed of the proposed development prior to the fieldwork and Mr Richard Peters represented the BLALC during the fieldwork on 5 April 2002. Mr Peters was consulted about the survey methodology prior to fieldwork and the

recommendations for the first section of the survey presented within this report are those agreed upon with Mr Peters at that time. A report on the fieldwork and recommendations for the study area was received by Umwelt from Bathurst LALC four days after the fieldwork was completed (**Appendix 1**).

Later, Springvale Coal Pty Ltd became aware that the Gundungurra Tribal Council Aboriginal Corporation (GTCAC) had an interest in the area and subsequently arranged for representatives of the GTCAC to visit the survey area.

Second Field Survey (4 September 2002)

The second fieldwork was undertaken 4 September 2002. Mr Bill Hardie (GTCAC) and Mr Warwick Peckham (BLALC) were contacted prior to the survey. Mr Bill Hardie and Mr Shannon Kennedy represented GTCAC and Mr Warwick Peckham represented BLALC during fieldwork. The recommendations for the second field trip presented within this report are those agreed upon with Mr Hardie and Mr Peckham.

A revised version of the draft copy of the report will be provided to BLALC and GTCAC with a request that they consider the results and recommendations included in the report. The report remains in a draft format until Umwelt receives a written response from the Bathurst LALC and GTCAC. The comments from the BLALC and GTCAC will be included in the final report in **Appendix 1**.

2.1 NATIVE TITLE SEARCH

A search of the National Native Title Register provides information of the status of native title claims in the area of interest. That is, if a native title determination, a native title application and/or an agreement under the *Native Title Act* 1993 is active at the time of the search.

Umwelt lodged a Native Title Search for the study area on 26 August 2002. Results from the search indicate there is currently two claims relevant to this project. Both claims were submitted by the Gundungurra Tribal Council Aboriginal Corporation, application numbers NC 97/4 and NC 97/7 lodged 29/4/97 and 20/1/97 respectively. These claims cover a large area incorporating the Lithgow Shire Local Government Area and the current study area and had not been determined at the time of writing. Copies of the Claimant Application Summaries are included in **Appendix 2**.

3.0 THE ENVIRONMENTAL CONTEXT

3.1 THE STUDY AREA

3.1.1 Landscape

The study area is situated on the Newnes Plateau, which is comprised of gentle low hills with broad crests on a sandstone plateau surface (King 1993: 24). The Newnes Plateau and adjoining Blue Mountain Plateau are heavily dissected by first order streams of Coxs River to the west and south, Capertee River to the northwest, Nepean River to the southeast and Colo River to the north and east. The area is characterised by ridgetops, sheer cliffs, spurs, steep gullies, broad valleys and headwater valleys. In the past, access to the ridgetops from the valleys would have been difficult for Aboriginal people, but McIntyre (1990: 5) has argued that access would have been possible 'via the headwater valleys'.

The study area is drained by tributaries of Marrangaroo Creek, which is part of the catchment area of the Coxs River. The ridges of Newnes Plateau rise sharply from the valley of Marrangaroo Creek, approximately 1 kilometre to the southwest of the study area.

The study area incorporates 5 areas (**Figure 1.2**). Survey Areas 1 to 3 were surveyed during the first fieldwork in April 2002. Survey Areas 4 and 5 were surveyed during the second phase of the fieldwork in September 2002. Survey Area 1 (proposed shaft facility) is the most southwesterly section of the study area and is situated on the crest of a spur and adjacent slopes to the north and south. Survey Area 2 (proposed power line and access road) travels east from the spur crest, across a gentle upper slope and then turns northeast along the level crest of the Blue Mountain Range ridgeline to Survey Area 3. Survey Area 3 (initial proposed substation) is located on a level area on the crest of the ridgeline. Survey Area 4 (new proposed location for substation compound) is situated on the crest of the Blue Mountain Range ridgeline. The landform crossed in Survey Area 5 (extension of proposed power line) includes the crest of the ridgeline, spur crests, upper slopes, drainage depressions and stream channels. The western portion of the survey area (Survey Areas 1-3) rises from 1140 to 1160 metres above sea level over a distance of 265 metres. The ridgeline is 1170 metres above sea level. In the eastern half of the survey route (Survey Areas 4 and 5), the topography ranges from 1120 to 1170 metres above sea level with moderate gradients.

3.1.2 Geology and Soils

The study area is situated in the Western Coalfield region. The geology comprises quartz and quartz-lithic sandstone embedded with thin red, grey and green claystone of the Triassic Narrabeen Group and these overlie the older Permian Illawarra Coal Measures that include layers of shale, sandstone, coal and conglomerate (King 1993). Gorges, escarpments and creek valleys have been created by erosion in the softer Permian layers and this has resulted in a high number of sandstone rockshelters on the plateau. Rockshelters provided shelter for Aboriginal people. Shallow soils formed from the weathering of shale and sandstone are found amongst the rocky outcrops on the crests.

3.1.3 Climate

The climate for the Newnes Plateau is classified by the Bureau of Meteorology as warm temperate with an annual rainfall of 1097 millimetres. Temperatures in summer are a mild 23.5°C (average) and a cold -1.0° (average) in winter (King 1993: 3).

3.1.4 Water Resources

The study area is located on the crest, spurs and upper slopes of the Blue Mountain Range. Local tributaries drain to the west of the ridgeline and into the Marangaroo Creek, which flows to Coxs River to the south. Coxs River flows south to Warragamba Dam, the major water supply for Sydney. There was no water observed in the local tributaries at the time of fieldwork. The nearest permanent water is Marangaroo Creek, approximately 2 kilometres to the south of the study area.

3.1.5 Vegetation

The vegetation of the study area consists of open forest dominated by Silvertop Ash (*Eucalyptus sieberi*) and Narrow-leaved Peppermint (*E. radiata*) with Ribbon Gum (*E. viminalis* subsp. *viminalis*), Blue Mountains Ash (*E. oreades*) and Brittle Gum (*E. mannifera*). The overstorey vegetation has been subject to logging in the past, and as such mature trees were not recorded. Overstorey species were generally between 8 and 10 metres in height, with emergent trees to 20 metres.

The community comprised a dry heath understorey to approximately 0.5 to 1 metre, which included Drumsticks (*Isopogon anemonifolius*), Cone-sticks (*Petrophile sessilis*), Hair-pin Banksia (*Banksia*

spinulosa), Crinkle Bush (*Lomatia salaifolia*) and Spiny-headed Mat Rush (*Lomandra longifolia*). Ground cover species included a range of grasses such as *Poa sp.* and *Danthonia sp.* and herbs such as Silky Purple Flag (*Patersonia sericea*). The understorey supported a high diversity of species with species percent cover in the order of 75% to 90 %. Weed infestation was generally very low, with disturbance limited to access tracks. Many native species remain that were useful resources for Aboriginal hunter-gatherers. Aboriginal plant resources identified during the fieldwork are described in **Section 6**.

3.1.6 Fauna

Fauna identified in the study area includes common wombat, eastern grey kangaroo, swamp wallaby and marsupial mouse. All of these species would have been resources used by Aboriginal people.

4.0 ARCHAEOLOGICAL CONTEXT

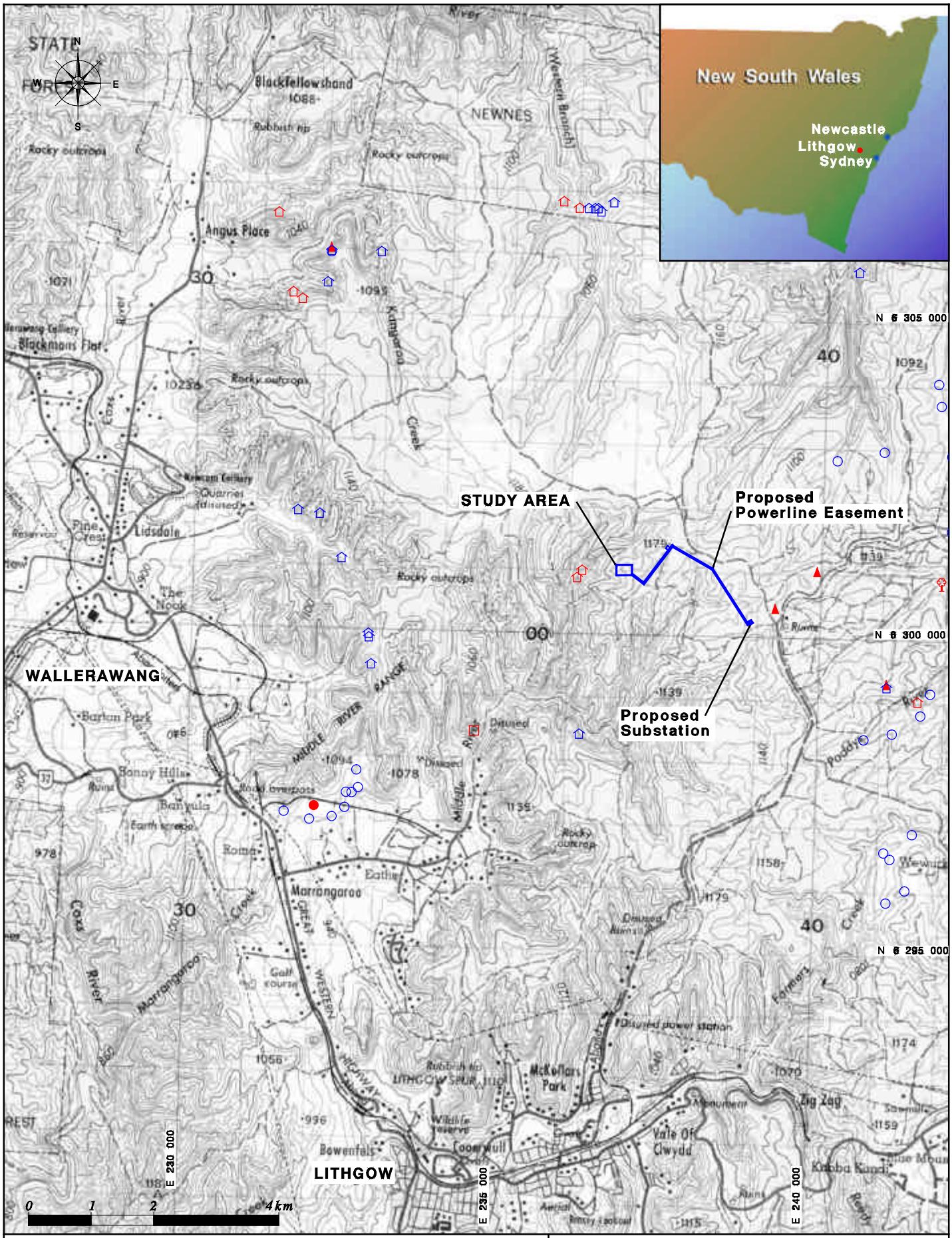
4.1 MODELS OF ABORIGINAL SETTLEMENT IN THE BLUE MOUNTAINS

Several theories have been offered for the Aboriginal occupation of the sandstone plateau of Blue Mountains. These include sporadic visits for hunting activities in the warmer weather or for ceremonial/religious purposes (Johnson 1979 in McIntyre 1990; Stockton 1970), rare visits, if at all (McCarthy 1974) and permanent occupation during milder phases during the Holocene (Lennon 1983 in McIntyre 1990; Stockton & Holland 1974). Johnson (1979 in McIntyre 1990) argued that resources on the plateau were poor and that large rock shelters on margins of the plateau (rich in art and poor in lithic material) were used for ceremonial purposes only and that the watercourses were used as access routes to the plateau. McIntyre (1990) disagreed with this, arguing that:

- because of the nature of the watercourses (thickly vegetated, wet and narrow), they were unlikely to be used as access routes;
- ridges were used as Aboriginal travel routes;
- art sites cannot be explained as ceremonial sites because of their inaccessibility/remoteness. Major art sites (e.g. Blackfellows Hands and Kangaroo Creek) can be easily accessed from Cox's Valley. Also, the appearance of stencils of small children's hands found at Blackfellows Hands Site would suggest it is highly unlikely to be a ceremonial site.

4.2 NPWS REGISTER OF ABORIGINAL SITES

The NPWS Register of Aboriginal Sites was consulted for information on sites recorded on the Lithgow 89311-11-S and Cullen Bullen 89311-111-N 1:25,000 mapsheets within 6 kilometres of the study area. The search parameters included sites recorded within the grid reference range from AMG 231000 to 243000E and from 6295000 to 6307000N. Sixty-two sites were listed on the site register (**Appendix 3**). No previously recorded sites were located within the current survey area. A summary of previously recorded site types within the vicinity of the study area is presented in **Table 4.1**. **Figure 4.1** indicates the location of the previously recorded sites within close proximity of the survey area.



Legend

- Shelter with Art & Axe Grinding Groove
- Shelter with Deposit & Axe Grinding Groove
- Isolated Find
- Artefact Scatter
- Axe Grinding Groove
- Scarred Tree
- Historic Site

Umwelt (Australia) Pty Limited

Base Map Source: Wallerawang 1:100 000 Topographic Map

FIGURE 4.1

Distribution of Previously Recorded Archaeological Sites within 6km of the Study Area

A4 Scale 1:80 000

Ref No.:R04_V2/1571_007.dgn

Table 4.1 - Previously Recorded Aboriginal Sites from NPWS Site Register

Aboriginal ceremonial and Dreaming sites	Axe grinding grooves	Isolated finds	Artefact scatters	Scarred trees	Shelter with art	Rock shelters with art and axe grinding grooves	Rock shelters with axe grinding grooves, deposit and an artefact scatter	Shelter with deposit
1	2	1	26	1	10	2	1	18

The majority of the previously recorded sites were artefact scatters (26), followed by rock shelters with deposit (18), then rock shelters with art (10), axe grinding grooves (2), rock shelters with art and axe grinding grooves (2), rock shelters with axe grinding grooves, deposit and an artefact scatter (1), an isolated find (1), a scarred tree (1) and an Aboriginal ceremonial and Dreaming site (1).

The distribution of sites is summarised below (**Figure 4.1**).

- Rock shelter sites are generally located along the escarpments and ridge tops, mainly in the northern half of the search area. Two rock shelters with art are located less than a kilometre to the west of the study area.

- Axe grinding grooves are found predominantly on upper slopes to the east of the study area. Grinding grooves have been recorded within 500 metres to the east of the new proposed location for the Substation Complex.

- A scarred tree is located approximately 3 kilometres to the east-north-east of the study area on the confluence of two drainage depressions in the upper reaches of Bungleboori Creek.

- An Aboriginal Ceremonial and Dreaming site was identified on the escarpment, 3 kilometres southwest of the study area.

- Artefact scatters are located on plateaus or creek valleys within 100 metres of the nearest tributary:

    - several artefact scatters are located on the plateau between 3 and 4 kilometres to the southeast of the study area, adjacent to Paddys Creek. Paddys Creek flows northeast to Bungleboori Creek catchment area;

    - six artefact scatters are located along tributaries of the upper catchment area of Farmers Creek, approximately 5 kilometres to the southeast of the study area. Farmers Creek flows southwest to the Coxs River. Another group of sites is located within an area between 5 and 7 kilometres to the southwest of the study area. Eight artefact scatters and an isolated find are located on the creek flats of a tributary of Marrangaroo Creek (the study area is within the same drainage area). The artefact scatters are all within 50 metres of the creekline and the isolated find is 100 metres from the creekline; and

    - a further five artefact scatters are located on first order, north flowing tributaries of Bungleboori Creek. The sites are within 3 and 5 kilometres to the northeast of the study area.

4.3 PREVIOUS ARCHAEOLOGICAL RESEARCH

This section of the report presents a brief summary of the previous archaeological research in the vicinity of the study area for which there were written accounts available at Hurstville NPWS in April 2002. Additional information not held in NPWS Hurstville was taken from McIntyre (1990).

4.3.1 Gorecki 1982

Gorecki (from McIntyre 1990: 14) carried out preliminary archaeological investigations within the then proposed Springvale underground mine in 1982 and 1983. Eight sites and 30 potential areas of deposit (PADs) were identified in areas that had previously been thought of as 'marginal'. Two of these sites are within 7 kilometres to the northwest of the study area; the site types include one grinding groove and one shelter with deposit. Gorecki's studies led to further archaeological investigations in the area.

4.3.2 Gollan 1983

In 1983, Gollan (from McIntyre 1990: 15) surveyed an area which included the Springvale longwall underground mine area, concentrating on the upper plateau. Of the sites Gollan recorded, 22 are located within the NPWS Site Register search area. The sites types include artefact scatters (16), axe grinding grooves (1), shelters with art (3) and shelters with deposit (2). The majority of these sites are located between 4 and 5 kilometres to the west of the study area. One site (shelter with deposit) is located less than 3 kilometres to the south of the study area, on the escarpment of Marrangaroo Creek. Gollan concluded that the occurrence of large open sites in the area was rare.

4.3.3 Rich 1988

Rich (1988) conducted an archaeological survey on the north side of Marrangaroo Creek for the proposed construction of a prison for the Public Works Department. A total of ten sites were identified, including eight open sites (artefact scatters) and two isolated artefacts. The sites were all within 100 metres of Marrangaroo Creek. From her study Rich predicted that for sites found along Marrangaroo Creek:

- the predominant raw material used for manufacturing artefacts would be quartz and quartzite pebbles;
- artefacts manufactured from these materials would be large in size and variable in shape;
- a low incidence of retouch would occur; and
- there would be a relatively high percentage of artefacts with cortex.

4.3.4 McIntyre 1990

McIntyre (1990) undertook an archaeological study at Kariwara Colliery as part of an EIS for the proposed construction of a new longwall coal mine for Newcom Collieries Pty Ltd. The study area was situated in the Newnes Plateau, north of Lithgow. The current study area is within the southern boundary of the area surveyed by McIntyre. McIntyre concentrated her survey on valley slopes and cliff lines, targeting shelter sites because of the potential impact of subsidence on these sites along the escarpment from longwall mining. McIntyre's survey did not include the current study area. The nearest survey route passed 2 kilometres to the west of the study area. The landform units in the current study area were not appropriate for her study.

Forty-two sites were recorded during the study. The majority of the sites were rockshelters. McIntyre argued that site complexes were located at the head of valleys such as Neubecks Creek where resources were concentrated and access to plateaus was easy.

4.3.5 Rich and Gorman 1992

Rich and Gorman carried out an archaeological survey as part of an environmental impact study (EIS) for the proposed Springvale Colliery and related facilities. The study area included a conveyor belt from Springvale Colliery to Mt Piper Power Station (approximately 15 kilometres northwest of the current survey area), a pit top facility at Springvale (approximately 6 kilometres west of the research area) and the Springvale longwall mine (extends east from the pit top facility). Nine artefact scatters, one isolated find, two shelters with art, four rock shelters with potential archaeological deposit and two areas of potential site locations were recorded. Artefact scatters were the most predominant site type away from areas of high relief. Shelters with deposit and/or art were the predominant type on Newnes Plateau. Three areas were surveyed on Newnes Plateau as part of the study. Two of these areas were on tributaries of Marrangaroo Creek. The two rock shelters with art and two of the rock shelters with potential archaeological deposits were recorded less than 600 metres from the current survey area.

4.4 PREDICTIVE MODEL

Based on the information taken from previously recorded Aboriginal sites and the topography of the area, the following is a predictive model for distribution of site types and site contents for the study area.

4.4.1 Artefact Scatters

The most common type of site located by archaeologists in the area during surveys are sites that contained scatters of stone artefacts (artefact scatters). Artefact scatter sites are located predominantly along tributaries in the upper catchment area of creeks or in creek valleys. The occurrence of artefact scatter sites decreases with distance from a watercourse and increase in gradient. The low gradient of the present survey area and its location between two drainage depressions in the upper catchment area of Marrangaroo Creek suggests that artefact scatters are the most likely site type to occur. The past logging and recreational use of the area (e.g. trail bike tracks) would suggest that there may be disturbance to Cultural Heritage sites, albeit limited. Ground cover from vegetation will restrict visibility. Should artefact scatters be found in the area, it is most probable they would be small sites containing flakes manufactured from quartz or quartzite.

4.4.2 Isolated finds

Isolated finds (single artefact) may occur in the study area. A single artefact may be an indicator that other artefacts are present but are not visible at the time of survey due to disturbance or limited visibility.

4.4.3 Shelters with Rock Art

Another form of evidence of past Aboriginal presence is rock art. Paintings and/or engravings are found in rock shelters, overhangs and on exposed rock surfaces. Ten rock art sites are located within 6 kilometres of the survey area. There are no overhangs or shelters in the survey area but there is a possibility of engravings on exposed sandstone rock surfaces.

4.4.4 Shelters with Deposit

There are a large number of shelters with deposit recorded in the area. These shelters are considered to have been suitable for Aboriginal occupation based on their size and aspect. Their depth of deposit suggests that they may contain evidence of occupation. Once again, there are no overhangs or shelters in the survey area, therefore this type of site will not occur.

4.4.5 Scarred or Carved Trees

Scarred or carved trees created by Aboriginal people may be found wherever very old trees survive, with a particular emphasis along creek lines where extensive occupation sites are known to occur. Aboriginal people made scarred trees when a piece of bark was cut from a tree using axes and wedges. The bark (and sometimes the wood) was used to make storage containers, canoes, shields and shelters. Carved trees were used for ceremonial reasons and as burial markers. Carved trees are not found as frequently as scarred trees. The nearest scarred tree located in the area was less than 3 kilometres to the east on the confluence of two tributaries of Bungleboori Creek. Taking into account the high intensity of European land clearance in the survey area and therefore the lack of mature trees, it is unlikely scarred or carved trees will be found in the study area.

4.4.6 Grinding Grooves

Axe grinding grooves are grooves generally 150-300 millimetres long by 50-80 millimetres wide, usually found on sandstone or conglomerate rock surfaces. The grooves result from repeated rubbing during the grinding down of basalt (or similar volcanic or metamorphic stone) axe blanks by Aboriginal people. They are usually located on outcrops in or adjacent to rivers and creeks because a good supply of water helped expedite the grinding process. Ground edge axes or hatchets were an important component of the traditional Aboriginal toolkit. The closest grinding grooves have been recorded within 1 kilometre to the east of the study area, in the Bungleboori Creek catchment area. No axe grinding grooves have been recorded in Marrangaroo Creek within 6 kilometres of the study area. There are several stream channels/tributaries running through the survey area. Should these contain outcropping sandstone, it is possible that axe grinding grooves will be located.

4.4.7 Natural/Mythical Places

Aboriginal people may regard natural features of the landscape as important places. Examples of natural/mythical places can be a rock, waterhole, tree or mountain. These places often do not have any archaeological evidence (eg. artefacts) to attest to their Aboriginal importance and are generally only known from the Aboriginal oral history of an area. These places are generally identified as being associated with the activities of Dreaming Ancestors and are highly significant to contemporary Aboriginal people. Review of the NPWS Site Register has indicated that no natural/mythical places are known within the present study area, however, a Dreaming site has been identified on an escarpment, 3 kilometres south of the study area (this site is also recorded as a ceremonial site - see below).

4.4.8 Ceremonial Sites

Ceremonial sites are areas used for important functions such as initiation, corroborees and other tribal meetings. One or more raised earth rings or circles of stones associated with carved trees indicate the presence of a bora ground (constructed for male initiation). Review of the NPWS Site Register has indicated that there are no ceremonial sites recorded within the study area but there has been a ceremonial and Dreaming site identified on an escarpment, 3 kilometres south of the study area.

4.4.9 Stone arrangements

Stone arrangements may take the form of single or multiple cairns, upright standing stones, lines or rings of stones or even stones arranged into figurative designs such as snakes or turtles. The location of many of the recorded stone arrangements suggest they were related to ceremonial grounds and in particular initiation grounds (McBryde 1974: 31-42), while others appear to mark tribal boundaries (Leney 1907: 72-77). No stone arrangements have been recorded within 6 kilometres of the survey route. However, the Aboriginal oral history of this area (Bill Hardie pers. comm. September 2002) suggests there is a possibility that stone arrangements may be found on ridges within the study area. Aboriginal oral history suggests that there was an Aboriginal trade route along the ridgeline and ceremonial grounds close to the trade route. Stone arrangements could be found as markers for the ceremonial grounds.

4.5 SUMMARY OF PREDICTIVE MODEL

From previously recorded archaeological sites in the area, the most likely site type to occur will be artefact scatters. Artefact scatters are more likely to occur in areas within 100 metres of a tributary in the upper catchment area. Artefact scatters will be small and the predominant raw material will be quartz and quartzite. There is a possibility of locating axe grinding grooves if sandstone is outcropping in water channels. In addition, stone arrangements may be found on the crests. The number of art sites on the Newnes Plateau has indicated to researchers that this may be a ceremonial area or a travel route. The Aboriginal oral history suggests that stone arrangements are often found in association with ceremonial areas or as markers on travel routes and that they can be expected in the study area. The following predictions are made for the five Survey areas:

- Given that Survey Area 1 is on a slope with thick vegetation cover it is predicted that evidence of Aboriginal cultural heritage will be difficult to locate.

- Survey Area 2 is on a gentle slope and a level ridgeline. Areas of good visibility are expected on the graded road along the level ridgeline. It is predicted that this is the most likely area for evidence of Aboriginal cultural heritage sites.

- Survey Area 3 is situated on a level area on the ridgeline but Aboriginal cultural heritage will be difficult to locate due to thick vegetation cover.

- Survey Area 4 is situated on a gentle slope on the edge of the ridgeline. Aboriginal cultural heritage material will be difficult to locate because of the thick vegetation cover and the disturbance to the area in the past from logging and vegetation clearing.

- The corridor for Survey Area 5 crosses crests, upper slopes and stream channels. It is unlikely that artefact scatters will be located because of the thick vegetation cover. However, there is a possibility of locating axe grinding grooves in the stream channels, should sandstone be outcropping.

In addition, there is a possibility of finding stone arrangements on crests of ridges in all five survey areas.

5.0 THE SURVEYS

Two field trips were undertaken. Survey Areas 1 to 3 were investigated on 5 March 2002 and Survey Areas 4 and 5 on 4 September 2002.

5.1 FIRST FIELD TRIP (5 MARCH 2002)

Participants included Rick Peters (BLALC), Leila McAdam (Umwelt) and John McAdam (Observer). Three areas were surveyed (**Figure 5.1**). Survey Area 1 included the proposed shaft facility area, Survey Area 2 included the access road and power line, and Survey Area 3 included the then proposed substation area. Details of the surveys are in **Appendix 4**. A summary of the surveys follows.

5.1.1 Survey Area 1

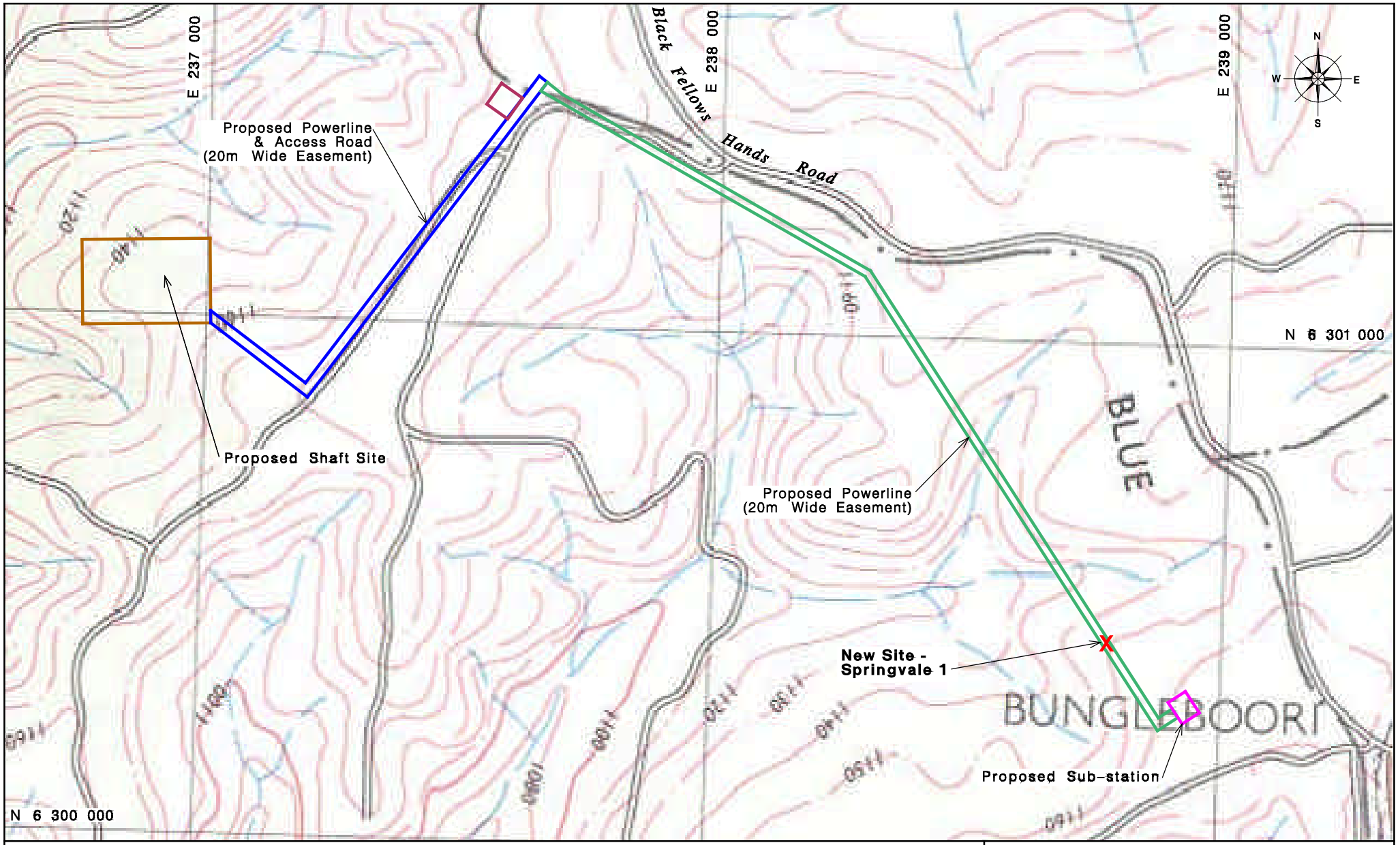
The entire area of Survey Area 1 was walked (165 metres by 250 metres - 41,250 m^2). It was decided to walk four transects around the boundary of Survey Area 1 first to locate pegged and flagged corners A, B, C and D. After locating the corners, participants walked two transects through the centre, the first transect from east to west, then the second from west to east to cover the whole area. Throughout the six transects, participants searched for areas of exposure, outcropping rock and marked trees. Participants walked approximately 10-15 metres apart throughout the survey, covering a width of approximately 40 metres with each transect (**Figure 5.1**). A two-track vehicle track ran along the inside of the southern boundary and a motor bike track crossed the area from Corner B to the southern boundary. The vegetation cover in Survey Area 1 was very thick, limiting areas of exposure throughout the survey (see **Plate 5.1**). No Aboriginal cultural heritage sites were found in Survey Area 1.

5.1.2 Survey Area 2

This survey started at the southeastern corner of Survey Area 1, travelling east, then turned northeast to finish at the southern corner of Survey Area 3 (**Figure 5.1**). The survey area covered 25 metres by 1140 metres with a total area of 28,500m^2. The landform elements in Survey Area 2 included a gentle upper slope and crest of a spur, and a broad relatively level area on the ridgeline. Participants walked 5-10 metres apart in an easterly direction along a gentle upslope for a distance of 240 metres. One member walked on the road just to the south of the survey area. Visibility was so poor on the survey route, it was thought that if artefacts were located on the road, this would give an indication of what may be hidden by vegetation. One member walked along the road. At the 240 metre point, participants turned to the northeast and followed the road along a gentle slope along the ridge line to finish on a level area where the road intersected with Black Fellows Hand Road, 1140 metres from the start of the survey. One member walked on the road and the other two members walked approximately 5-10 metres either side of the road. Areas of exposure with varying percentages of visibility were located on the road (**Plate 5.2**). The variation was due mainly to the concentration of sand on the road from slope wash. No areas of exposure were located away from the road. Prior to the survey, the gentle slope to level ridgeline was thought to be a likely area to find a site. Despite the improved visibility, no Aboriginal cultural heritage sites were found.

5.1.3 Survey Area 3

The survey area was 50 metres by 50 metres. Participants walked three transects, each transect approximately 15-20 metres wide (**Figure 5.1**). The topography in Survey Area 3 was a level area of ridgeline (50 metres by 50 metres). Transect 1 started at the northeastern corner of Survey Area 3, west of the intersection of two graded roads, approximately 500 metres west of Black Fellows Hands Road (**Plate 5.3**). Members walked at a distance of 5 metres apart in a northwesterly direction for 50 metres, turned and walked back along the second transect in a southwesterly direction, turned and walked the last transect in a northwesterly direction. No exposures were located throughout the survey due to the dense vegetation cover. No Aboriginal cultural heritage sites were found.



Legend

- Survey Area 1
- Survey Area 2
- Survey Area 3
- Survey Area 4
- Survey Area 5
- X New Aboriginal Site

Umwelt (Australia) Pty Limited
Source: Springvale Mine

0 100 200 400m

FIGURE 5.1
Survey Routes and New Site

A4 Scale 1:10 000 | Ref No.:R04_V2/1571_029.dgn

PLATE 5.1
Survey Area 1 (facing north east). Pegged & flagged Corner 'B'. Plate shows the trail bike track that crosses the survey area and thick vegetation cover

PLATE 5.2
Survey Area 2 (facing north). Visibility on the road & vegetation cover away from the road

PLATE 5.3

Survey Area 3 (facing west). Thick vegetation cover in survey area

5.2 SECOND FIELD TRIP (4 SEPTEMBER 2002)

Participants included Warwick Peckham (BLALC), Bill Hardie and Shannon Kennedy (GTCAC) and Leila McAdam (Umwelt). Two areas were surveyed (**Figure 5.1**) - Survey Area 4 included the new proposed substation area, Survey Area 5 covered the additional 20 metres width of easement for the proposed power line. Details of the surveys are in **Appendix 4**. A summary of the surveys follows.

5.2.1 Survey Area 4

The survey area (40 metres by 50 metres) was located on a gentle slope on the edge of the ridge crest of the Blue Mountains Range (**Figure 5.1**). The vegetation had been logged and cleared in the past and the surface was covered with dry heath regrowth. Participants walked two transects. Transect 1 started with the first member of the group at the northwest corner of the survey area. Members walked at 5 metre intervals in a southeasterly direction for 50 metres, then walked back in a northwesterly direction to cover the remainder of the survey area. No Aboriginal cultural heritage material was found. Ground surface visibility was 0% due to the vegetation cover (**Plate 5.4**). Exposures were inspected on the adjacent access road, however, no artefacts were identified.

5.2.2 Survey Area 5

The survey area ran parallel and adjacent to the easement for the existing power line. The area to be covered was from 12.5 metres to 27.5 metres west of the existing power line (width of 20 metres). Participants walked approximately 4 to 5 metres apart in a generally north-northwesterly direction for a distance of 1350 metres before turning in a northwesterly direction for 750 metres (total of 2.1 kilometres) (**Figure 5.1**). The survey route began and ended on crests, falling to cross two deeply incised stream channels and several shallower drainage depressions. The slopes varied from gentle to moderate gradients. The crests contained residual substrates where soils had been deflated by erosion (slope and sheet wash) leaving a lag deposit. The 'A' soil horizon on crests and upper slopes contained very little depth with sandy, light yellow coloured soils. The stream banks contained deeper deposits resulting from the erosion of slopes and crests but the depth was hard to determine because of the thick ground cover.

The route was overgrown with vegetation throughout and visibility was further limited by background sandstone and conglomerate rubble and pebbles and aggraded sand from slopewash. Exposures were almost non-existent. Visibility in the occasional exposures was limited to 5%. One site was identified (two stone mounds) (refer to **Section 6.1**). Exposures with visibility were inspected on the adjacent access road and crests away from the survey area to give an indication of what may be hidden underneath the vegetation (**Plate 5.5**). No other artefacts were located.

5.3 EFFECTIVE COVER

Table 5.1 presents the effective coverage for the 5 survey areas. **Table 5.2** presents the effective coverage for landform units. Landform units have been divided into crests (ridge and spur), upper slopes and watercourses (drainage depressions and stream channels). The total study area was surveyed.

PLATE 5.4
Survey Area 4

PLATE 5.5
Survey Area 5

Table 5.1 - Effective Coverage of Surveys

Survey No	Landform unit	Area Surveyed (metres^2)	Area of exposure (metres^2)/ % visibility	Total area of exposure (metres^2) of each survey	Total % of exposure for each survey area	Area for detection on the exposure (exposed area x % of visibility) (metres^2)	Effective coverage for total area of each survey
1	Upper slope (16500m^2) and crest (24750m^2)	41,250	1m x 50m @ 5% (crest); 3m x 3m @ 100% (upper slope)	59	0.1	11.5	0.03
2	Upper slope (2500m^2) crest 2 (26000m^2)	28,500	100m x 3m @ 50% 100m x 3m @ 90% 200m x 2m @ 30% 190m x 1m @ 5% 160m x 2m @ 60% 35m x 2m @ 30% 140m x 3m @ 60% 40m x 3m @ 50%	2,120 (all on crest)	7.4	1074.5	3.7
3	Crest of ridgeline	2,500	Nil	0	0	0	0
4	Crest of ridgeline	2,000	Nil	0	0	0	0
5	Crests (16650m^2) Upper slope (13650m^2) Stream channels and drainage depression (1200m^2)	31,500	15m x 15m @ 50% (upper slope) 5m x 5 m @ 5% (upper slope) 15m x 3m @ 5% (crest) 20m x 5m @ 5% (upper slope) 50m x 15m @ 15% (crest)	1145	3.6	233.5	0.7

Percentage of visibility for total area of each survey was calculated: SUM (area of each exposure X percentage of exposure) X 100 then divided by the total area surveyed for each area. Area of effective cover was less than 1% for Survey Areas 1, 3, 4 and 5. Survey Area 2 had a greater percentage of effective cover at 3.7% with some large areas of high visibility yet no sites were located.

Table 5.2 - Effective Coverage of Land Form Units

Landform Unit	Area surveyed (metres^2)	Total Area of exposure for each landform unit (metres^2)	Total % of exposure for each landform unit	Area for detection on the exposure (exposed area x % of visibility) (metres^2)	% of effective coverage for each landform unit (area of detection/total landform unit)
Crest	71900	2965	4.1	1191.75	1.6
Upper slope	32650	359	1.1	127.75	0.4
Watercourses	1200	0	0	0	0
Total	**105750**	**3324**	**3.1**	**1319.5**	**1.2**

Crests made up the major portion of the total area surveyed followed by upper slopes and a small percentage of watercourses. The highest percentage of exposure and visibility was found on the crests (1.6%). No exposures were found near watercourses.

6.0 SURVEY RESULTS

One Aboriginal cultural heritage site (or sensitive area) was located during the surveys. Site Springvale 1 (stone arrangement) was located approximately 200 metres from the start of Survey 5. Poor visibility due to vegetation growth in many areas may be a contributing factor to the lack of

other sites in the area. However, in this regard there was a reasonable amount of exposure in Survey Area 2, yet no sites were located on that section. There were also no sites/artefacts located in areas of visibility on crests and on the access road running parallel and adjacent to Survey Areas 4 and 5. This overall result suggests there is only a very low probability of sites, such as artefact scatters, being located in the study area.

6.1 SITE SPRINGVALE 1 (STONE ARRANGEMENT)

AMG 238760E 6300377N

The site was located 20 metres southwest of the power line and 20 metres north of a deeply incised stream channel (**Figure 5.1**). Two mounds of stone were located on an upper slope, just below the break of slope of a level crest of a spur line. The stone mounds (A and B) were 5 metres apart. Both mounds contained sandstone rocks which averaged 400mm x 200mm x 200mm in size (**Plate 6.1**). The stones showed signs of weathering, however there was no evidence of human modification.

The dimensions of Mound A are:

- Length - 1000mm,
- Width - 600mm,
- Height - 450mm.

The dimensions of Mound B are:

- Length - 1000mm,
- Width - 1000mm,
- Height - 1000mm.

Visibility around the mounds and in the vicinity was 0% due to thick vegetation, leaf litter and background rubble. The stream channel below the site did not contain outcropping sandstone although small sandstone pieces were lying on the surface. There was no water in the stream channel at the time of survey. An abundance of plant resources were available in the area including: grasstrees, geebungs, Lomandra, Dianella and sedges.

Bill Hardie (GTCAC) pointed out that this site was very important because of the ceremonies held in the broader area in the past and that the mounds are most likely direction markers to bora grounds and that this was a male ceremonial site. However, both Warwick Peckham (BLALC) and Leila McAdam (Archaeologist) held reservations about whether Aborigines or Europeans (e.g. surveyors) constructed the mounds. The region has a rich history of European use (settlers, foresters and miners in the past). The vicinity was searched for other distinguishing features that may relate to direction of the two mounds and give some insight into the reasons for the mounds. It was concluded by all present that the two mounds were some kind of marker. Subsequent research has found that no known European boundaries appear to have existed in the area (e.g. local government, Portion or Parish boundaries) giving more credence to the idea that the mounds might be Aboriginal in origin.

6.2 ABORIGINAL RESOURCES

Resources that would have been available for Aboriginal use in the past were recorded throughout the study area (**Appendix 4**). Sandstone and stones from conglomerate in the area are useful for manufacturing stone tools, grinding seeds and for sharpening axes. Known faunal resources include common wombat, eastern grey kangaroo, swamp wallaby and marsupial mouse. Plants

PLATE 6.1
Stone Mound

suitable for Aboriginal use were recorded throughout the surveys, but the species diversity present today would not reflect the actual abundance of resources available to Aboriginal people in pre-contact times. Of the plants seen:

- Dianella could be used for basket weaving and the base of the leaves is edible raw;
- gum could be eaten from Acacia;
- the nectar of Grevillea and Banksias are reported to have been eaten by Aborigines and as a throat medicine (Low 1989: 170-71, 1990: 34);
- the underground stem and tubers of some sedges can be eaten and the leaves used for weaving;
- grasstrees (*Xanthorrhoea sp.)* had numerous uses. The base of the leaves and pith inside were eaten, resin was used for hafting stone tools and flowering stems were used for spear shafts;
- the fruits of geebungs (*Persoonia sp*.) could be eaten;
- flowers of Lomandra can be sucked for their nectar and the base of the leaves can be eaten raw and the whole leaf used for weaving; and
- starch for the manufacture of damper could be removed from the underground fibrous stem of bracken fern (*Pteridium esculentum*).

6.3 REVIEW OF PREDICTIVE MODEL

In the predictive model for this study, it was thought that:

If any sites were found, they would most likely be artefact scatters or isolated finds; and these are most likely to occur in Survey Area 2.

Despite the fact that there were large areas of visibility on the road, no artefacts were located in Survey Area 2. The lack of sites may be attributed to the lack of visibility due to thick vegetation cover but no artefacts were located in areas of visibility along crest and upper slopes in Survey Area 2 or in areas of visibility outside the survey area. This result indicates that this area is unlikely to have artefact scatters in opposition to the predictive model.

There was a possibility of locating stone arrangements on crests.

A stone arrangement was located in Survey Area 5 below the break of slope near the crest of the ridgeline as predicted.

Should sandstone be outcropping in watercourses, there was a possibility that grinding grooves could be located.

No sandstone was found outcropping in the watercourses, and subsequently no grinding grooves were located.

7.0 SIGNIFICANCE ASSESSMENT

7.1 ABORIGINAL SIGNIFICANCE/SENSITIVITY

Even though an area may not have Aboriginal archaeological sites, it may still have cultural heritage significance to Aboriginal communities. The formal response to the current study from the

BLALC and GTCAC will appear in **Appendix 1** in the final version of this report. Because of differing opinions regarding whether the stone arrangement (Site Springvale 1) was constructed by Europeans or Aborigines, there are differing opinions about the significance of the site.

The BLALC have assessed Site Springvale 1 as having low significance due to the uncertainty of the authenticity that the site is really an Aboriginal site and not a European site. The GTCAC have placed a high significance value on the site due to the fact that they believe Aboriginal oral history indicates the area was used as a trade route and for ceremonies and that Site Springvale 1 is a male ceremonial site.

7.2 ARCHAEOLOGICAL SIGNIFICANCE

The archaeological significance of Aboriginal sites is assessed according to their value to contribute to the scientific understanding of Aboriginal culture in pre-European times. This is generally termed their archaeological research potential.

7.2.1 Archaeological Research Potential

The archaeological research potential of a site depends on factors such as:

- the potential of a site or artefacts it contains to provide information to answer questions of relevance to the contemporary archaeological/Aboriginal community;
- the potential of the site or artefacts it contains to provide information not available from other sites previously known from an area (its uniqueness/rarity);
- the potential of a site to provide an example of a site type that is not already being conserved in a similar landscape in the general area (its representativeness);
- the state of preservation of the site or artefacts it contains relative to other sites of the same type previously known from an area (its archaeological integrity); and
- the inclusion of the site in a complex of other sites which may give it greater potential for answering research questions than an isolated site (site inter-relatedness).

7.2.1.1 Rarity and Representativeness

One of the objectives of cultural heritage management is to ensure that a representative sample of all site types is preserved in the variety of landscapes in which they occur. Like many other natural resources, archaeological sites are a non-renewable resource. Once they are destroyed they cannot be replaced or replicated. As a result, one of the aims of a scientific value assessment is to examine the potential of newly discovered sites to act as examples of a particular site type.

All sites can be described as representative of a particular site type, however, certain aspects of sites increase both their rarity and representativeness value. Some sites contain elements that are uncommon to the area in which they are located. Examples would be hearths or axe grinding grooves. Such sites have high rarity value. Other sites may be composed of common elements, but may be preserved in such a way, or may be arranged with such complexity that they will have great value in representing the site type, but in an unusually informative way. Sites of a similar type, which are heavily disturbed or lack complexity, have less ability to inform us of the kind of activities taking place in such sites.

On archaeological grounds it is not possible to determine whether the Springvale 1 stone arrangement site is of European or Aboriginal construction, however, it does appear to be of greater than 50 years antiquity and thus has heritage value and should not be destroyed unnecessarily.

Based on the criteria that there are no other stone arrangements recorded or conserved within 6 kilometres of the study area (according to NPWS Site Search 27 March 2002), the rarity and representativeness value of this site is assessed as high.

7.2.1.2 Integrity and Intactness

Each archaeological site represents a number of pieces of evidence spatially organised by human behaviour and by subsequent environmental effects. The interpretation of a site is based both on the evidence and the way it has been organised. When a site has been subject to relatively few environmental (or post-depositional) processes it will represent more directly the original human activities which created it. Such undisturbed sites are considered to have greater archaeological integrity.

In sites which have been heavily disturbed by post-depositional processes such as erosion, development or vehicle movement, aspects of the original activities which formed the sites will be masked. This has a severe constraining effect on the utility of the site in its ability to inform us of the Aboriginal past.

Despite disturbance from logging activities and the construction of the power line and access road on the boundary of Survey Area 5, the stone arrangement site remains intact and retains its integrity. As there are no other known stone arrangements in the vicinity against which to rank this site for its degree of integrity and intactness, it must be assessed as having high values for these attributes.

7.2.1.3 Connectedness

Connectedness refers to the relationship between sites within an area. Connectedness can be considered in a number of ways, at a number of scales.

In its broadest sense, 'connectedness' refers to patterns linking sites within an area. Connectedness may refer to the tendency for artefacts within a certain area to be made of a certain raw material, or for sites to occur in certain landforms where occupation is not usually expected. In some cases, it may be that a series of sites within an area relate to a number of different activities, which are in fact all components of a single land use system. The difficulty with assessing such an aspect of connectedness arises in demonstrating that all of the sites relate to the same period of time. While it is broadly possible to assign some artefacts to limited time periods, such artefact categories cannot be used to make statements about the remaining majority of the artefacts within an assemblage. Furthermore, the units of time ascribed to certain artefacts are commonly too broad (eg. 4000 years) to be useful in discussing the operation of a pattern of landuse at a given time.

From an archaeological perspective it is difficult to assess connectedness for the stone arrangement site as its derivation (Aboriginal/European) is uncertain. In recognition of this the site must be assessed as having a low value for connectedness from a scientific perspective.

7.2.1.4 Potential for Archaeological Deposits

Potential archaeological deposits (PADs) are places where the sub-surface profile is assessed as having a high probability of containing cultural heritage materials in a relatively undisturbed context. Factors that need to be considered when assessing PADs include:

- The depth of the 'A' horizon profile.
- Any potential disturbances to the sub-surface environment (eg. ploughing).
- The probability of cultural materials being present as assessed through the environmental setting and/or a surface artefact assemblage.

- Any geomorphic agencies likely to have affected the area (eg. creek channel migration, colluvial or alluvial depositional processes).

During the survey no areas of PAD were recorded. In general, the soils on the crests and upper slopes were skeletal and subject to erosion (sheet wash and stream channelling) and downslope movement. The drainage depressions and stream channels encountered during the surveys were headwaters and subject to incision. There were some areas with occasional depth of deposit adjacent to the stream beds, but this deposit appears to have been derived in recent times from material eroded from the access road built upslope. It was concluded on the basis of the overall shallow nature of the soils in the area and the extensive disturbance factors, that the area did not contain any areas that warrant assessment as a PAD.

7.2.1.5 Summary of Archaeological Site Significance

Site significance has been assessed for Site Springvale 1 relative to four criteria. The scientific values ascribed on the basis of these assessments are presented in **Table 7.1** below. A value has been assigned to each criteria, then totalled and averaged to give a final assessment value (low =1; moderate = 2; high = 3).

Table 7.1 - Summary of Scientific Significance Assessments

Rarity and representativeness	Integrity and intactness	Connectedness	Potential archaeological deposits	Archaeological assessment
high	high	low	low	moderate

Due to its high value for rarity and representativeness and for integrity and intactness, Site Springvale 1 is assessed as having a moderate value for scientific/archaeological significance.

7.3 SUMMARY OF SIGNIFICANCE

Three different levels of significance have been offered for Site Springvale 1. Significance assessment is presented in **Table 7.2**.

Table 7.2 - Summary of Aboriginal and Scientific Significance Assessment

Group	Value of Assessment
GTCAC	High
BLALC	Low
Scientific	Moderate
Overall	**Moderate**

From **Table 7.2** it can be seen that the Aboriginal significance assessment of Site Springvale 1 ranges from low to high whilst the archaeological/scientific assessment is moderate. The following management options will be viewed in relation to what appears to be an overall moderate level of significance for the Site Springvale 1.

8.0 MANAGEMENT OPTIONS

The following section outlines two general approaches to the management of Site Springvale 1 and the study area in general.

8.1 SITE SPRINGVALE 1

8.1.1 Preservation of site

This option would involve establishing a fence around the site during construction activities to prevent inadvertent damage to the site. The fence would be removed after the completion of construction to ensure that it did not attract attention to the site.

The protection of the site in this manner would ensure that the site remains available to educate people both in the present and in the future about the past Aboriginal/European use of this landscape.

8.1.2 Destruction of Site

A NSW NPWS Section 90 Consent to Destroy Permit would be required for Site Springvale 1 if the development necessitated its destruction. In this case the destruction of the site is not thought necessary nor the most appropriate outcome from an archaeological or Aboriginal cultural heritage perspective.

8.2 THE STUDY AREA

8.2.1 Further Archaeological Investigation

Further archaeological investigation of an area is often suggested if it is felt that through such action a significant improvement in our understanding of the Aboriginal past in the area might be attained. Further investigation would be likely to involve sub-surface testing in areas where past Aboriginal activities are expected to have been concentrated. Based on the results of the survey and the lack of any PADs further archaeological investigation is considered unwarranted.

8.2.2 Monitoring of Initial Ground Disturbing Works

Monitoring of the initial ground disturbing works in a development area is a strategy often suggested by the Aboriginal community when they feel that there is still a possibility of subsurface artefacts. In the present study area the BLALC and GTCAC have suggested they will require to be afforded the opportunity to monitor the initial disturbing works in the study area. Also, GTCAC has requested that a male representative be present when post holes for the power poles are drilled near Site Springvale 1.

9.0 RECOMMENDATIONS

The following recommendations are made on the basis of:

- the legal requirement imposed by Section 90 of the *National Parks and Wildlife Act, 1974* which states that it is an offence to knowingly disturb, deface or cause or permit the destruction of relics or an Aboriginal place without the written consent of the NPWS;

- the results of a search of the NPWS Site Register and archaeological literature relating to the general locality of the proposed development;
- the results of the surface survey;
- an evaluation of the impact of prior developments on the survey area;
- the assessment of archaeological significance of the survey area; and
- consultation with Bathurst LALC and GTCAC in relation to the Aboriginal significance of the survey area.

In view of all the above it is recommended that the development be allowed to proceed on the following conditions.

1. Site Springvale 1 should be temporarily fenced during construction of the powerline to avoid its inadvertent destruction/damage during ground disturbing works. The fence should be placed around the site at a distance not less than 10 metres from the site. No ground disturbing works are to be undertaken inside the fenced area. The area is to have a sign stating no access to unauthorised personnel. After construction works are completed the fence should be removed to avoid drawing attention to the site.

2. Representatives of the BLALC and GTCAC should be afforded the opportunity to be present during any initial ground disturbance work carried out within the study area.

3. That a male representative of GTCAC be present when post holes for the power poles are drilled near Site Springvale 1, and a male representative of BLALC be given the opportunity to be present.

4. That a male archaeologist only is to undertake any further work near Site Springvale 1.

5. If an Aboriginal Cultural Heritage site is uncovered then all work must cease in that area (and for an appropriate distance from that area, as defined by the Aboriginal monitors on-site) until the site can be assessed by NSW NPWS.

6. If human skeletal material is uncovered during construction all works in the area must cease and the NSW Police and the NSW NPWS informed. Work may recommence at a distance approved by the Bathurst LALC and the GTCAC.

10.0 REFERENCES

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APPENDIX 1

Reports from Bathurst Local Aboriginal Land Council and Gundungurra Tribal Council Aboriginal Corporation

BATHURST
LOCAL ABORIGINAL LAND COUNCIL

130 Bentinck Street
Bathurst NSW 2795

PO Box 1500
Bathurst NSW 2795

Phone: 02 6332 6835
Fax: 02 6332 3623

SPRINGVALE COLLIERY

PROPOSED ACCESS ROAD-VENTILATION SHAFT-POWERLINE-SUB-STATION

A survey was conducted on Friday 5 April 2002 for Springvale Colliery northeast of Lithgow in the Newnes State Forest near Black Fellows Hands Road for the proposed access road, ventilation shaft, power line and sub-station .

There was zil visibility due to the heavy ground cover consisting of leaves, shurbs, new ground cover growth, dead and fallen trees. The surveyed area consisted of very sandy soil which has been distrubed by motor bike tracks, effects of water erosion and pervious bush fires

We thoroughly walked over all the proposed excuvation areas. Ground visibility was nil and no Aboriginal sites or artifacts were to be located nor were there any shelters, scared trees or evidence of Aboriginal occupation to be found within the survey area during these surveys.

The only area for clear visibility was the main road itself.

RECOMMENDATION-due to the sensitivity of the locality to other Aboriginal sites recorded around the surveyed area, plus nil visibility any surface breaking within the surveyed area will require monitoring by the Bathurst Local Aboriginal Land Council.

If this recommendation is met the Bathurst Local Abriginal Land Council will have no objections to this project commencing.

Present at tihs survey were:

Leila McAdam	Archaeologist	Umwelt Australia Pty Ltd
John McAdam	Observer	
Richard J Peters	Sites Officer	Bathurst Local Aboriginal Land Council

Richard J. Peters

RICHARD J PETERS
SITES OFFICER

6 APRIL 2002

BATHURST
LOCAL ABORIGINAL LAND COUNCIL

130 Bentinck Street
Bathurst NSW 2795

PO Box 1500
Bathurst NSW 2795

Phone: 02 6332 6835
Fax: 02 6332 3623

SPRINGVALE COLLIERY

Proposed Access Road Power line Substation

A Survey was conducted on the 4th September 2002 for Springvale Colliery as per the attached map and study area.

A thorough search of the proposed area was done there was nil visablity due to the dense vegetation as a result no Aboriginal Artifacts were located, however there were to piles of rocks located along the proposed route.

They may have some Aboriginal significance and they may also be of European exraction it is very much difficult to say either way I would suggest the piles remain as they are and that particular area not be disturbed.

A part from this the Bathurst Local Aboriginal Land Council have no objections to this proposal proceedings.

If anything of Aboriginal significance be found during the proceedings, work i8s to be ceased immediately and the Bathurst Aboriginal Land Council to be notified.

Present at this Survey were:

Leila McAdam	Archaeologist Umwelt Australia
Bill Hardie	Gundungarra Tribal Council
Warwick Peckham	Bathurst Local Aboriginal Land Council

Yours Sincerely,

Warwick Peckham
Co-ordinator

APPENDIX 2

Native Title Claims

NATIONAL NATIVE TITLE TRIBUNAL

Claimant Application Summary

Application numbers	Federal Court number: NG6057/98 NNTT number: NC97/4
Application name	Gundungurra Tribal Council Aboriginal Corporation #5
Name of body where application lodged	National Native Title Tribunal
Date application lodged	20/01/1997
Current stage(s)	Notification Complete, In Mediation
Applicants	Mr Mervyn Trindall
Address for service	Eduard Neumann Craddock, Murray & Neumann Solicitors Level 2 255 Castlereagh Street SYDNEY NSW 2000 Phone: (02) 9283 4755 Fax: (02) 9283 4180
Persons claiming to hold native title	The members of the Gundungurra Tribal Council Aboriginal Corporation.
Native title rights and interests claimed	1. Subject to (2) - (5) below, the full and free enjoyment of the following native title rights and interests area are claimed in relation to the land and waters the subject of the application: a. A right to possess, occupy, use and enjoy the claim area; b. A right to make decisions about the use and enjoyment of the claim area; c. A right of access to the claimed area; d. A right to control the access of others to the claimed area; e. The right to control the use and enjoyment of others or resources of the claimed area; f. The right to trade in resources of the claimed area; g. The right to receive a portion of any resources taken by others from the claimed area; h. The right to maintain, protect and prevent the misuse of cultural knowledge of the common law holders associated with the claimed area. 2. With respect of those parts of the area the subject of the application which are, or have been, the subject of a previous non-exclusive possession act within the meaning of s 23F of the Native Title Act 1993, the native title rights and interests area set out in (1) are claimed subject to the rights and interests created in the 'non-exclusive possession act' which are not inconsistent with the rights and interests claimed and, in the case of rights granted which are inconsistent with the rights and interests claimed, subject to any suspension of the native title rights and interests which those inconsistent rights and interests cause.

3. With respect to those parts of the area the subject of the application which are, or have been, the subject of:

a. a category B intermediate period act within the meaning of s232C of the Native Title Act 1993;

b. a category C intermediate period act within the meaning of s232D of the Native Title Act 1993;

c. a category D intermediate period act within the meaning of s232E of the Native Title Act 1993;

the native title rights and interests claimed are those set out in (1) above subject to the rights and interests created in the non-exclusive possession act which are not inconsistent with the rights and interests claimed and, in the case of any rights granted which are inconsistent with the rights and interests claimed, subject to any suspension of the native title rights and interests which those inconsistent rights and interests cause.

4. With respect to those parts of the area of the application which are, or have been, the subject of:

a. a category B past act within the meaning of s230 of the Native Title Act 1993;

b. a category C past act within the meaning of s231 of the Native Title Act 1993;

c. a category D past act within the meaning of s232 of the Native Title Act 1993;

the native title rights and interests claimed area those set out in (1) above subject to the rights and interests created in the non-exclusive possession act which are not inconsistent with the rights and interests claimed and, in the case of any rights granted which are inconsistent with the rights and interests claimed, subject to any extinguishment or suspension of the native title rights and interests which those inconsistent rights and interests cause.

5. The native title rights and interests identified above do not extend to ownership of any minerals, petroleum or gas which are wholly owned by the Crown.

6. The native title rights and interests identified above do not include a claim for exclusive occupation and use of offshore areas as defined by s253 of the Native Title Act 1993.

Area

Jurisdiction: New South Wales
Location: The land & water subject to the application embraces an area of 1255.62 hectares and is situated approximately 4 kilometres north east of the city of Lithgow.
Local government region(s): Lithgow City Council
ATSIC region(s): Binaal Billa Regional Council
Representative A/TSI body(s): NSW Native Title Services
Approximate size: 1255.62 hectares
(Note: There may be areas within the external boundary of the application that are not claimed.)
Land/water and/or sea: Land/Water

Area covered by the claim (as detailed in the application):

(a) The boundaries of the area covered by the application are those of assessment lease application no. 5 Orange. A 'meets and bounds' description of these boundaries follows: Commencing at a point being ISG grid reference Easting 224069.047, Northing 1297747.118 thence Northerly by a line bearing 359?33'01" for a distance of 5052.732 metres to a point being ISG reference. Easting 224029.377, Northing 1302799.694 thence Easterly by a line bearing 89?33'32" for a distance of 2850.346 metres to a point being ISG Grid reference Easting 226879.639, Northing 1302821.640 thence Southerly by a line bearing 179.34'02" for a distance of 2594.128 metres, to a point being ISG reference Easting 226899.237, Northing 1300227.586 thence Westerly by a line bearing 269.33'53" for a distance of 749.210 metres to a point being ISG reference Easting 226150.049, Northing 1300221.895 thence Southerly by a line bearing 179.33'45" for a distance of 2458.580 metres to a point being ISG Grid reference Easting 226168.824, Northing 1297763.387 thence

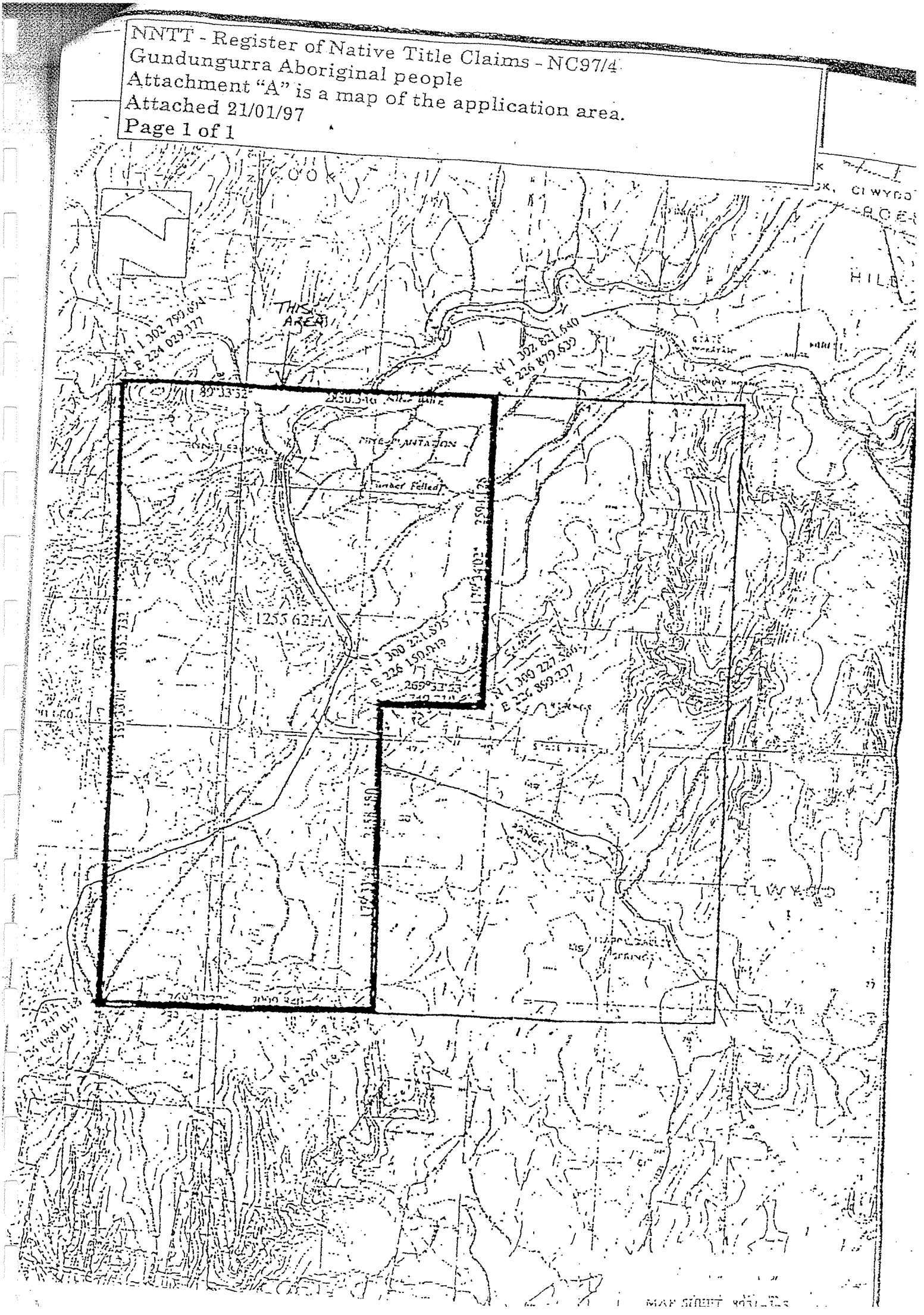
	Westerly by a line bearing 269.33'22" for a distance of 2099.840 metres to the point of commencement, having an area of about 1255 hectares. (b) Subject to clauses (d) and (e) the area covered by the application excludes any land or waters covered by: (i) a scheduled interest; (ii) a freehold estate; (iii) a commercial lease that is neither an agricultural lease nor a pastoral lease; (iv) an exclusive agricultural lease or an exclusive pastoral lease (v) a residential lease; (vi) a community purposes lease; (vii) a lease dissected from a mining lease as referred to in s23B(2)(vii); (viii) any lease (other than a mining lease) that confers a right of exclusive use over particular land or waters which was validly vested or granted on or before 23 December 1996. (c) Subject to clauses (d) and (e) the area covered by the application excludes any area covered by the valid construction or establishment of any public work, where the construction or establishment of the public work commenced on or before 23 December 1996. (d) Where the act specified in (b) and (c) falls within the provisions of (i) s 23B(9) - Exclusion of acts benefiting Aboriginal peoples or Torres Strait Islanders; (ii) s 23B(9A) - Establishment of a national or state park; (iii) s 23B(9B) - Acts where legislation provides for non-extinguishment; (iv) s 23B(9C) - Exclusion of Crown to Crown grants; and (v) s 23B(10) - Exclusion by regulation, the area covered by the act is not excluded from this application. (e) Where an act referred to in clauses (b) and (c) covers land or waters referred to in: s 47 - Pastoral leases held by native title claimants; s 47A - Reserves etc covered by claimant applications; and s 47B - Vacant crown land covered by claimant applications, the area covered by the act is not excluded from the application. (f) Where an area is covered by a previous non-exclusive possession act (s 23F) the native title claim group does not claim possession, occupation use and enjoyment to the exclusion of all others. (g) The area covered by the application excludes land where native title has been extinguished at common law.

Registration information	*Please refer to the Register of Native Title Claims/National Native Title Register (as appropriate) for registered details of this application.* **Date claim entered on Register of Native Title Claims:** 20/01/1997 **Registration test status:** Accepted for registration **Registration history:** Registered from 20/01/1997.

Attachments	1. Map of Claim Area, Attachment A of the Application, 1 page - A4, Attached 21/01/1997.

NNTT contact details		
	Case manager:	Anoushka Lenffer
	Address:	National Native Title Tribunal Level 25 25 Bligh Street SYDNEY NSW 2000 GPO Box 9973 SYDNEY NSW 2001
	Phone:	(02) 9235 6300 Freecall 1800 640 501
	Fax:	(02) 9233 5613
	Web page:	www.nntt.gov.au

NNTT - Register of Native Title Claims - NC97/4
Gundungurra Aboriginal people
Attachment "A" is a map of the application area.
Attached 21/01/97
Page 1 of 1

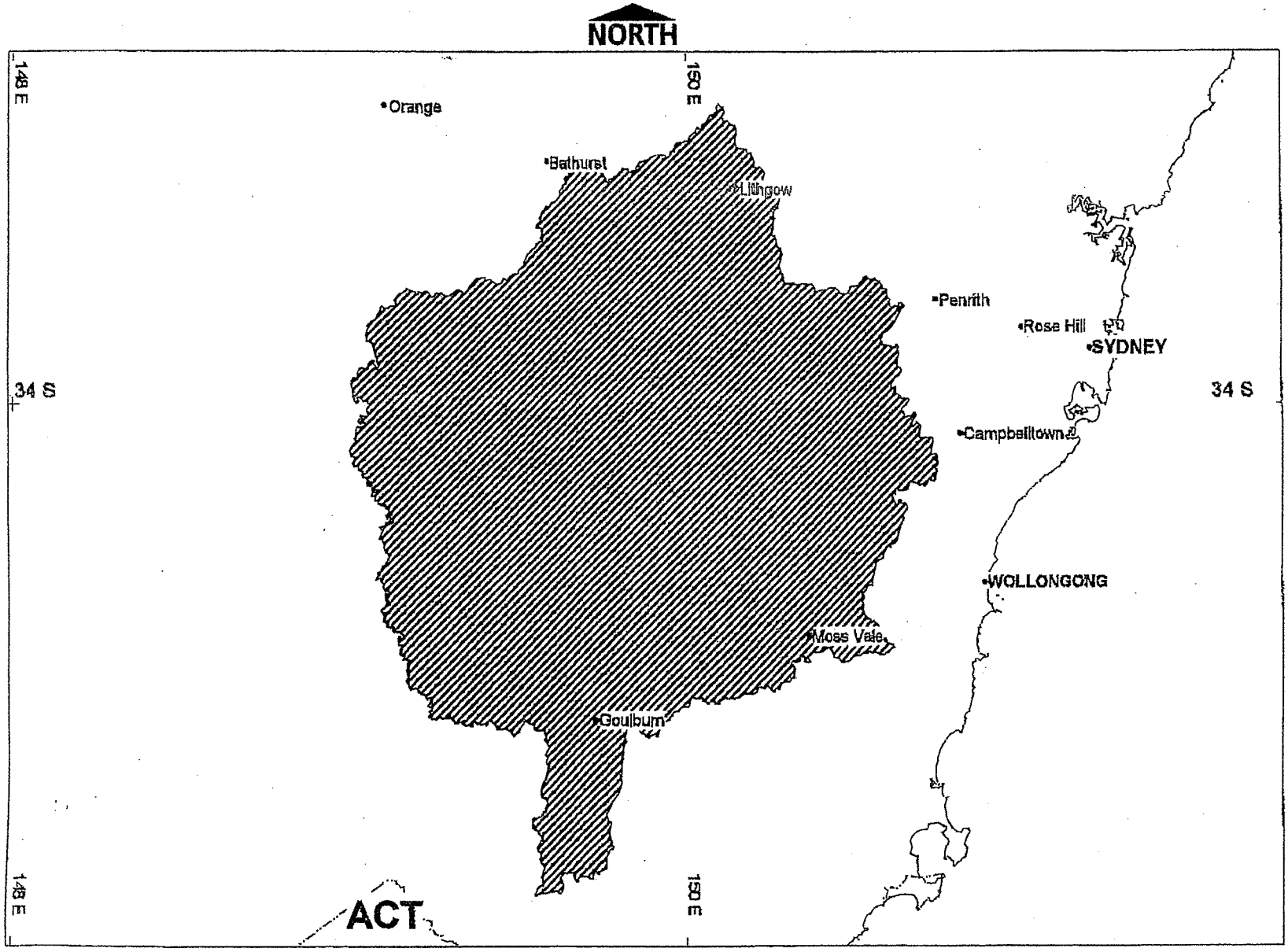


as at 18/05/1999

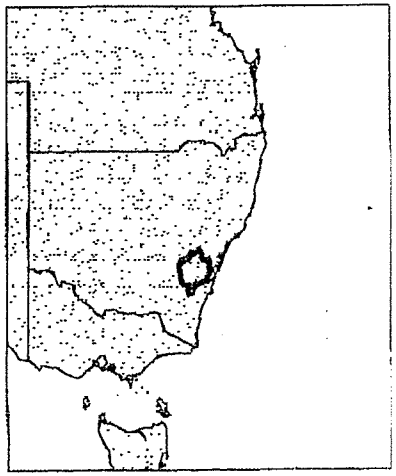
Map created from data sourced from Land Information Centre, DIM&T, NSW
by Geospatial Information Unit, National Native Title Tribunal

Gundungurra #6
Application Area = 18682.37 sqkm

0 80
KILOMETRES
Latitude and Longitude based on Australian Geodetic Datum 1984



Location of NC97/007
Within New South Wales & ACT



NATIONAL NATIVE TITLE TRIBUNAL

Claimant Application Summary

Application numbers	Federal Court number: NG6060/98 NNTT number: NC97/7
Application name	Gundungurra Tribal Council Aboriginal Corporation #6
Name of body where application lodged	National Native Title Tribunal
Date application lodged	29/04/1997
Current stage(s)	Notification Complete, In Mediation
Applicants	Ms Elsie Stockwell, Ms Pamela Stockwell
Address for service	Mr Eduard Neumann Craddock Murray and Neumann Level 2 255 Castlereagh Street SYDNEY NSW 2000 Phone: 02 9283 4755 Fax: 02 9283 4180
Persons claiming to hold native title	The members of the Gundungurra Tribal Council Aboriginal Corporation
Native title rights and interests claimed	1. Subject to (2) - (5) below, the full and free enjoyment of the following native title rights and interests area are claimed in relation to the land and waters the subject of the application: a. A right to possess, occupy, use and enjoy the claim area; b. A right to make decisions about the use and enjoyment of the claim area; c. A right of access to the claimed area; d. A right to control the access of others to the claimed area; e. The right to control the use and enjoyment of others or resources of the claimed area; f. The right to trade in resources of the claimed area; g. The right to receive a portion of any resources taken by others from the claimed area; h. The right to maintain, protect and prevent the misuse of cultural knowledge of the common law holders associated with the claimed area. 2. With respect of those parts of the area the subject of the application which are, or have been, the subject of a previous non-exclusive possession act within the meaning of s 23F of the Native Title Act 1993, the native title rights and interests area set out in (1) are claimed subject to the rights and interests created in the 'non-exclusive possession act' which are not inconsistent with the rights and interests claimed, subject to any suspension of the native title rights and interests which those inconsistent rights and interests cause. 3. With respect to those parts of the area the subject of the application which are, or have been, the subject of:

a. a category B intermediate period act within the meaning of s232C of the Native Title Act 1993;

b. a category C intermediate period act within the meaning of s232D of the Native Title Act 1993;

c. a category D intermediate period act within the meaning of s232E of the Native Title Act 1993;

the native title rights and interests claimed are those set out in (1) above subject to the rights and interests created in the non-exclusive possession act which are not inconsistent with the rights and interests claimed and, in the case of any rights granted which are inconsistent with the rights and interests claimed, subject to any suspension of the native title rights and interests which those inconsistent rights and interests cause.

4. With respect to those parts of the area of the application which are, or have been, the subject of:

a. a category B past act within the meaning of s230 of the Native Title Act 1993;

b. a category C past act within the meaning of s231 of the Native Title Act 1993;

c. a category D past act within the meaning of s232 of the Native Title Act 1993;

the native title rights and interests claimed area those set out in (1) above subject to the rights and interests created in the non-exclusive possession act which are not inconsistent with the rights and interests claimed and, in the case of any rights granted which are inconsistent with the rights and interests claimed, subject to any extinguishment or suspension of the native title rights and interests which those inconsistent rights and interests cause.

5. The native title rights and interests identified above do not extend to ownership of any minerals, petroleum or gas which are wholly owned by the Crown.

6. The native title rights and interests identified above do not include a claim for exclusive occupation and use of offshore areas as defined by s253 of the Native Title Act 1993.

Area

Jurisdiction: New South Wales
Location: Land and waters in the area from the Blue Mountains south to Goulburn, following the Lachlan River west to Newbridge and then north to Mt Davidson.
Local government region(s): Bathurst City Council, Blayney Shire Council, Blue Mountains City Council, Boorowa Shire Council, Camden Council, Campbelltown City Council, Cowra Shire Council, Crookwell Shire Council, Evans Shire Council, Goulburn City Council, Lithgow City Council, Gunning Shire Council, Liverpool City Council, Mulwaree Shire Council, Oberon Council, Penrith City Council, Tallaganda Shire Council, Wingecarribee Shire Council, Wollondilly Shire Council
ATSIC region(s): Binaal Billa Regional Council, Sydney Regional Council, Queanbeyan Regional Council
Representative A/TSI body(s): NSW Native Title Services
Land/water and/or sea: Land/Water

Area covered by the claim (as detailed in the application):
(a) Commencing at 150.52997 east longitude and 34.591636 south latitude, approximately 15.5 kilometres east south east of Moss Vale, the application traverses clockwise starting in a south-westerly direction, passing through points 2 to 36,765 of the following geographic coordinates. They are in decimal degrees and referenced to Australian Geodetic Datum 1984 (AGD84). These coordinates are based on the position of spatial reference data sourced by Land Information Centre, Department of Information Management and Technology, New South Wales as of 18 May 1999.

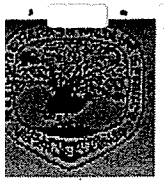
(b) Subject to clauses (d) and (e) the area covered by the application excludes any land or waters covered by:

	(i) a scheduled interest; (ii) freehold estate; (iii) a commercial lease that is neither an agricultural lease nor a pastoral lease; (iv) an exclusive agricultural lease or an exclusive pastoral lease; (v) residential lease; (vi) a community purposes lease; (vii) a lease dissected from a mining lease as referred to in s23B(2)(vii); (viii) any lease (other than a mining lease) that confers a right of exclusive use over particular land or waters; which was validly vested or granted on or before 23 December 1996. (c) Subject to clauses (d) and (e) the area covered by the application excludes any area covered by the valid construction or establishment of any public work, where the construction or establishment of the public work commenced on or before 23 December 1996. (d) Where the act specified in (b) and (c) falls within the provisions of (i) s23B(9) - Exclusion of acts benefiting Aboriginal peoples or Torres Strait Islanders; (ii) s23B (9A) - Establishment of a national or state park; (iii) s23B (9B) - Acts where legislation provides for non-extinguishment; (iv) s23B (9C) - Exclusion of Crown to Crown grants; and (v) s23B (10) - Exclusion by regulation, the area covered by the act is not excluded from this application. (e) Where an act referred to in clauses (b) and (c) covers land or waters referred to in: s47 - Pastoral leases held by native title claimants; s47A - Reserves etc covered by claimant applications; and s47B - Vacant crown land covered by claimant applications, the area covered by the act is not excluded from the application. (f) Where an area is covered by a previous non-exclusive possession act (s 23F) the native title claim group does not claim possession, occupation, use and enjoyment to the exclusion of all others. (g) The area covered by the application excludes land where native title has been extinguished at common law. (h) The area covered by the application excludes areas covered by prior Gundungurra claims filed with the National Native Title Tribunal being NC96/7, NC96/27, NC96/30, NC96/36 and 97/4.
Registration information	*Please refer to the Register of Native Title Claims/National Native Title Register (as appropriate) for registered details of this application.* **Date claim entered on Register of Native Title Claims:** 29/04/1997 **Registration test status:** Accepted for registration **Registration history:** Registered from 29/04/1997.
Attachments	1. Plan of Application Area, Attachment A of the Application, 1 page - A4, Attached 29/04/1997.

NNTT contact details		
	Case manager:	Anoushka Lenffer
	Address:	National Native Title Tribunal Level 25 25 Bligh Street SYDNEY NSW 2000 GPO Box 9973 SYDNEY NSW 2001
	Phone:	(02) 9235 6300 Freecall 1800 640 501
	Fax:	(02) 9233 5613
	Web page:	www.nntt.gov.au

APPENDIX 3

Previously Recorded Sites from NPWS Site Register



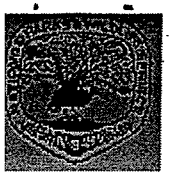
Aboriginal Heritage Information Management System
National Park and Wildlife Services, NSW

List of Sites (Partial)

Springvale

Grid Reference Type = AMG Zone = 56 Easting From = 231000 Easting to = 243000 Northing From = 6295000 Northing to = 6307000

Site Id	AMG / GDA	Zone	Easting	Northing	Access Restrictions			Site Features	Further Site Information Contact	Report ID
					Gender	General	Location			
5-1-0024	AMG	56	231250	6306650	None			Art (Pigment or Engraved)		
5-1-0112	AMG	56	231500	6297100	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		1414
5-1-0041	AMG	56	231500	6305380	None			Art (Pigment or Engraved)		
5-1-0079	AMG	56	231600	6306100	None					
5-1-0008	AMG	56	231640	6301900	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0040	AMG	56	231650	6305280	None			Art (Pigment or Engraved)		
5-1-0117	AMG	56	231910	6296980	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0250	AMG	56	231980	6297200	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0159	AMG	56	231990	6301850	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		2016
5-1-0151	AMG	56	232050	6305550	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		2016
5-1-0078	AMG	56	232100	6306050	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal) Grinding Groove		2016



Aboriginal Heritage Informat[illegible] Management System

National Park and Wildlife Services, NSW

List of Sites (Partial)

Springvale

Grid Reference Type = AMG Zone = 56 Easting From = 231000 Easting to = 243000 Northing From = 6295000 Northing to = 6307000

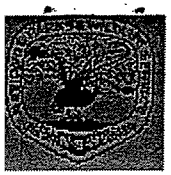
Site Id	AMG / GDA	Zone	Easting	Northing	Access Restrictions			Site Features	Further Site Information Contact	Report ID
					Gender	General	Location			
45-1-0116	AMG	56	232270	6297030	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		1414
45-1-0113	AMG	56	232470	6297180	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		1414
45-1-0089	AMG	56	232490	6297420	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		1414
45-1-0090	AMG	56	232580	6297420	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		1414
45-1-0114	AMG	56	232650	6297780	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		1414
45-1-0115	AMG	56	232680	6297500	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		1414
45-1-0091	AMG	56	232800	6299950	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
45-1-0087	AMG	56	232810	6299890	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
45-1-0088	AMG	56	232850	6299460	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
45-1-0152	AMG	56	232900	6306050	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		2016
45-1-2557	AMG	56	234520	6298440	None	No	No	Aboriginal Ceremony and Dreaming		

List of Sites (Partial)

Springvale

Grid Reference Type = AMG Zone = 56 Easting From = 231000 Easting to = 243000 Northing From = 6295000 Northing to = 6307000

Site Id	AMG / GDA	Zone	Easting	Northing	Access Restrictions			Site Features	Further Site Information Contact	Report ID
					Gender	General	Location			
5-1-0138	AMG	56	235800	6306900	None			Art (Pigment or Engraved)		2016
5-1-0139	AMG	56	236050	6306800	None			Art (Pigment or Engraved)		2016
5-1-0204	AMG	56	236120	6300900	None			Art (Pigment or Engraved)		2300
5-1-0199	AMG	56	236200	6298400	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0205	AMG	56	236200	6301020	None			Art (Pigment or Engraved)		2300
5-1-0150	AMG	56	236200	6306800	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		2016
5-1-0149	AMG	56	236300	6306800	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		2016
5-1-0144	AMG	56	236350	6306800	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		2016
5-1-0145	AMG	56	236400	6306750	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		2016
5-1-0137	AMG	56	236600	6306900	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		2016
5-1-0002	AMG	56	239300	6300400	None			Grinding Groove		



Aboriginal Heritage Information Management System
National Park and Wildlife Services, NSW

List of Sites (Partial)

Springvale

Grid Reference Type = AMG Zone = 56 Easting From = 231000 Easting to = 243000 Northing From = 6295000 Northing to = 6307000

Site Id	AMG / GDA	Zone	Easting	Northing	Access Restrictions			Site Features	Further Site Information Contact	Report ID
					Gender	General	Location			
45-1-0005	AMG	56	239960	6301000	None			Grinding Groove		1474
45-1-0051	AMG	56	240250	6302850	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
45-1-0132	AMG	56	240550	6305850	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		2016
45-1-0131	AMG	56	240550	6306150	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		2016
45-1-0154	AMG	56	240700	6306150	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		2016
45-1-0184	AMG	56	240750	6298400	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
45-1-0052	AMG	56	241000	6303000	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
45-1-0196	AMG	56	241100	6296600	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
45-1-0065	AMG	56	241100	6299220	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal) Grinding Groove		
45-1-0194	AMG	56	241150	6295800	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
45-1-0195	AMG	56	241200	6296500	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		

Aboriginal Heritage Information Management System
National Park and Wildlife Services, NSW

List of Sites (Partial)

Springvale

Grid Reference Type = AMG Zone = 56 Easting From = 231000 Easting to = 243000 Northing From = 6295000 Northing to = 6307000

Site Id	AMG / GDA	Zone	Easting	Northing	Access Restrictions			Site Features	Further Site Information Contact	Report ID
					Gender	General	Location			
5-1-0185	AMG	56	241200	6298500	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0193	AMG	56	241450	6296000	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0192	AMG	56	241550	6296900	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0186	AMG	56	241600	6299000	None			Art (Pigment or Engraved)		
5-1-0187	AMG	56	241650	6298800	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0188	AMG	56	241800	6299150	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0178	AMG	56	241850	6304100	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0177	AMG	56	241900	6303750	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0129	AMG	56	241950	6300950	None			Modified Tree (Carved or Scarred)		2016
5-1-0197	AMG	56	242080	6302950	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0179	AMG	56	242100	6301750	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		

Aboriginal Heritage Information Management System
National Park and Wildlife Services, NSW

List of Sites (Partial)

Springvale

Grid Reference Type = AMG Zone = 56 Easting From = 231000 Easting to = 243000 Northing From = 6295000 Northing to = 6307000

Site Id	AMG / GDA	Zone	Easting	Northing	Access Restrictions			Site Features	Further Site Information Contact	Report ID
					Gender	General	Location			
5-1-0198	AMG	56	242100	6303200	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0128	AMG	56	242200	6301100	None			Art (Pigment or Engraved)		2016
5-1-0182	AMG	56	242350	6301150	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0181	AMG	56	242350	6301200	None			Art (Pigment or Engraved) Grinding Groove		
5-1-0189	AMG	56	242400	6298950	None			Art (Pigment or Engraved)		
5-1-0004	AMG	56	242600	6301200	None			Art (Pigment or Engraved) Grinding Groove		2016
5-1-0191	AMG	56	242950	6298500	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		
5-1-0190	AMG	56	242950	6298600	None			Artefact (Stone, Bone, Shell, Glass, Ceramic and Metal)		

APPENDIX 4

Description of Surveys

Survey Area 1

Metres from Start Survey 1	Bearing	Slope and Aspect	Topographic Unit	Vegetation	Geology Soil type aggrading/de grading/ stable	Land Use Disturbance	Visibility	Artefacts/Sites GPS Description
(C-D) 0-250m	W	W 2-3° at start, increasing to 8-10° with a SW aspect	Walked downslope along the crest of a spurline, then upperslope of spurline. 1 person on the road because of visibility and the other 2 approximately 15-20 metres apart. Walked to Corner D	Open forest with dry heath understorey. Very few mature trees, mostly regrowth. The dominant vegetation included Silvertop Ash (*Eucalyptus sieberi*) and Narrow-leaved Peppermint (*E. radiata*) with Ribbon Gum (*E. viminalis* subsp. *viminalis*), Blue Mountains Ash (*E. oreades*) and Brittle Gum (*E. mannifera*), Acacia, heaths, Grevillea, Banksia, Dianella, sword sedge, bracken fern, broad leaf drumstick (*Isopogon anemonifolius*) and Lomandra.	Sandstone, red ochre on road. Soil washing downslope, much of the surface covered in sand, some scouring	Logging, a two track road along the southern edge of the survey area for the first 50 metres. A motor bike track crosses the area.	An average of 5% on the road 1m x 50m due to aggradation from slopewash, leaf litter and vegetation, away from road 0% except for an area 3m x 3m @ 100%. Thick vegetation	GPS during Survey-corner C 237015E 6300926N GPS from topo 236999E 6300969N
(D-A) 165m	N	SW at 5-8° at start, then W & 5°, finishing NW 5-8° at finish.	Walked upslope on an Upper slope at start, over crest of a spurline then downslope. Walked to the drainage depression.	As above	Sandstone, some erosion aggradation from slopewash and scouring	As above	0% visibility because of vegetation and sand over ground surface from slopewash	GPS during Survey-corner D 236754E 6300957N GPS from topo 236749E 6300963N

Survey Area 1 (cont)

(A-B) 250m	E	NW at start 5-8° to NE at 1° at finish	Walked upslope on upper slope to crest of spurline at finish	As above	As above	Logging and motorbike track. Bike track covered with sand from slopewash	As above	GPS from topo A 236744E 63001127N Walked an extra hundred metres to N and W to drainage depression and did not locate pegs for Corner A
(B-C) 165m	S	NE at 1° at start, to 2-3° at C	Walked slightly upslope over spur crest and then downslope	As above	As above	As above	As above	GPS from Survey-Corner B 236996E 6301133N GPS from topo 236994E 6301134N
Sweep through from B-C line to D-A line50m x 250m each way	W	W-NW 2-3	Downslope along spur ridge then upslope along spur ridge	As above	As above	As above	As above	

Survey Area 2

Metres from Start Survey 2	Bearing	Slope and Aspect	Topographic Unit	Vegetation	Geology Soil type aggrading/de grading/ stable	Land Use Disturbance	Visibility	Artefacts/Sites GPS Description
0	E	2-3° NW	Crest of spur, walking upslope	Open forest with dry heath understorey. Very few mature trees, mostly regrowth. The dominant vegetation included Silvertop Ash (*Eucalyptus sieberi*) and Narrow-leaved Peppermint (*E. radiata*) with Ribbon Gum (*E. viminalis* subsp. *viminalis*), Blue Mountains Ash (*E. oreades*) and Brittle Gum (*E. mannifera*), Acacia, heaths, Grevillea, Banksia, Dianella, sword sedge, bracken fern, broad leaf drumstick (*Isopogon anemonifolius*) and Lomandra	Sandstone, red ochre on road, soil washing downslope, much of the surface covered in sand, some scouring	Logging, a two track road outside the southern edge of the survey area	An average of 5% on the road 1m x 120m due to aggradation from slopewash, leaf litter and vegetation, away from road 0% Total of 0% for survey area	Survey-corner C 237015E 6300926N From topo 236999E 6300969N
120m	E	2-3° NW	Walking upslope along the spur crest	As above	As above	As above	2m x 120m @ 5% on road, Total of 0% for survey area	

Survey Area 2 (cont)

240	NE	SW <1°	Walking on a gentle upslope along crest of ridgeline. The road is now included in the survey. 1 person walking on the road and the other two members walking 10m either side of road	As above	Sandstone, high concentrations of sand on and off the road due to slopewash	Logging, road track	On road 100m x 3m @ 50%, (sand and leaf litter); Off road 0% grass, leaf litter & sand	
300	NE	SW <1°		As above	As above	As above	On road 100m x 3m @ 90%, off road 0%	
400	NE	SW <1°		More bracken fern, sword sedge and heath is taller	As above	As above	On road 200m 2m @ 30%, off road 0%	
650m	NE	SW <1°		As above	As above	As above	On road 190m x 1 m @ 5% due to sand from slopewash, 0% off road	
840m	NE	SW <1°		As above	As above	As above	On road 160m x 2m @ 60% on road	
885	NE	SW <1°	Road has a detour	Lot of regrowth, trees have been cleared and the area is generally grassy underneath, lot of lomandra	As above	Lot of rubbish dumped and a lot of road base on surface	Road splits add extra 35m x 2m @ 30%.	

Survey Area 2 (cont)

1000	NE	SW <1°	Junction of two roads	Thicker understorey	As above	As above	Road 140m x 3m @ 60%, extra area of 40m x 3m @ 50%, off road still 0%	
1140 Finish	NE	360° 0 slope	Level area on crest. Junction of track with Black Fellows Hand Road	As above	As above	Roads graded, piles of soil and stone on northern side of road, very disturbed area.	Lot of leaf litter	237652E 6301447N

Survey Area 3

Metres from Start Survey 3	Bearing	Slope and Aspect	Topographic Unit	Vegetation	Geology Soil type aggrading/de grading/ stable	Land Use Disturbance	Visibility	Artefacts/Sites GPS Description
Trans 1	NW	360° 0 slope	Crest of spur	Open forest with dry heath understorey. Very few mature trees, mostly regrowth. The dominant vegetation Silvertop Ash (*Eucalyptus sieberi*) and Narrow-leaved Peppermint (*E. radiata*) with Ribbon Gum (*E. viminalis* subsp. *viminalis*), Blue Mountains Ash (*E. oreades*) and Brittle Gum (*E. mannifera*), Acacia, heaths, Grevillea, Banksia, Dianella, sword sedge, bracken fern, broad leaf drumstick (*Isopogon anemonifolius*), and Lomandra.	Sandstone	Roads graded, piles of soil and stone on northern side of road., very disturbed area. Survey area has been cleared in the past.	0% due to thick vegetation growth	237652E 6301447N
Trans 2	SE	As above	As above	As above	As above	As above	As above	
Trans 3	NW	As above	As above	As above	As above	As above	As above	

Survey Area 4

Metres from Start Survey 3	Bearing	Slope and Aspect	Topographic Unit	Vegetation	Geology Soil type aggrading/de grading/ stable	Land Use Disturbance	Visibility	Artefacts/Sites GPS Description
Trans 1	SE	NW <1° slope	Plateau summit	Area cleared in the past, regrowth dry heath. Acacia,	Sandstone	Land has been cleared of	0% due to thick vegetation growth	NW corner: 238887E 6300268N;

				Dianella, Banksia, Lomandra, geebung		vegetation in the past. A power line runs within 20m of the western boundary and an access road 15 m of the western boundary		SW corner: 238895E 6300220
Trans 2	NW	As above	As above	As above	As above	As above	As above	SE corner: 238940E 6300245N; NE corner: 238915E 6300285N

Survey Area 5

Metres from Start Survey 3	Bearing	Slope and Aspect	Topographic Unit	Vegetation	Geology Soil type aggrading/degrading/ stable	Land Use Disturbance	Visibility	Artefacts/Sites GPS Description
Start	NNW	NW <1°	Plateau summit	Mostly cleared with heath regrowth (Acacia dominant species). Either side of the survey corridor: open forest with dry heath understorey. Very few mature trees, mostly regrowth. The dominant vegetation Silvertop Ash (*Eucalyptus sieberi*) and Narrow-leaved Peppermint (*E. radiata*) with Ribbon Gum (*E. viminalis* subsp. *viminalis*), Blue Mountains Ash (*E. oreades*), Stringybark and Brittle Gum (*E. mannifera*), Acacia, heaths, Grevillea,	Residual sandstone substrate. Light yellow coloured sandy soil. Soil eroded by sheet wash leaving a lag deposit of gravel (mainly quartz) and sandstone angular outcrop fragments. .	The survey corridor is adjacent to the west of power line easement (25m wide) and access road. Vegetation has been cleared previoiusly for the easement. Logging has occurred in the past	0% due to heavy cover of vegetation	238872E 6300220N

				Banksia, Dianella, sword sedge, bracken fern, purple lilies, geebung				
	NNW	NW @ 5°	Upper slope	As above	The slopes have both erosional and aggrading processes, with sand washed down from upslope	As above	15m x 15m @ 50%	238830E 6300300N
	NNW	SW @ 1°	Stream channel (no water)	As above	Some sandy deposit but cannot determine depth because of thick cover of vegetation	As above	5m x 5m @ 5%	238790E 6300357N photo 3
Site	NNW	S @ 5°	Upper slope above stream channel	As above Upper storey mainly Blue Mountain Ash, Stringybark & Silver top Ash, depauperate mid storey and heaths understorey, grasstrees, geebungs, sedges	2 piles of stone	As above	0%	238760E 6300377N Site Springvale 1 Stone Arrangements photos 4 & 5
	NNW	NW @ 8°	Upper slope/crest break of slope to stream channel to the NW	As above	Crests have been eroded leaving a lag deposit and slopes have both eroded areas and aggraded sand	As above	0%	238750E 6200400N
	NNW	SSW @ 1°	Stream channel	Lot of regrowth Blue Mountain Ash, Silver top Ash	Broad grassy deep depression. Sandy	As above	0%	238655E 6200520N photo 6

					deposit, could have PAD but cannot determine depth (thick vegetation)			
	NNW	S @ 5-6°	Upper slope	Colony of grasstrees on slopes, Grevillea, sedges,heaths, Banksia	Skeletal A horizon	As above	0%	
	NNW	SW @ 5-8°	Crest of spurline	Lot of regrowth	As above	As above, road to the east cut down up to 1.5m	15m x 3m @ 5%	238595E 6300665N photo 7
	NNW	S @ 1°	Stream channel Area adjacent to channel (northern side) that would be suitable for camping –slope 1-2°	Abundance of rasp ferns, bracken ferns, Dianella, Lomandra, geebungs, lot of large burnt trees. Very damp area. No surface water visible but water seeping through on road	Build up of sandy deposits but cannot determine depth because of vegetation cover	Incised, access road built up over depression 20m to NE of survey corridor. Water seeping through soil on road from recent rains	0%	238516E 6300720N possible PAD
	NNW	SE & NW @ <1°	Crest spurline	Lot of grasstrees	Skeletal A horizon.	Power line and access road to the north east. Area logged in the past	0%	238435E 6300875N
	Change NW	SW @ 3-5°	Upper slope west of crest, walking across slope across a series of dips and rises	Vegetation as for above	As above	As above	20m x 5m @ 5% aggraded sand, background rubble and leaf litter	238304E 6301100N
	NW	WSW @ 1-2°	Crest of plateau	Lot of bracken and sedges	As above	As above, access road crosses to western side of power line twice for approx 50m	0%	237930E 6301295N
	NW	S @ 2-3°	Drainage depression	Bracken fern, Lomandra, geebungs	As above	As above then road crosses back to eastern side of	0%	237820E 6301360N

						power line		
Finish: 2100 metres	NW	SE @ 1-2°	Crest of plateau	. Either side of the survey corridor: open forest with dry heath understorey. Very few mature trees, mostly regrowth. The dominant vegetation Silvertop Ash (*Eucalyptus sieberi*) and Narrow-leaved Peppermint (*E. radiata*) with Ribbon Gum (*E. viminalis* subsp. *viminalis*), Blue Mountains Ash (*E. oreades*), Stringybark and Brittle Gum (*E. mannifera*), Acacia, heaths, Grevillea, Banksia, Dianella, bracken fern. sword sedge, purple lilies, geebung		Area highly disturbed. Several graded roads converge, power lines, vegetation has been cleared and logging in the past	50mx15m @ 5%	237660E 6301455N

APPENDIX 5

Site Card – Site Springvale 1

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

Site name	Springvale 1	**NPWS Site Number**	
Owner/manager	Regional Manager, Macquarie Region		
Owner Address	State Forest of NSW PO Box 143 Bathurst NSW 2795		
Location	Newnes State Forest		
How to get to the site	The study area is situated within the Newnes State Forest which is located on the Newnes Plateau, in the western Blue Mountains, west of Sydney, Central New South Wales. The site is on the western side of Black Fellows Hand Road, approximately 9 kilometres north of Lithgow and 8 kilometres east of Wallerawang. The eastern boundary of the study area is approximately 500 metres west of Bungleboori Rest Area. See Figure 1 attached		
1:250,000 map name		**NPWS map code**	
AMG Zone	56 **AMG Easting** 238760	**AMG Northing**	6300377
Method for grid reference	Hand-held GPS **Map scale (if method = map)** 1:25,000 **Map name**		Lithgow 8931-III-S
NPWS District Name (see map)	Blue Mountains	**NPWS Zone (see map)**	Sydney Zone
Portion no.	n/a	**Parish**	Marangaroo
Site type(s)	Stone Arrangement	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	The site was located 20 metres southwest of the power line and 20 metres north of a deeply incised stream channel. Two mounds of stone were located on an upper slope, just below the break of slope of a level crest of a spur line. The stone mounds (A and B) were 5 metres apart. Both mounds contained sandstone rocks which averaged 400mm x 200mm x 200mm in size (Plate 1 & 2). The dimensions of Mound A are: Length - 1000mm, Width - 600mm, Height - 450mm. The dimensions of Mound B are: Length 1000mm, Width 1000mm Height 1000mm Rocks were weathered, however, there was no evidence of human modification. Visibility around the mounds and in the vicinity was 0% due to thick vegetation, leaf litter and background rubble. The stream channel below the site did not contain outcropping sandstone although small sandstone pieces were lying on the surface. There was no water in the stream channel at the time of the survey. An abundance of plant resources were available in the area including: grasstrees, geebungs, Lomandra, Dianella and sedges.		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

Land form	Upper slope	**Aspect**	S	**Slope**	5 degrees
Mark position of the site					
Local rock type	Sandstone & conglomerate	**Land use/effect**	State Forest		
Distance from drinking water	20m to stream channel (no water at time of survey), 2 km to permanent water	**Source**	Marangaroo Creek		
Resource zone (eg. estuarine, river, forest)	Forest	**Vegetation**	Dry schleryphll forest with dry heath understorey		
Edible plants	Grasstrees, geebungs, Lomandra, Garnia, bracken fern, Acacia, Grevillea	**Faunal resources** (include shellfish)	common wombat, eastern grey kangaroo, swamp wallaby and marsupial mouse		
Other exploitable resources (eg. ochre)	conglomerate for stone tools				
Are there other sites in the locality	No	**Are they in the Sites Register**		**Other site types include**	

Site condition	Good		
Management recommendations	For the duration of construction of the power line, the site should be fenced with a warning sign indicating that the area should not be disturbed. The fence and sign should be removed upon completion of the power line to avoid drawing attention to the site by casual visitors.		
Have artefacts been removed from site	No	**When**	
By whom		**Deposited at**	
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	

Reason for investigation	Archeological survey for proposed development of transmission line easement associated with ventilation shaft facility for Springvale Colliery.		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Warwick Peckham, Co-ordinator Bathurst Local Aboriginal Land Council PO Box 1500 Bathurst. NSW. 2795 Mr Bill Hardie and Mr Shannon Kennedy Co-ordinator Gundungurra Tribal Council Aboriginal Corporation 14 Oak Street Katoomba. NSW. 2780.

Version: June 1998	Data entered by:	Date entered:

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

Is the site important to local Aborigines	Yes		
Verbal/written reference sources	Umwelt (Australia) Pty Limited,. 2002. Archaeological Assessment of Proposed Ventilation Shaft Facility Newnes State Forest, NSW	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	2
Site recorded by	L. McAdam	**Date of recording**	4 September, 2002
Address/institution	Umwelt (Australia) Pty Limited, 2/20 The Boulevarde, Toronto 2238		

PLATE 1
Stone Mound

PLATE 2
Stone Mound

Umwelt (Australia) Pty Limited
2/20 The Boulevarde
PO Box 838
Toronto NSW 2283

Ph. 02 4950 5322
Fax 02 4950 5737