Centennial Coal

Angus Place Colliery, Ventilation Facility Project: Modification 2 of Project Approval 06_0021

Environmental Assessment
Volume 1: Report

October 2012

Centennial Coal
Environment Matters

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STATEMENT OF CERTIFICATION

We certify that we have prepared this Environmental Assessment report and to the best of our knowledge it is a true account of the proposed Ventilation Facility Project and is not considered to be either false or misleading.

……

Belinda Lewis

Planning Manager

RPS Australia East Pty Ltd

3 October 2012

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Executive Summary

Introduction

Angus Place Colliery is an existing underground longwall mining operation located in the Western Coalfield of NSW, approximately 120 kilometres west-northwest of Sydney. It is operated by Centennial Coal Company Limited. This Environmental Assessment (EA) has been prepared for an application to modify Project Approval 06_0021 under Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Project

The Project Application Area is located to the east of the existing colliery, wholly within the Newnes State Forest. The proposed Ventilation Facility Project (the project) comprises:

- Development of underground roadways from the eastern extent of longwall 910 to the proposed Ventilation Facility;
- Development of underground roadways eastwards of the Ventilation Facility to undertake trial mining. Approximately 709,575 tonnes of coal would be extracted over a period of 3.5 years as a result of the trial mining. This would be part of the approved production limit of 4 million tonnes per annum (Mtpa) from the colliery;
- Construction and operation of a Ventilation Facility consisting of both upcast (exhaust) and downcast (intake) shafts, an air compressor station, emulsion mixing and supply plant, various services boreholes, electrical substation, self-bunded diesel storage tank, back-up generator, internal roadways and hardstand area, spoil emplacement area, water management control ponds, fire controls (including Bushfire Asset Protection Zones), security fencing and miscellaneous buildings;
- Construction of a new access track from Sunnyside Ridge Road to the Ventilation Facility;
- Establishment of a 66kV/11kV electrical substation (including Bushfire Asset Protection Zone and security fencing situated off Sunnyside Ridge Road;
- Construction and operation of a switchyard facility and security fencing (including access track);
- 66kV trenched electrical power supply from existing powerline (running adjacent to Blackfellows Hands Road and Sunnyside Ridge Road) via a proposed switchyard and to the proposed substation following Sunnyside Ridge Road; and
- 11kV trenched electrical power supply from the proposed substation to the proposed Ventilation Facility along Sunnyside Ridge Road and the proposed new track to the Ventilation Facility.

Construction is anticipated to be undertaken from January 2013 to September 2015 (approximately two years and nine months). The Ventilation Facility would be operational from October 2015. Rehabilitation would be undertaken in accordance with a Rehabilitation Strategy. A Construction Environmental Management Plan (CEMP) would be prepared for the construction works and would include the relevant measures identified in the EA.

Key Environmental Issues

The Director General's Requirements (DGRs) for the EA were issued by the Department of Planning and Infrastructure (DP&I) in January 2012. These, together with the results of an environmental risk assessment, guided the preparation of the EA. The table below provides an overview of the key outcomes from the EA.

A referral was submitted to the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in June 2012 to determine whether the project constituted a controlled action. On 2 July 2012 SEWPaC provided notification of the decision that the project does not constitute a controlled action under the EPBC Act. Therefore, the project does not require further assessment or approval under the EPBC Act.

Table 1 Overview of the Key Outcomes from the EA

Key Outcomes
Flora and Fauna ▪ There would be a loss of approximately 17.3ha vegetation, including approximately 15ha native vegetation, a portion of which would be harvested by forestry. The loss of native vegetation would include approximately 1,269 *Personnia hindii* plants that are listed as endangered flora species under the *Threatened Species Conservation Act 1995* (TSC Act). ▪ Mitigation measures include erosion and sediment controls, seed collection and seed banking of *Persoonia hindii,* translocation of *Personnia hindii* plants scheduled for removal, direct management of the residual population and a review of records held on this species. There is an Endangered Ecological Community (EEC), Newnes Plateau Hanging Swamp approximately 55m to the southwest of the Ventilation Facility. This community is also a Groundwater Dependant Ecosystem (GDE). There are two significant ecological areas to the north and east of the Ventilation Facility. There would be buffers of at least 50m around these areas within which no disturbance to vegetation or works would take place. These areas would be protected from changes in water quality and quantity through mitigation measures to manage runoff.
Surface Water ▪ There would be approximately 0.5Megalitres (ML) per day of groundwater make from the proposed trial mining and this would be discharged into Kangaroo Creek through Licensed Discharge Point (LDP) 001 in accordance with the limits established by the Environment Protection Licence (EPL). ▪ During construction and operation there would be an increase in run-off and a change in water quality that may affect the swamps and significant ecological areas. Detailed water management measures are identified as mitigation.
Groundwater ▪ The drainage of deep groundwater from the strata resulting from the proposed underground roadways would be negligible. It would be unlikely to produce a significant reduction in groundwater pressure except within the strata immediately above the underground roadways.
Rehabilitation ▪ The Rehabilitation Strategy for the project would be implemented. ▪ The post mining use for the land is State Forest.
Soil and Land ▪ There would be soil disturbance resulting from the vegetation clearance. Soil handling techniques are identified as mitigation.
Greenhouse Gas ▪ There would be approximately 185 tonnes of direct (Scope 1, approximately 13,877 tonnes of indirect (Scope 2) and approximately 2,674 indirect (Scope 3) greenhouse gas emissions. ▪ The total greenhouse gas emissions from the existing/approved Angus Place Colliery plus the proposed project would be 1,081,192. This represents 0.7% of total NSW greenhouse gas emissions and 0.2% of greenhouse gas emissions from Australia (based on 2009 totals).
Air Quality ▪ Levels of particulates, NO_2, CO, VOCs and odour at residential properties located from approximately 7km to the west and north west of the Project Application Area would be well below the nominated project criteria. ▪ There would be negligible impacts on recreational receptors such as the Bungleboori picnic and camp site within the Newnes State Forest. Odour would be noticeable within the immediate vicinity of the

Key Outcomes
Ventilation Facility.
Noise ▪ Noise generated during construction and operation would be significantly below the noise criteria for the residential receptors to the north and north west. ▪ During operation, an area approximately 700m from the Ventilation Facility, including a short section of Sunnyside Ridge Road would experience small exceedances of the project noise criteria specified for a passive recreation area. Mitigation to minimise noise from the Ventilation Facility is identified.
Bushfire ▪ The Project Application Area is within a bushfire prone area. ▪ Asset Protection Zones around the proposed buildings and structures are included within the Project Application Area. ▪ A range of mitigation measures are identified to minimise and manage bushfire risk.
Visual ▪ Neither the construction works nor the operational structures would be visible to the nearest residential properties to the north and north west. ▪ Construction works and some of the operational structures would be visible by those using the Newnes State Forest for recreation in the immediate vicinity of the Project Application Area and potentially from recreational places to the south, south east and east. Mitigation measures to blend the structures into their surroundings are identified.
Recreation ▪ Effects during construction on those using the Newnes State Forest for recreation, due to changes in air quality, noise, traffic, views and hazards would be minor and temporary and confined largely to the immediate area with some potential views from three recreational places to the south, south east and east. ▪ Effects during operation on those using the Newnes State Forest for recreation due to changes in odour, noise and views would largely be confined to the immediate vicinity although there may also be views from three recreational places to the south, south east and east. Public safety issues include bushfire risk and unauthorised access.
Traffic ▪ Construction traffic would average less than 20 daily vehicle trips over the construction period. ▪ Operational traffic would average less than 10 vehicles per week with an expected peak of 4 vehicle trips on a single day. ▪ There would be no significant impact on road capacity within the sub region and Newnes State Forest that provide access to the Project Application Area.
Economic ▪ Centennial's operations and the regional mining industry are important to the economic sustainability of the Lithgow Local Government Area (LGA). ▪ Angus Place Colliery needs to investigate the potential additional resource to the east of the existing mine. Subject to the results of the investigation proposed and any subsequent applications for Project Approval there could be potential to sustain operations beyond 2016. ▪ There would be no net employment generated by the project although for the provision of services there will be a preference for local contractors and services where practical during the tendering and evaluation process.
Subsidence ▪ Subsidence from the proposed underground roadways would be less than 20mm which is considered negligible. ▪ The proposed powerline and switchyard would be affected by subsidence from Springvale Colliery longwalls and mitigation measures are identified.
Heritage ▪ A survey involving Aboriginal community stakeholders was undertaken and no Aboriginal sites were identified.

Key Outcomes
▪ There are no non Aboriginal sites within or in proximity of the Project Application Area.
Agriculture ▪ An Agricultural Impact Statement (AIS) has been undertaken, taking into account the DP&I's Guidelines for Agricultural Impact Statements of 2012. ▪ Pre construction harvesting of forest has been negotiated with Forests NSW and a Security Bond and rental agreement between Centennial Angus Place Pty Ltd and Forests NSW would be established. ▪ There are no agricultural enterprises within the Project Application Area and, beyond the forestry, no resources or land values upon which agricultural enterprises are reliant. There would therefore be a negligible impact on agricultural resources.
Waste ▪ Waste generated during construction and operation would be minimised and managed.
Other Hazards ▪ During construction there are potential hazards such as those associated with unauthorised access to construction sites and contact with voltage. Fences and signage would be installed. ▪ Materials to be used during construction are not classified as hazardous. ▪ During operation, security measures at the Ventilation Facility include fencing, lighting, signage and CCTV and there would be fencing and signage at the substation and switchyard sites. ▪ Materials to be stored during operation do not exceed thresholds specified in State Environmental Planning Policy (SEPP) No. 33 (Hazardous and Offensive Development).
Cumulative ▪ An application for a new bore (bore 8) for Springvale Colliery is in the process of being prepared and it is currently anticipated that this project might also involve the removal of *Persoonia hindii*. Therefore there is potential for cumulative effects with the project. Mitigation measures for the project are identified. ▪ There may be cumulative effects with other existing and proposed developments in the Newnes State Forest on those using the Newnes State Forest for recreation within the immediate vicinity of the Project Application Area and potentially from three recreational places to the south, south east and east. ▪ On a regional basis, together with projects such as other Centennial projects, Pine Dale Colliery and power stations in the area there is potential for cumulative effects associated with greenhouse gas emissions and the general intensification of mining in the local area.

1.0 Introduction

1.1 Overview

Angus Place Colliery is an existing underground longwall mining operation located in the Western Coalfield of NSW, approximately 120 kilometres west-northwest of Sydney (Figure 1.1). It is operated by Centennial Coal Company Limited.

This EA has been prepared for an application to modify Project Approval 06_0021 under section 75W of Part 3A[1] of the EP&A Act. The proposed Ventilation Facility Project (the project) would be the second modification to the Project Approval and comprises the development of underground roadways and a Ventilation Facility with associated infrastructure to the east of the existing Angus Place Colliery.

DGRs for the EA were issued by the DP&I on 18 January 2012 and a copy is provided at Appendix 1.1.

1.2 The Proponent

Angus Place Colliery is owned in equal shares by the Springvale joint venture parties, Centennial Springvale Pty Ltd and Springvale SK Kores Pty Ltd. Centennial Angus Place Pty Ltd, the Proponent, is a wholly owned subsidiary of Centennial Coal Company Limited and is the Manager of Angus Place Colliery, for and on behalf of the joint venture parties.

Centennial Coal Company Limited operates several coal mines in NSW. It supplies thermal and coking coal to both domestic and export markets. Approximately 60% of Centennial Coal Company's coal is supplied to the domestic market, accounting for 40% of NSW's coal fired electricity.

1.3 Project Team

The preparation of an Environmental Risk Assessment and the subsequent issue of the DGRs informed the range and scope of the technical assessments. These include a number of technical assessments in addition to those identified in the DGRs as they were originally identified in the Environmental Risk Assessment and undertaken in accordance with Centennial Angus Place Pty Ltd's precautionary approach. The Project Team is set out in Table 1.3 below.

Table 1.3 Project Team

Role/Report	Company
Proponent	Centennial Angus Place Pty Ltd
EA Project Management	RPS
Legal	Allens Linklaters
Flora and Fauna	RPS
Surface Water	GHD
Hydrogeology	Aurecon
Rehabilitation	GSS Environmental (GSSE)

[1] Part 3A of the EP&A Act was repealed in October 2011. Schedule 6A of the EP&A Act makes provision for 'transitional Part 3A projects' for which Part 3A continues to be applicable. This applies to this project.

Soils and Land Resource	GSSE
Noise and Vibration	SLR
Air Quality	SLR
Greenhouse Gas	SLR
Bushfire	Australian Bushfire Protection Planners (ABPP)
Visual	RPS
Recreation	RPS
Traffic	Anton Reisch Consulting (ARC)
Economic	AIGIS Group
Subsidence	Ditton Geotechnical Services Pty Ltd (DGS)
Cultural Heritage	RPS
Agriculture	GSSE
Waste	RPS
Other Hazards	RPS
Cumulative Effects	RPS with input from the technical assessors

1.4 Overview of Proposed Project

Currently approved operations at Angus Place Colliery are planned to be complete by January 2016.

The project comprises:

- Development of underground roadways from the eastern extent of longwall 910 to the proposed Ventilation Facility;
- Development of underground roadways eastwards of the Ventilation Facility to undertake trial mining. Approximately 709,575 tonnes of coal would be extracted over a period of 3.5 years as a result of the trial mining. This would be part of the approved production limit of 4Mtpa from the colliery;
- Construction and operation of a Ventilation Facility consisting of both upcast (exhaust) and downcast (intake) shafts, an air compressor station, emulsion mixing and supply plant, various services boreholes, electrical substation, self-bunded diesel storage tank, back-up generator, internal roadways and hardstand area, spoil emplacement area, water management control ponds, fire controls (including Bushfire Asset Protection Zones), security fencing and miscellaneous buildings;
- Construction of a new access track from Sunnyside Ridge Road to the Ventilation Facility;
- Establishment of a 66kV/11kV electrical substation (including Bushfire Asset Protection Zone and security fencing) situated off Sunnyside Ridge Road;
- Construction and operation of a switchyard facility (including access track);
- 66kV trenched electrical power supply from existing powerline running adjacent to Blackfellows Hands Road to the proposed substation adjacent to Sunnyside Ridge Road; and
- 11kV trenched electrical power supply from the proposed substation to the proposed Ventilation Facility along Sunnyside Ridge Road and the proposed new track to the Ventilation Facility.

It is currently anticipated that, subject to the determination of the application by the Planning and Assessment Commission, works would commence in January 2013.

Potential environmental issues have been taken into account by Angus Place Colliery during the design stage of the project resulting in amendments to the project. Prior to the establishment of the project upon which this EA is based, the following was undertaken:

- A broad brush risk Environmental Risk Assessment;
- An Environmental Constraints Study (that identified constraints such as the presence of protected flora to enable an informed consideration of potential sites for the substation and location of the Ventilation Facility;
- Additional ecological surveys to clarify potential locations for the substation;
- Revisions to the Project Application Area to include bushfire Asset Protection Zones; and
- The potential vegetation clearing associated with a new power supply line has been reduced by amending the scheme to consider only a trenched power supply line, instead of an overhead powerline.

Further information about the alternatives considered is provided in Section 5: Project Justification and Alternatives.

Further detailed information about the project is provided in Section 4: The Proposed Ventilation Facility Project.

1.5 Project Application Area

Figure 1.2 identifies the location of the Project Application Area for the project in the context of the existing and approved colliery. It is located to the east of the existing colliery, within the Newnes State Forest. For the purposes of this EA, the Project Application Area comprises nine Environmental Study Areas (ESAs) for the proposed surface infrastructure and a Subsidence Assessment Area for the proposed roadways (refer Section 2.2). The ESAs are larger areas than would be required for the works in order to provide flexibility for the precise siting of the proposed components of the project and to ensure that the worst case environmental impacts are identified.

1.6 Content and Form of the EA

This EA comprises two Volumes. Volume 1 comprises the main EA report including the Statement of Commitments.

In summary, Volume 1 of the EA covers the following:

Executive Summary

Section 1 - Introduction

Section 2 – The Project Application Area

Section 3 – Overview of Existing Operations

Section 4 – The Proposed Ventilation Facility Project

Section 5 – Project Justification and Alternatives

Section 6 – Consultation

Section 7 – Planning Context

Section 8 – Environmental Risk Assessment

Section 9 – Environmental Assessment

Section 10 – Statement of Commitments

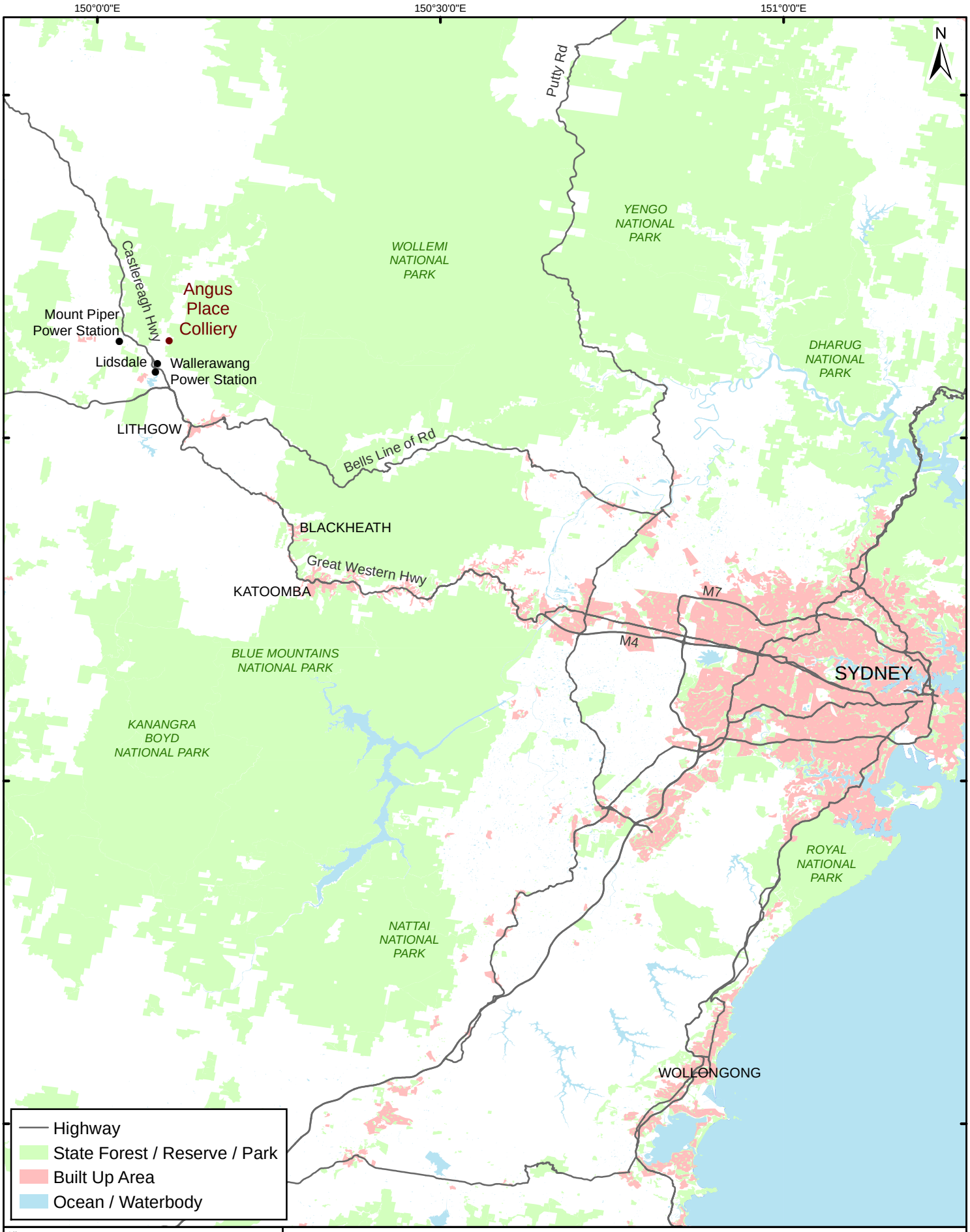
Section 11 – Justification and Conclusion

Section 12 – References

Section 13 – Abbreviations

Section 14 - Glossary

Volume 2 contains the appendices including the DGRs and the technical assessment reports.



Client:	Centennial Coal
Compiled by: TW	Date: 19/07/2012
Approved by: JAK	Date: 19/07/2012

0 5 10 20 30 km

Datum: GDA94

RPS

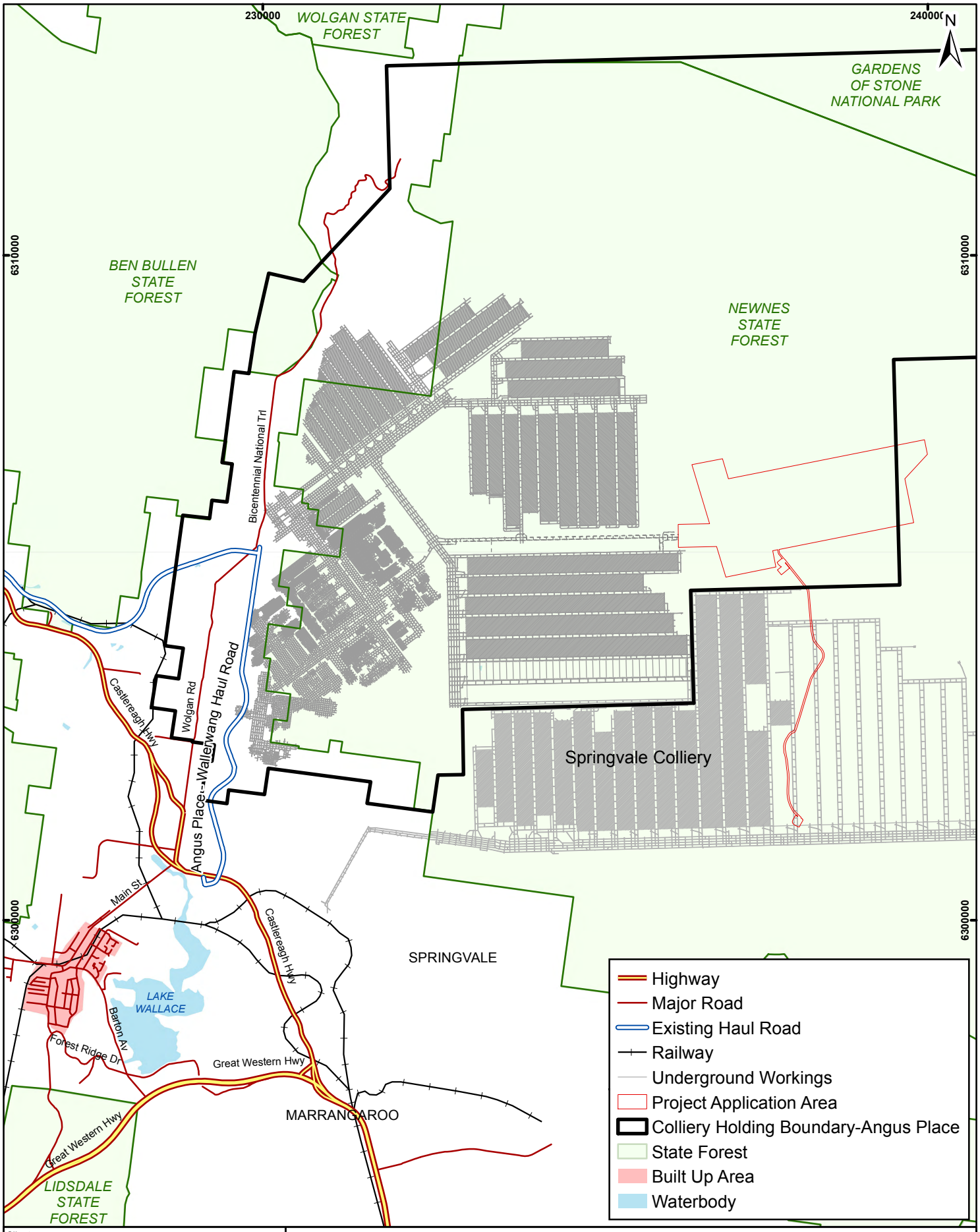
Location of Angus Place Colliery

Figure 1.1

Project: Angus Place Colliery Ventilation Facility Project

Source: Base topographic data © Commonwealth of Australia (Geoscience Australia) 2006.

Tracking ID: 11-3671-001d Compiled: 19 July 2012



Client:	Centennial Coal		
Compiled by:	TW	Date:	27/07/2012
Approved by:	JAK	Date:	27/07/2012

0 0.5 1 2 3 km

Datum: GDA94 / MGA Zone 56

RPS

Location of Project Application Area

Figure 1.2

Project: Angus Place Colliery Ventilation Facility Project

2.0 The Project Application Area

2.1 Location of Colliery

Angus Place Colliery is situated to the west of the Blue Mountains in New South Wales approximately 5km to the north of the village of Lidsdale, 8km north east of the township of Wallerawang and 15km north west of the city of Lithgow (Figure 1.1).

2.2 Project Application Area

The Project Application Area that is the subject of this EA is located to the east of the existing Angus Place Colliery (Figure 1.2), within the Newnes State Forest. Sunnyside Ridge Road runs north south within the Project Application Area. It is a public unsealed road surrounded predominantly by forest.

As noted in the preceding chapter, for the purposes of this EA, the Project Application Area has been divided into nine ESAs within which the proposed surface infrastructure components would be located as well as a Subsidence Assessment Area for the proposed underground roadways. The Project Application Area is shown in Figure 2.1.

The Project Application Area comprises approximately 472ha. The majority of this is the Subsidence Assessment Area at approximately 380ha. The total amount of land clearing would directly impact approximately 17.3ha and is wholly contained within the ESAs for the proposed infrastructure. The ESAs are larger than the areas that would be cleared to provide Centennial Angus Place Pty Ltd with flexibility in determining the final sitting of the project components. Further information about each ESA is provided in Section 4.1).

2.3 Land Use and Ownership

The Project Application Area is located wholly within the Newnes State Forest, which is used for both forestry activities and recreation. All land within the Project Application Area is Crown Land managed by Forests NSW as part of a forestry enterprise.

The area is promoted for activities such as bushwalking and 4WD. There are recreational places in the vicinity of the Project Application Area such as Bungleboori picnic and camp site approximately 1.6km to the south east, The Lost City approximately 2.5km to the south and the Wolgan Falls approximately 4.5km to the north.

The Gardens of Stone National Park is approximately 9km to the north, Wollemi National Park is approximately 15km to the north east and the Blue Mountains National Park is approximately 14km to the east.

Land Capability mapping by the former Soil Conservation Service of NSW classifies land into eight classes ranging from Class I – suitable for regular cultivation, to Class VIII – unsuitable for rural production. Land within the Project Application Area comprises Land Capability Classes VI and VII and is used for forestry purposes only.

Two Springvale Colliery dewatering borehole compounds are located in close proximity to the Project Application Area at the northern end. Dewatering borehole No 5 (decommissioned) and No 6 (active) are located to the west and east of Sunnyside Ridge Road respectively (Figure 2.1). A pine plantation is located within the Project Application Area at ESAs 7 and 8.

There are no residential properties within or close to the Project Application Area. The closest residential properties are six properties located to the west and north west between 7.6 and 8.8km from the Project Application Area.

The remains of an old landing strip are located adjacent to Sunnyside Ridge Road. To the south of the Project Application Area is an existing overhead 66kV power line that runs approximately north west to south east.

An Occupation Permit under the *Forestry Act 1916* is required to enable the development of infrastructure in a State Forest. The allocation of Occupation Permits is managed by Forests NSW. For the project, the proposed surface infrastructure would be incorporated into the existing Occupation Permit agreement between Angus Place Colliery (Springvale Coal Pty Ltd) and Forests NSW. This will be obtained prior to the commencement of construction.

For significant mining developments in a State Forest, such as a Ventilation Facility, a Mining Lease is required under the *Mining Act 1992*.

2.4 Water, Soils and Topography

Newnes State Forest comprises narrow gorges with high ridgelines, steep sided slopes and sandstone cliffs above incised valleys, hilly areas with relatively flat crests and spurs and moderately sloped ephemeral drainage lines. Flattened crests, spurs and accessible ridgelines occur regularly and streams, such as Carne Creek and the Wolgan River and their tributaries can be found in the vicinity.

The north western section of the Project Application Area, within the Subsidence Assessment Area, comprises mildly undulating and relatively flat terrain to the east of the Wolgan River. The Wolgan River is incised with steep banks. The plateau area has ridge crests at an elevation of approximately 1100m and, in the Project Application Area, is cut by several deeply incised valleys where the Wolgan River flows.

Angus Place Colliery includes the watershed between two catchments, the Wolgan-Colo River (Hawkesbury-Napean catchment) to the north east and the Coxs River (Sydney catchment) to the south west. The Project Application Area is within the Wolgan-Colo River (Hawkesbury-Napean catchment) and partially within the Coxs River (Sydney catchment) as shown on Figure 2.2. The Wolgan River runs north south and the proposed underground roadways would pass beneath the river at depths of 270m to 380m. The river is within a valley and the land slopes upwards to the east towards a ridgeline upon which the surface infrastructure is proposed. This ridge is between the Wolgan River catchment and the Carne Creek catchment. Carne Creek and its tributaries are to the east of the Project Application Area. To the south of the Project Application Area is the Marrangaroo catchment. Marrangaroo Creek flows into the Coxs River.

There are a number of aquifers in the area. The aquifers and anticipated hydrogeological strata at Angus Place Colliery are shown in Figure 2.3.

The soil types in the Project Application Area comprise Yellow Kuosol, Acidic Yellow Orthic Tenosol and Acidic Red Orthic Tensol.

2.5 Geology

The Project Application Area is situated within the southern portion of the Western Coalfield. It is mostly underlain by Triasssic Narrabeen Group sandstone, with interbedded shale and siltstone. Narrabean Group rocks are underlain by the Illawarra Coal Measures.

The Illawarra Coal Measures comprise claystone, siltstone, sandstone and coal seams with a total thickness of about 120m in the area surrounding the Project Application Area. The combined Lidsdale and Lithgow seam is the lowermost seam in the coal measures and is located just above the base of the coal measures. It is the mining horizon at Angus Place Colliery and the total seam thickness ranges between 6.0m and 7.2m. The trial mining would occur within the Lithgow Seam (Unit 1), which forms the lower 3.3m of the combined seam thickness and is the higher quality grade of coal.

The Narrabeen Group rocks in Project Application Area are situated close to the surface and belong to the Grose Subgroup. They include the Banks Wall Sandstone and the uppermost part is deeply weathered and generally very friable. The sandstone is up to 200 m thick in this area. It is underlain by Mt York Claystone which is a fine-grained unit. It has a thickness ranging from 4 – 11m which limits vertical infiltration of groundwater from the overlying strata. The remainder of the lower part of the Narrabeen Group is comprised of Burra-Moko Head Sandstone and Caley Formation.

2.6 Vegetation

The Project Application Area is located within the Newnes State Forest. This area and its surroundings, for a distance of greater than 2km in any direction, contains native vegetation which is unbroken apart from occasional fire trails. Native vegetation is periodically selectively logged but there are no areas of clear-felling.

Woodland areas are dominated by *Eucalyptus* species, which have been subject to selective timber harvesting activities for a sustained period of time.

Persoonia hindii, a plant species listed as Endangered under the TSC Act, is present within the Project Application Area. *Persoonia hindii* is an erect to spreading shrub 0.3 to 1m tall with slightly upwardly curving linear-oblong leaves usually concave on the upper surface. Distribution is limited to the Newnes Plateau in the Upper Blue Mountains where it occurs in dry forest habitats.

From a review of the pre-existing mapped vegetation units found within The Vegetation of the Western Blue Mountains (DEC, 2006), there are two EECs within the Project Application Area. These EECs are MU50 Newnes Plateau Shrub Swamp and MU51 Newnes Plateau Hanging Swamp. MU50 corresponds to one EEC as listed under the TSC Act Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion. Both MU50 and MU51 correspond to the federally listed EEC known as Temperate Highland Peat Swamps on Sandstone under the EPBC Act. As described in the Executive Summary and in Section 7 Planning Context, SEWPaC has advised that the project does not constitute a controlled action under the EPBC Act. The locations of the swamps are shown on Figure 2.4. There are areas of Newnes Plateau Hanging Swamps and Newnes Plateau Shrub Swamps within the Project Application Area. This includes an area of hanging swamp of approximately 100m x 50m located approximately 55m from the site proposed for the Ventilation Facility.

During the EA process two significant ecological areas were identified within proximity of the Ventilation Facility. These two areas have moist vegetation, showing evidence of temporary water retention and affinities with swamp environs. Whilst they display some affinities with the EEC Montane Peatlands and Swamps they are were not considered by RPS ecologists to comply with the Final Determination description. The approximate location of these two significant ecological areas is provided in Figure 2.5 and further information is provided in Section 9.3 (with detailed discussion in Appendix 9.1 Flora and Fauna Assessment, pages 34-35). Habitat within the Project Application Area comprises open forest communities, swamp heath, canopy trees and understorey proteaceous shrubs, hollow-bearing trees and roosting and den habitat. Cleared areas also provide foraging habitat.

2.7 Climate

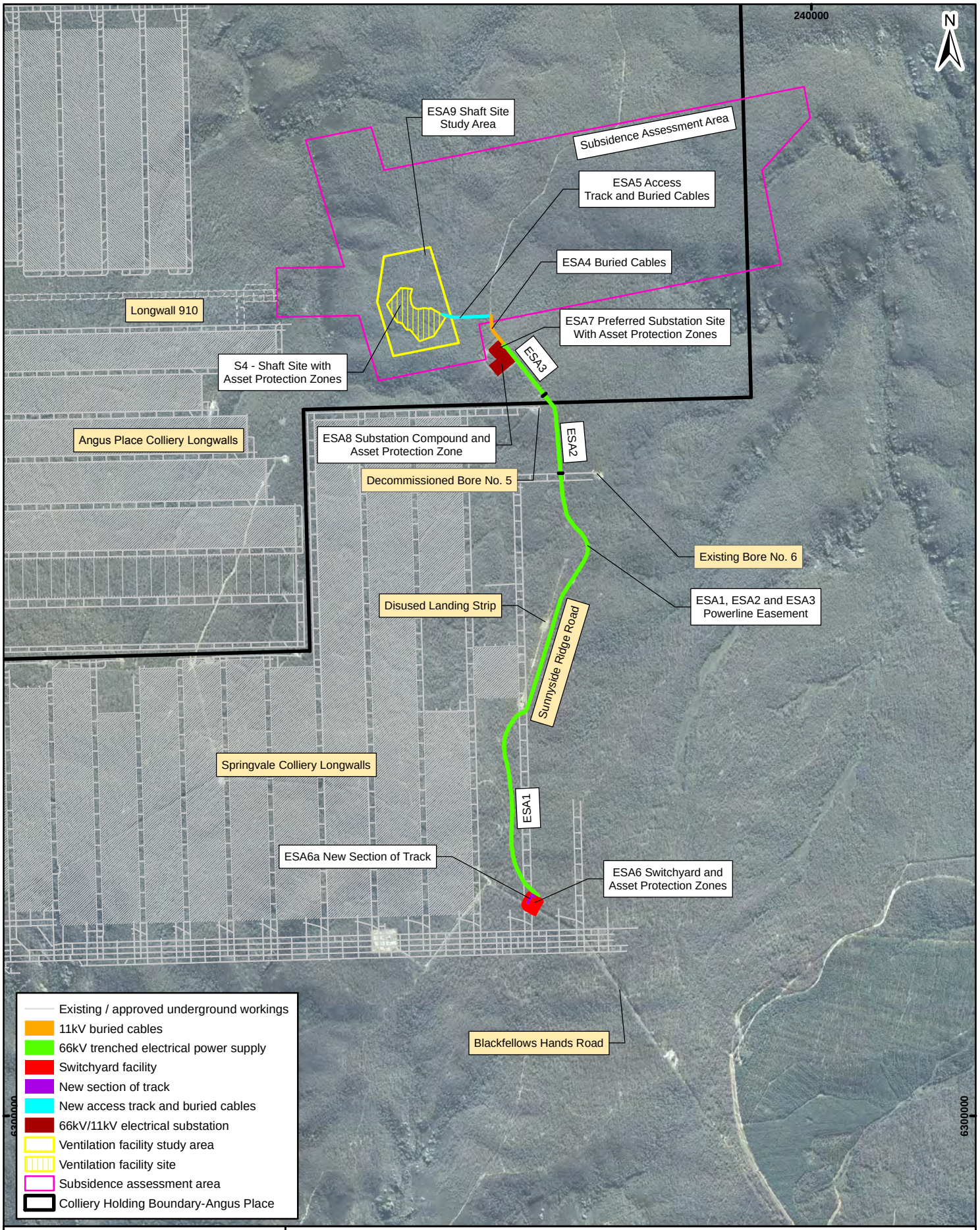
Rainfall data drawn partly from the Lithgow (Kylie Park) site operated by the Bureau of Meteorology and partly from the Lidsdale (Maddox Lane) station indicates that there has been highly variable annual rainfall from 1952 to 2011. Average monthly rainfalls vary from a low of around 53mm in July to a high of approximately 98.5mm in January. Temperature data from the Bathurst Agricultural Station and Oberon (Springbank) station showed that the lowest average maximum monthly temperature is in July at approximately 12oC and the highest is in January at approximately 28oC. Evaporation data from Bathurst Agricultural Station shows that the lowest average monthly evaporation is in June and the highest in January. The average annual evaporation rate was approximately 1,350mm compared to the annual average rainfall of approximately 819.7mm indicating an annual deficit of approximately 530.3mm (GHD, 2012).

Humidity data has been sourced from the Lithgow (Birdwood Street) site operated by the Bureau of Meteorology. This shows mean relative humidity at 9am ranges from 60% in October and 82% in June and mean relative humidity at 3pm ranges from 50% in December and 67% in June.

Wind roses for the years 2006 to 2008 show that the region has mainly light to moderate (between 1.5 m/s and 8 m/s) winds and that the wind direction is seasonally dependent. Winds occur reasonably evenly from most directions except the west-southwest and east northeast, from which winds occur infrequently. During the summer, the region has winds mainly from the east and during the winter mainly from the southwest (SLR, 2012a).

Atmospheric stability is the tendency of the atmosphere to resist or enhance vertical motion and there are six Stability Classes, A to F where A is very unstable and F is very stable. These classes indicate the characteristics of the prevailing meteorological conditions and are used as input into various air dispersion models. The frequency of each stability class Angus Place Colliery during 2006, 2007 and 2008 (predicted by CALMET meteorological model) shows a high frequency of conditions typical to Stability Class D and F. Stability Class D comprises neutral conditions, conducive to a moderate level of pollutant dispersion due to mechanical mixing. Stability Class F comprises stable night time conditions, which will inhibit pollutant dispersion (SLR, 2012a).

Temperature inversions can increase noise levels by focusing sound waves and occur predominantly at night during the winter months. At Angus Place Colliery temperature inversion is greater than 30% during the winter night time period and therefore this weather condition has been included in the noise assessment (SLR, 2012b).



Client: Centennial Coal

Compiled by:	TW	Date:	19/07/2012
Approved by:	JAK	Date:	19/07/2012

0 250 500 1,000 1,500 m

Datum: GDA94 / MGA Zone 56

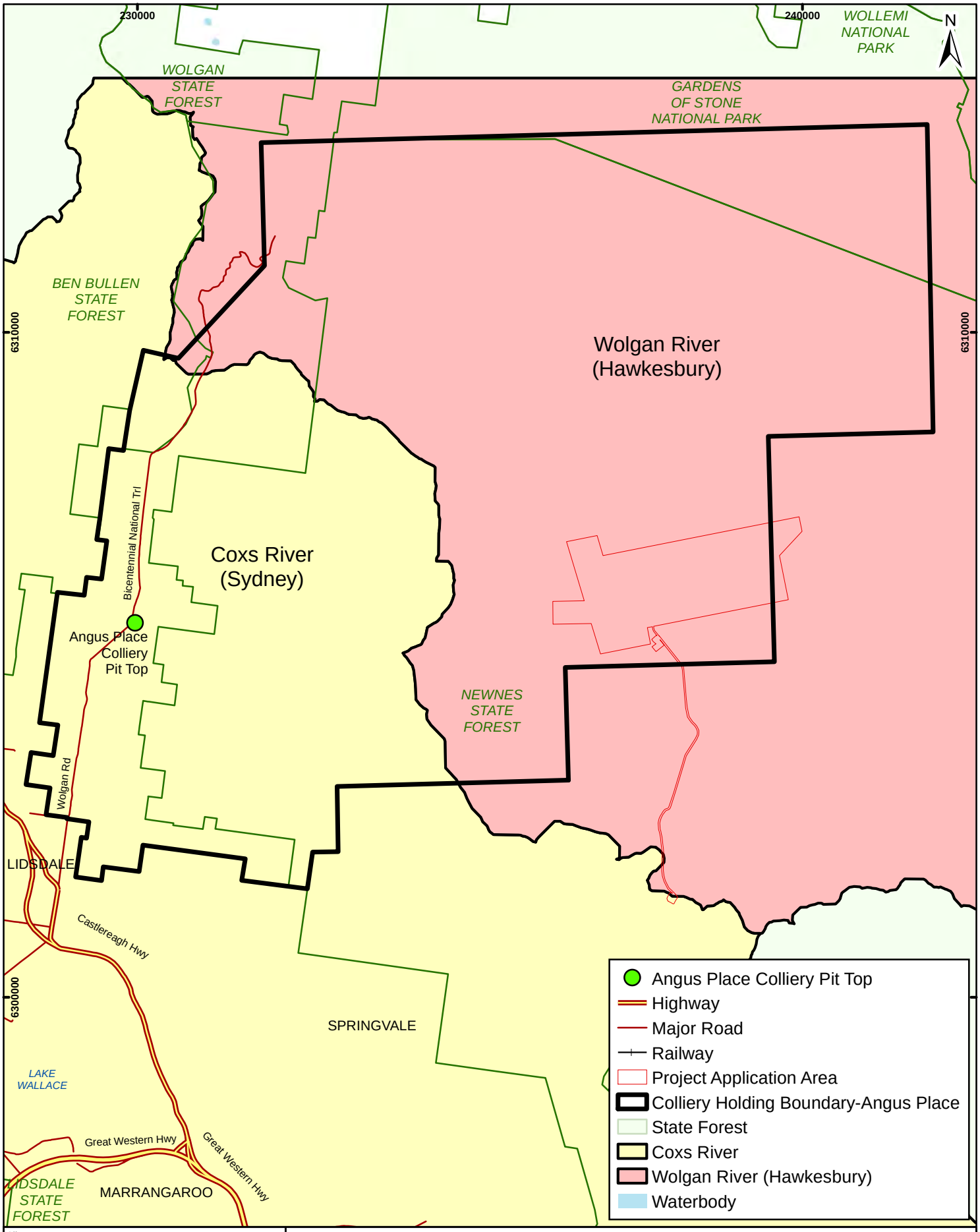
RPS

Proposed Ventilation Facility Project

Figure 2.1

Project: Angus Place Colliery Ventilation Facility Project

Source: Mine workings, project application features and orthophoto background © Centennial Coal 2012.



Client:	Centennial Coal		
Compiled by:	TW	Date:	25/07/2012
Approved by:	JAK	Date:	25/07/2012

0 0.5 1 2 3 km

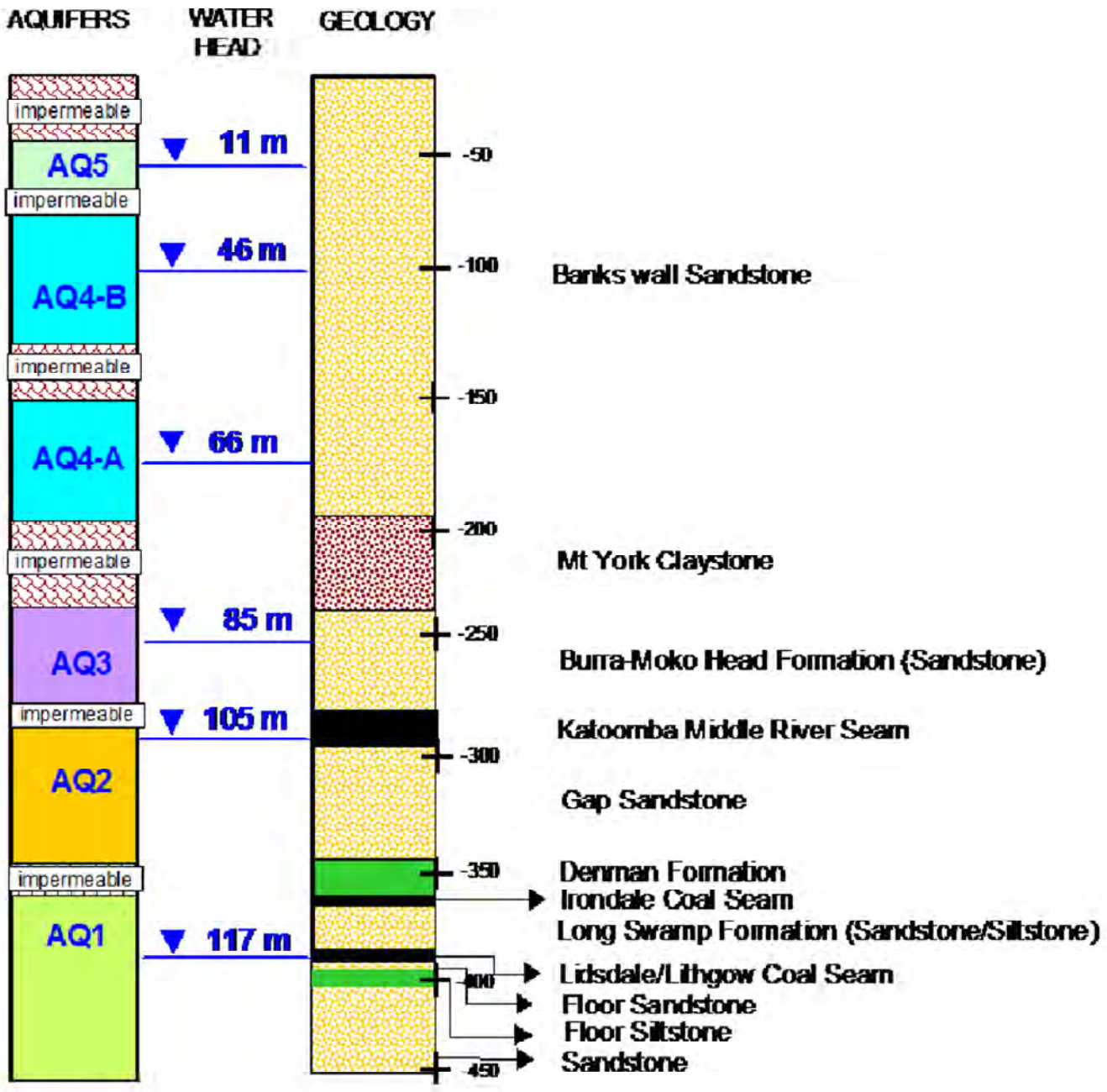
Datum: GDA94 / MGA Zone 56

RPS

River Catchment Areas

Figure 2.2

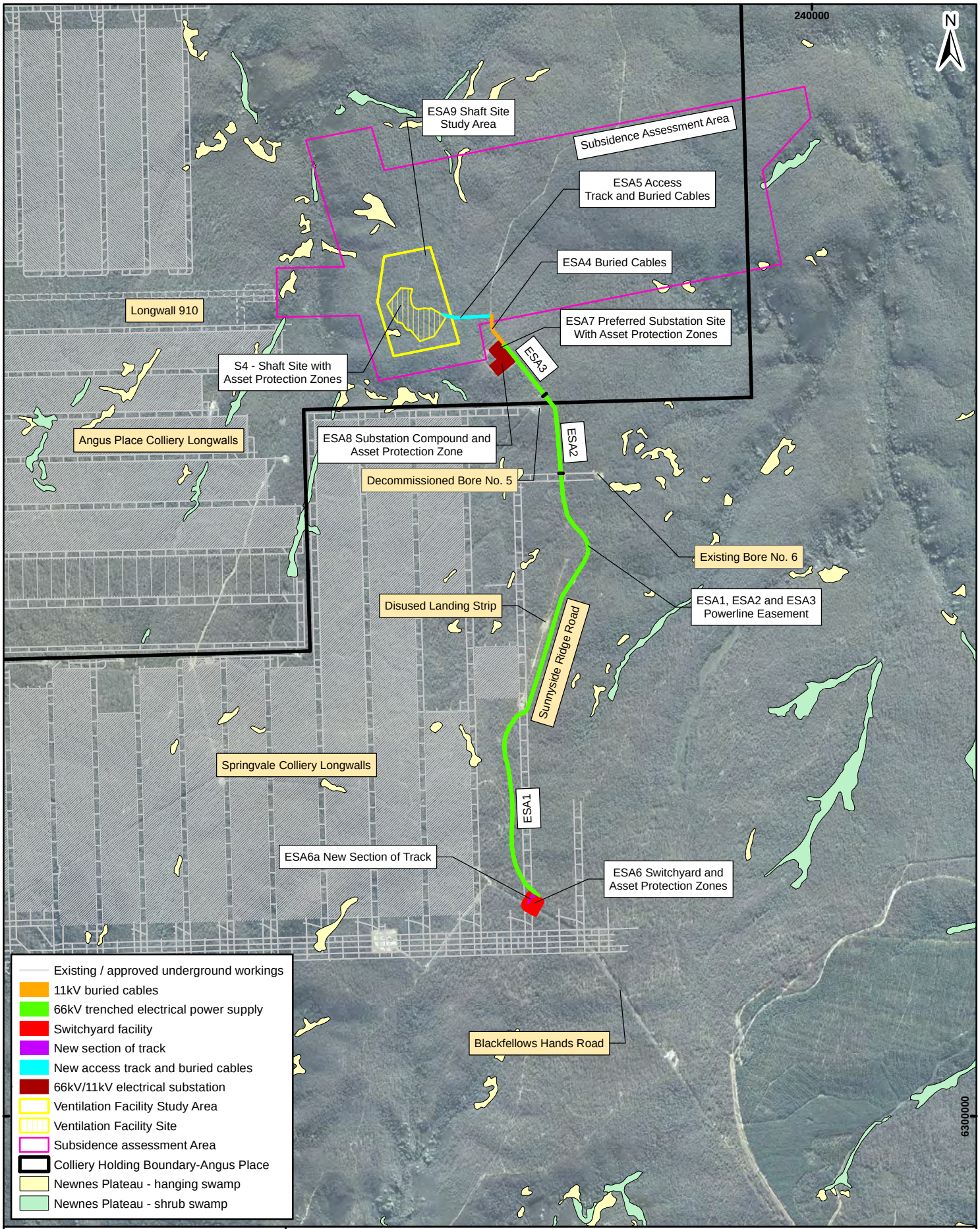
Project: Angus Place Colliery Ventilation Facility Project



Client: Centennial Coal		**Inferred Hydrogeological Section**	
Compiled by: TW	Date: 25/07/2012		
Approved by: JAK	Date: 25/07/2012	**Figure 2.3**	Project: Angus Place Colliery Ventilation Facility Project

Source: CSIRO, from Aurecon Hydrogeological Assessment 2012.

RPS



Client: Centennial Coal

Compiled by:	TW	Date:	19/07/2012
Approved by:	JAK	Date:	19/07/2012

0 250 500 1,000 1,500 m

Datum: GDA94 / MGA Zone 56

RPS

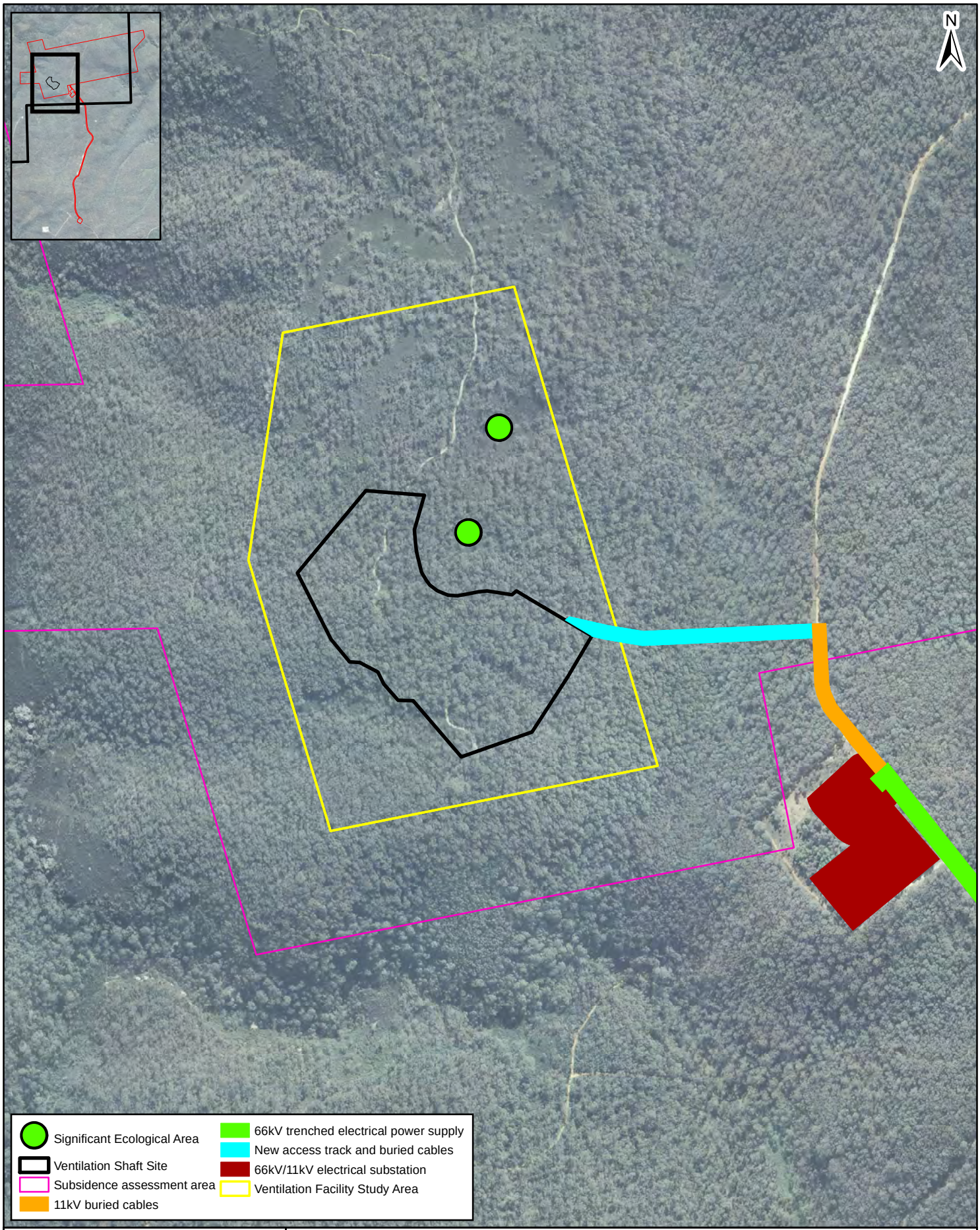
Location of Swamps

Figure 2.4

Project: Angus Place Colliery Ventilation Facility Project

Source: Mine workings, project application features and orthophoto background © Centennial Coal 2012.

Tracking ID: 11-3671-003e Compiled: 19 July 2012



Client: Centennial Coal	**Approximate Locations of Two Significant Ecological Areas**
Compiled by: TW — Date: 3/10/2012	
Approved by: JAK — Date: 3/10/2012	**Figure 2.5** — Project: Angus Place Colliery Ventilation Facility Project

0 20 40 80 120 m

Datum: GDA94 / MGA Zone 56

RPS

Source: Project application features and orthophoto background © Centennial Coal 2012.

3.0 Overview of Existing Operations

3.1 Existing Approvals

Angus Place Colliery commenced production in 1979, after being developed as an extension of the Newcom Mine at Kerosene Vale. Coal is extracted from the Lithgow Seam, primarily by the operation of a longwall shearer, and is used for domestic power generation at nearby Wallerawang and Mount Piper power stations.

Angus Place Colliery was initially granted Development Consent by the former Blaxland Shire Council following preparation of an Environmental Impact Statement in 1975. A Project Application under Part 3A of the EP&A Act was lodged in 2006 to increase the mining area and annual production from 2.3 to 3.5 Mtpa. Project Approval (06_0021) was issued to Angus Place Colliery by the Department of Planning on 13 September 2006.

Project Approval 06_0021 was modified under section 75W of the EP&A Act in 2011 to include two additional longwalls (910 and 900W) and increase the production limit to 4Mtpa. This modification was approved by the Planning Assessment Commission, as delegate for the Minister of Planning and Infrastructure, in August 2011.

A table with the schedule of the individual parcels of land to which the Project Approval applies is contained in Appendix 3.1. Mining Lease 1424 and Consolidated Coal Lease (CCL) 704 are shown on Figure 3.1 and the Angus Place Colliery Holding is shown on Figure 3.2.

The relevant approvals, leases, licences and permits that apply to Angus Place Colliery are identified in Table 3.1 below.

Table 3.1 Existing Approvals, Leases, Licences and Permits

Approval/Lease/ Licence/Permit	Description	Details/Status
Approval	Project Approval (06_0021) – increase mining area and annual production.	A Statement of Commitments was established with the Project Approval. This outlines the ongoing community commitments and consultation measures, environmental management, mitigation, monitoring and reporting measures that will be implemented with the approved mining operations.
Approval	Section 75W Modification of Project Approval 06_0021 – longwalls 910 and 900W and increase in annual production.	The notice of modification includes amended conditions and Modification 1 Statement of Commitments.
Approval	Haul Road	Consent 105/92 from the Council of the City of Greater Lithgow to Coal Link Pty Ltd.
Approval	Subsidence Management Plan Approval	Subsidence management approval for longwalls 930 to 980.
Approval	EPBC Act approval for longwalls 910 and 900W and increase in annual production.	Approval with conditions issued April 2012.
Lease	CCL 704	Transferred from Powercoal Pty Ltd in 2003. Renewed in 2006 with an extension to 2023.
Lease	Mining Lease 1424	Transferred from Powercoal Pty Ltd in 2003. Renewed in March 2005 with an extension to 18 August 2024.
Lease	CCL 702	Portion held by Angus Place Colliery via a sublease agreement with Coalpac Pty Ltd. Valid until 2024.
Lease	Mining Lease 1326	Part lease transfer from Springvale to Angus Place for Longwall 900W.
Licence	Exploration licences	Exploration Licences EL6856 and EL6293 are held by

Approval/Lease/ Licence/Permit	Description	Details/Status
		Angus Place Colliery.
Licence	EPL	EPL No. 467 covers the pit top area, Kerosene Vale operations and Newnes Plateau (emergency discharge point). Five utilisation/discharge points are authorised under the licence and the annual renewal date of the licence is 1 January.
Licence	Groundwater Licences	Groundwater licences approved under the *Water Act 1912* are held for the 930 (10BL601852) (decommissioned) and 940 (10BL601851) dewatering boreholes in addition to the groundwater collection system (10BL601838). Groundwater monitoring licences approved under the *Water Act 1912* are held for a series of shallow and deep groundwater monitoring piezometers. The piezometers measure groundwater behaviour levels across the Mining Lease area. The objective of these monitoring installations is to establish a baseline data set.
Licence	Radiation Licences	Radiation licence (registration number RR11830) for the fixed radiation gauge that measures the ash content of the coal product, as well as a licence to possess and sell radioactive substances (29229).

3.2 Existing Mining Operations

Angus Place Colliery is currently approved to operate 24 hours a day, 7 days a week. There is a current limit to production of up to 4Mtpa from the Lithgow seam.

Approximately 225 personnel are directly employed by the mine. Up to 75 temporary contractors are expected to be employed to assist with development activities for the longwalls 910 and 900W (approved in 2011).

Panels are extracted from the Lithgow coal seam using longwall mining techniques, with continuous miners used to mine development headings and other access roadways.

3.3 Existing Coal Handling and Transport

Angus Place Colliery owns and operates Wallerawang Haul Road. A second haul road to Mount Piper power station is owned by Coal Link Pty Ltd and operated by Angus Place Colliery.

No coal is transported via public roads.

3.4 Existing Surface Facilities

The existing pit top covers a total area of approximately 30 hectares. Existing surface facilities at the pit top and colliery are shown on Figures 3.4 and 3.5 and the existing ventilation facility is described below

3.4.1 Existing Ventilation Facilities

A coal mine requires a ventilation system to operate safely in accordance with the NSW Coal Mines Health and Safety Regulation, 2006. The current ventilation system at Angus Place consists of three intake drifts (fresh air) and one upcast shaft, at the mine fan site. All these surface entry/exits are located on or within the vicinity of the current Angus Place pit top area. The current mine fan (the Howden fan) operates at approximately 4600Pascal (Pa) and 230 m^3/sec, providing a sufficient quantity of pressure to support the current operation.

The former mine fan (the Flaktwoods fan) is still serviceable and "in-line" to the ventilation system (parallel to the Howden Fan). It is only operated when the Howden fan has scheduled downtime.

3.5 Angus Place Colliery's Risk Based Approach to Operations

Angus Place Colliery utilises a risk based framework to identify environmental, safety and business risks to its operation. This process involves its employees (and contractors where appropriate) identifying existing controls and recommending any necessary additional controls for risks identified. The focus is on the inter-relationship between people, machinery, methods of work, the environment and the community. From an environmental management perspective, this process is guided by the overarching Centennial Environment and Community Policy which clearly outlines Centennial Coal Company's vision and beliefs. The Policy aims to conduct business in an efficient and environmentally responsible manner that is compatible with the expectations of stakeholders including shareholders, government, employees and the community. The Policy also states Centennial Coal Company's commitment to minimising environmental impacts and to continual improvement in environmental performance.

To achieve the goals stipulated within the Centennial Environment and Community Policy at site level, Angus Place Colliery developed and implemented an Environmental Management System during 2009. The process required the identification and assessment of site based hazards and risks (aspects and impacts). In order to facilitate the effective management of the risks, several response procedures and standards have been developed and exist under the EMS framework document. Key response procedures aim to manage extreme and high risks such as hydrocarbon spills, dirty water management and airborne pollution. Each procedure and management plan has a periodic review timeframe regulated by the site's controlled document system to ensure the EMS remains effective and current.

The compilation of this EA was undertaken through a risk based and consultative approach. In particular, a broad brush risk assessment was undertaken early in the EA process – see Section 8 Environmental Risk Assessment.

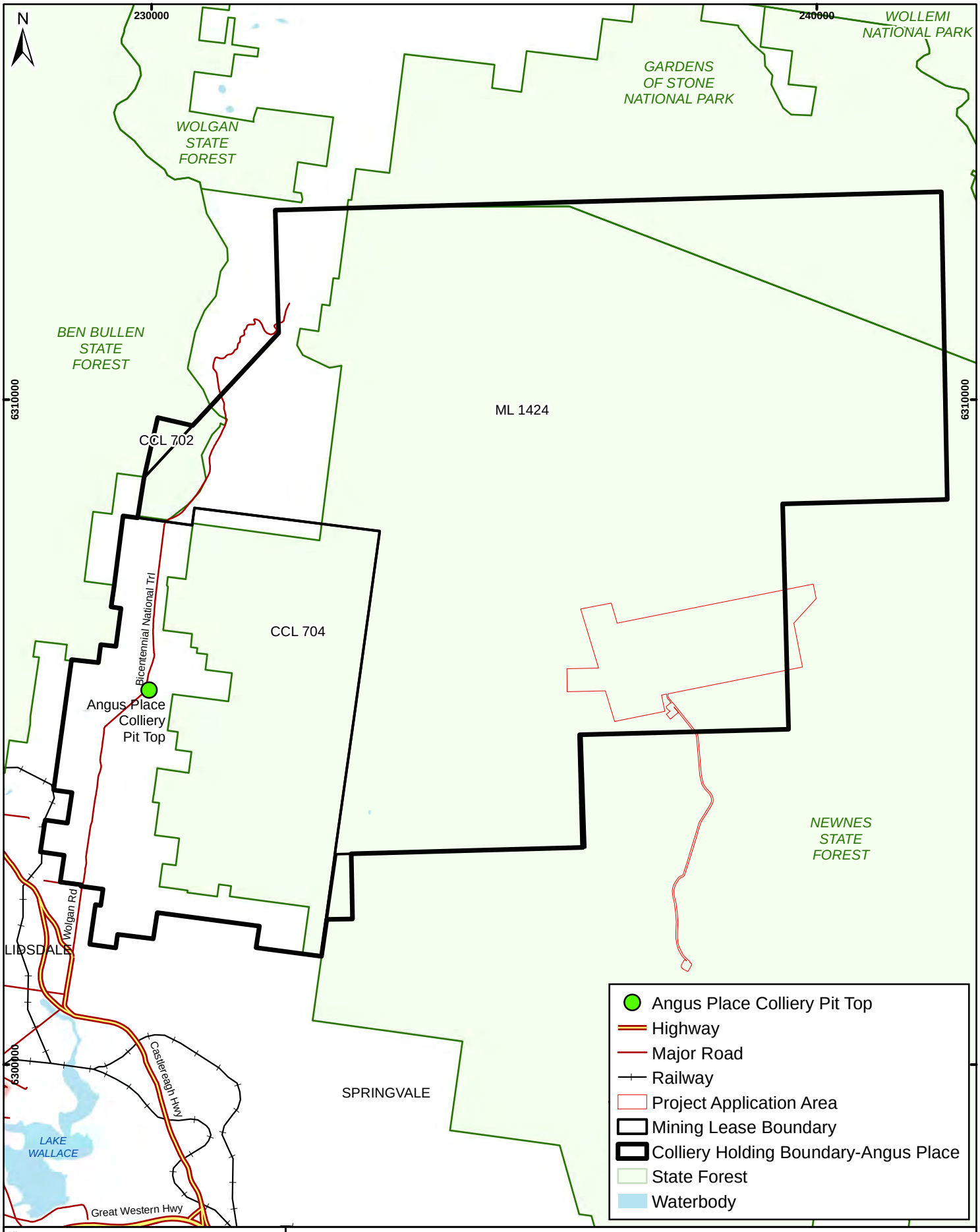
3.6 Existing Environmental Management and Monitoring

A range of management plans and monitoring regimes are in place and available via the Centennial Coal website (http://centennialcoal.com.au/Environment/Angus-Place.aspx) for the existing activities at Angus Place Colliery as outlined in Table 3.2 below. A number of these are being revised to address conditions of the first modification of the Project Approval.

Table 3.2 Environmental Management and Monitoring

Plans and Programs	Outline
Environmental Management Strategy	Describes the overall approach to environmental management at Angus Place Colliery.
Environmental Monitoring Program	As a high level document, the program provides a summary of the operational monitoring procedures and reporting functions required under the various management plans. By holistically assessing performance, the need for additional impact mitigation can be determined.
Flora and Fauna Management Plan	Aims to minimise impacts to flora and fauna by outlining strategies to manage vegetation clearing, weed control, access to environmentally sensitive areas and potential conflicts between flora and fauna and Aboriginal heritage.
Newnes Plateau Shrub	Measures and manages potential impacts on the Newnes Plateau Shrub

Plans and Programs	Outline
Swamp Management Plan	Swamps in the current mining area. The plan includes monitoring of the effects of subsidence in addition to other issues and outlines impact mitigation techniques.
Site Water Management Plan (SWMP)	Establishes management, baseline monitoring and impact mitigation techniques regarding surface water courses within the Colliery Holding Boundary. The plan additionally considers erosion and sediment control strategies.
Groundwater Management Plan	Aims to coordinate the sustainable management of groundwater affected by Angus Place Colliery's operations.
Noise Monitoring Program	Sets out procedures for monitoring, assessing and mitigating noise impacts from Angus Place Colliery with a view to maintaining acceptable levels in accordance with the Project Approval limits.
Air Quality Monitoring Program	Sets out procedures for monitoring, assessing and mitigating air quality impacts from Angus Place Colliery with a view to maintaining acceptable levels in accordance with the Project Approval limits.
Subsidence Management Plan	Summarises the subsidence predictions and expected impacts from underground mining and identifies how natural and built features will be managed. The plan and its sub-plans outline: ▪ Baseline data collection requirements, analysis and dissemination to relevant stakeholders. ▪ Public safety procedures in surface areas that may be affected by mine subsidence. ▪ Management of surface infrastructure to be potentially impacted by mine subsidence. ▪ Mitigation and remediation strategies to reduce the impact of subsidence.
Contractor Environmental Management Plan	Aims to ensure that all activities carried out on behalf of Angus Place Colliery comply with internal and external practices and guidelines for the impacts generated by the proposed activity.
Bushfire Management Procedure and Management of Bushfire Assets Procedure	Sets out the procedures for managing surface based assets in bushfire prone areas.
Ventilation Management System	The objectives of this management system are to ensure as far as reasonably practicable the safety of all persons present at the coal operation with regard to mine ventilation. The Ventilation Facility Project would directly benefit this objective.
Strata Failure Management System	The objectives of this management system are to ensure as far as reasonably practicable the safety of all persons present at the coal operation with regard to ground strata. The proposed trial mining would directly benefit this objective.



Client:	Centennial Coal		
Compiled by:	TW	Date:	23/07/2012
Approved by:	JAK	Date:	23/07/2012

0 0.5 1 2 3 km

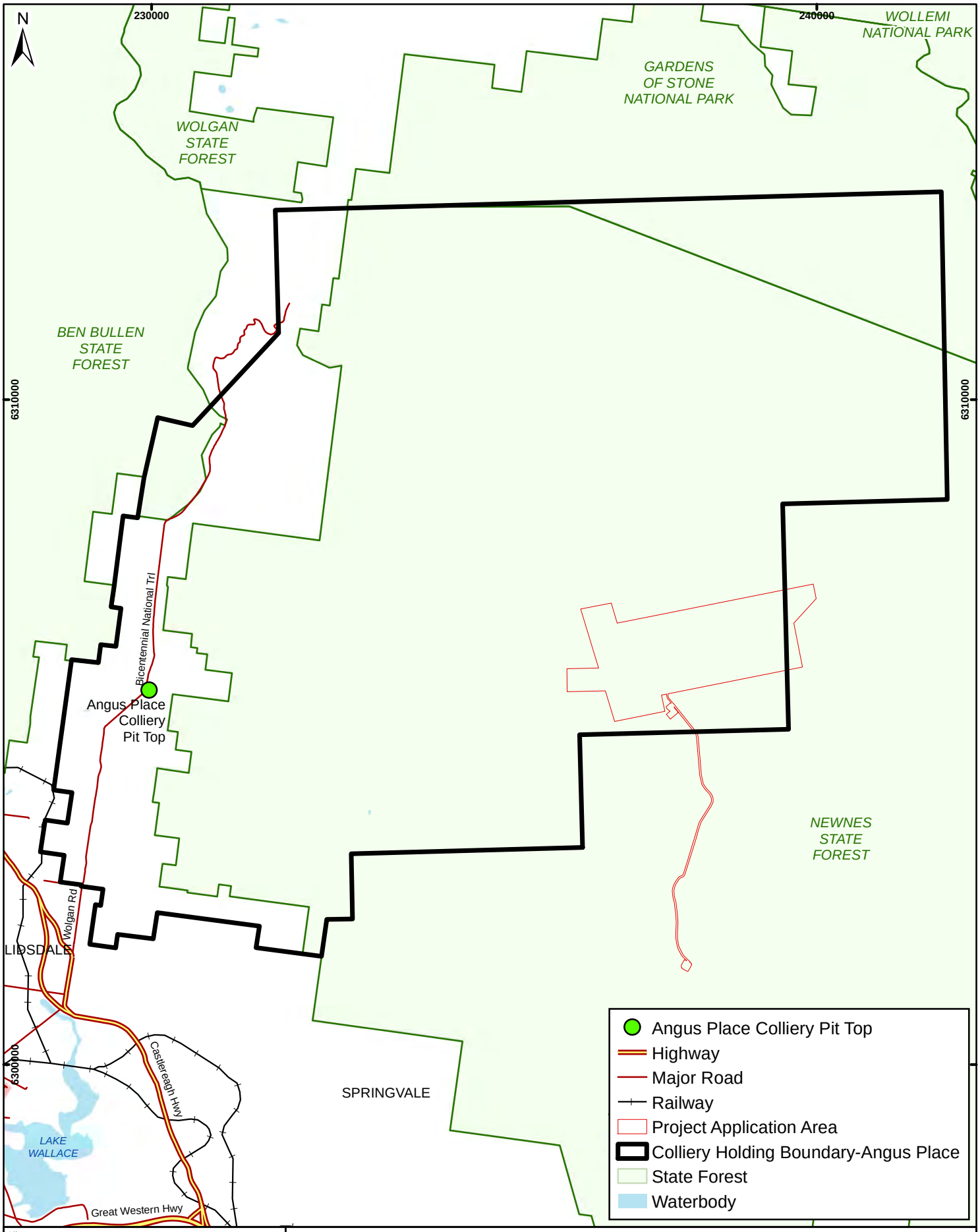
Datum: GDA94 / MGA Zone 56

RPS

Existing Mining Tenements

Figure 3.1

Project: Angus Place Colliery Ventilation Facility Project



Client:	Centennial Coal
Compiled by: TW	Date: 23/07/2012
Approved by: JAK	Date: 23/07/2012

0 0.5 1 2 3 km

Datum: GDA94 / MGA Zone 56

RPS

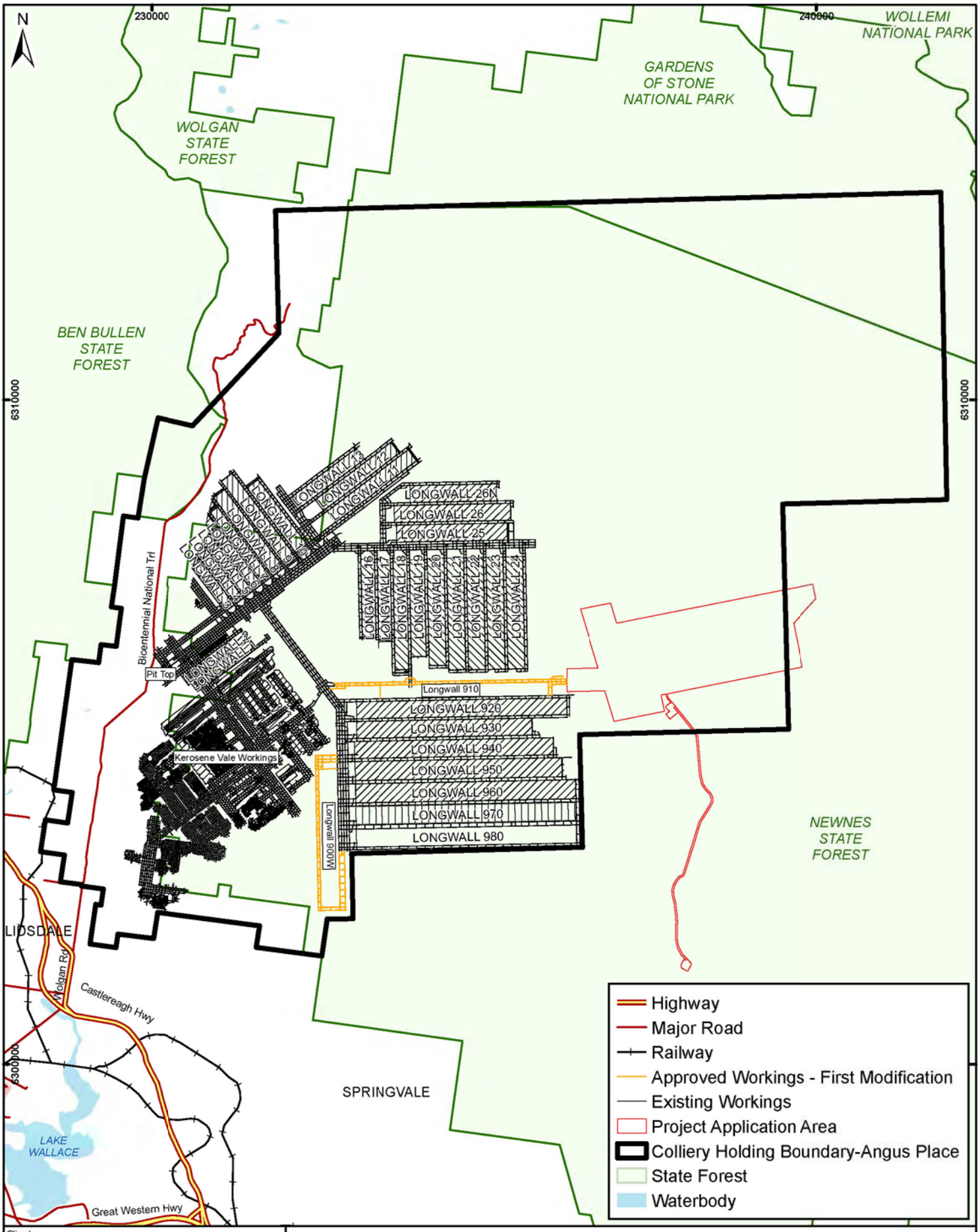
Existing Angus Place Colliery Holding Boundary

Figure 3.2

Project: Angus Place Colliery Ventilation Facility Project

Source: Base topographic data © Commonwealth of Australia (Geoscience Australia) 2006.
Colliery Holding Boundary © Centennial Coal 2012.

Tracking ID: 11-3671-007d Compiled: 23 July 2012



Client:	Centennial Coal
Compiled by: TW	Date: 23/07/2012
Approved by: JAK	Date: 23/07/2012

0 0.5 1 2 3 km

Datum: GDA94 / MGA Zone 56

RPS

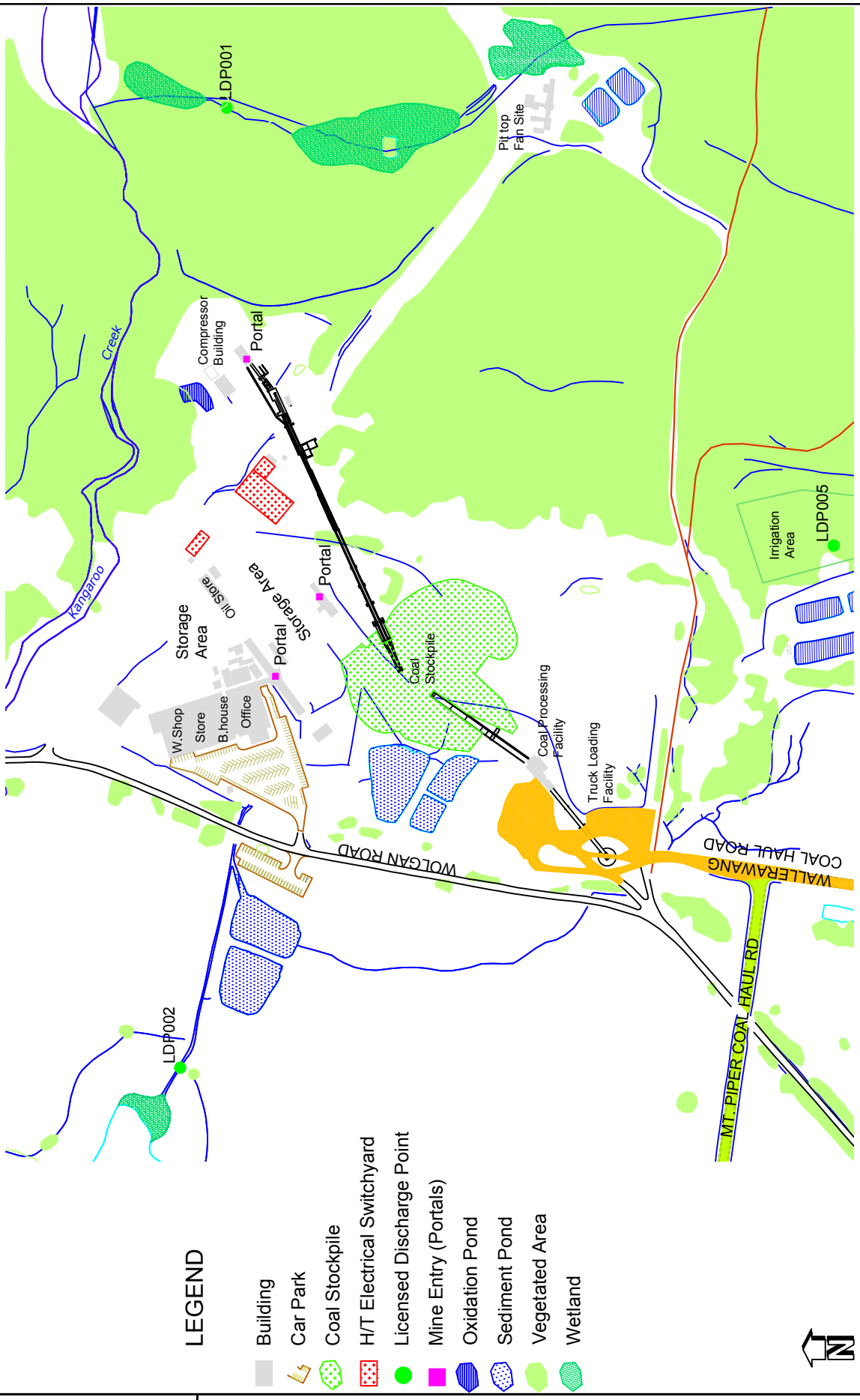
Existing / Approved Angus Place Colliery Workings

Figure 3.3

Project: Angus Place Colliery Ventilation Facility Project

Source: Base topographic data © Commonwealth of Australia (Geoscience Australia) 2006.
Mine workings and Colliery Holding Boundary © Centennial Coal 2012.

Tracking ID: 11-3671-005d Compiled: 23 July 2012

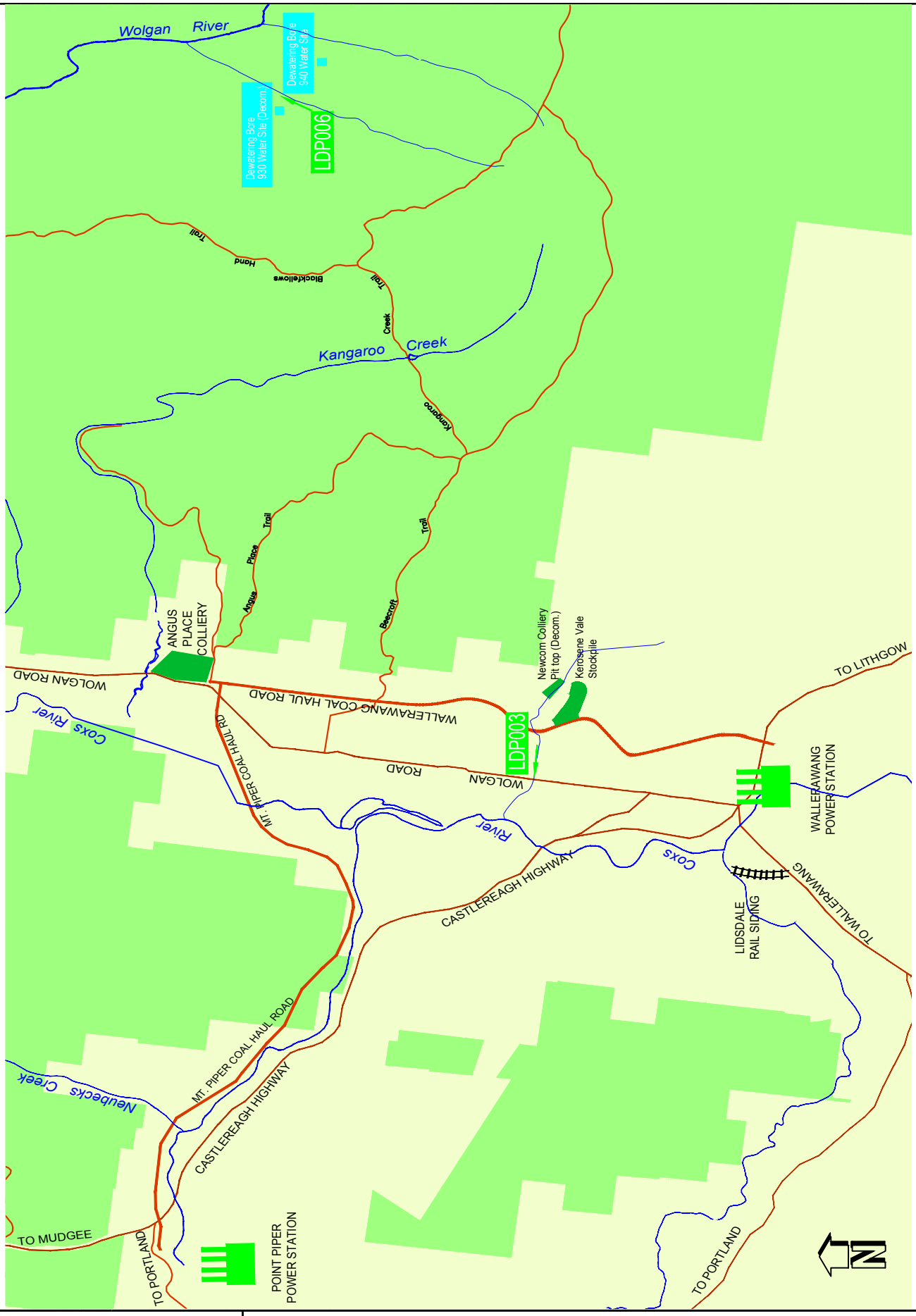


Client:	Centennial Coal	**Angus Place Colliery Pit Top Infrastructure**	
Compiled by: TW	Date: 25/06/2012		
Approved by: JAK	Date: 25/06/2012	**Figure 3.4**	Project: Angus Place Colliery Pit Top Infrastructure

0 50 100 150m
SCALE 1:3000

RPS

Source: Centennial Coal 2012.



Client:	Centennial Coal	**Angus Place Colliery Surface Related infrastructure**	
Compiled by: TW	Date: 25/06/2012		
Approved by: JAK	Date: 25/06/2012	**Figure 3.5**	Project: Angus Place Colliery Ventilation Facility Project

Source: Centennial Coal 2012.

RPS

4.0 The Proposed Ventilation Facility Project

4.1 Overview of the Project

The project comprises:

- Construction and operation of a Ventilation Facility consisting of both upcast (exhaust) and downcast (intake) shafts, an air compressor station, emulsion mixing and supply plant, various services boreholes, electrical substation, self-bunded diesel storage tank, back-up generator, internal roadways and hardstand area, spoil emplacement area, water management control ponds, fire controls (including Bushfire Asset Protection Zones), security fencing and amenity buildings;
- Development of underground roadways from the eastern extent of longwall 910 to the proposed Ventilation Facility;
- Development of underground roadways eastwards of the Ventilation Facility to undertake trial mining. Approximately 709,575 tonnes of coal would be extracted over a period of 3.5 years as a result of the trial mining. This would be part of the approved production limit of 4Mtpa from the colliery;
- Construction of a new access track from Sunnyside Ridge Road to the Ventilation Facility;
- Establishment of a 66kV/11kV electrical substation (including Bushfire Asset Protection Zone and security fencing) situated off Sunnyside Ridge Road;
- Construction and operation of a switchyard facility (including access track);
- 66kV trenched electrical power supply from the existing powerline running adjacent to Blackfellows Hands Road to the proposed substation following Sunnyside Ridge Road; and
- 11kV trenched electrical power supply from the proposed substation to the proposed Ventilation Facility along Sunnyside Ridge Road and the proposed new track to the Ventilation Facility.

Table 4.1 provides an overview of the areas of land affected by each component of the project. The Project Application Area comprises approximately 472ha, which is larger than the actual area that would be required for the project. Of the total area, 46ha comprises the ESAs for the proposed infrastructure and 426ha comprises the Subsidence Assessment Area. While the infrastructure would likely require a total clearance area of approximately 17.3ha, an area of 46ha has been assessed as part of this EA. This is to provide Angus Place Colliery with flexibility for the precise siting of the project components within this area. The largest part of the Project Application Area is the Subsidence Assessment Area. This is the area defined as having potential subsidence from the proposed underground roadways.

Table 4.1 Land Affected by Project

Project Application Area Component	Study Area (refer Figure 2-1)	Description
66kV trenched electrical power supply from the existing power line (running adjacent to Blackfellows Hands Road) to the proposed substation.	ESA1, 2 and 3	Corridor of approximately 25m width and 4.4km length following Sunnyside Ridge Road. This is a larger area than would be required for the proposed trenched power line to allow for design flexibility. 10m either side of the existing road of approximately 5m is provided for although only one side of the road (10m in width) would be required.

Project Application Area Component	Study Area (refer Figure 2-1)	Description
11kV trenched electrical power supply from the substation to the junction with the proposed new track to the Ventilation Facility.	ESA4	Corridor of approximately 20m width and 225m length following Sunnyside Ridge Road.
Construction of a new access track from Sunnyside Ridge Road to the Ventilation Facility.	ESA5	Corridor of approximately 20m width and 369m length. This comprises State Forest.
Construction and operation of a switchyard facility to the south of the junction of Sunnyside Ridge Road and Blackfellows Hands Road.	ESA6	ESA6 has an area of 1.74ha. This comprises State Forest and an existing powerline at the junction of Blackfellows Hands Road and Sunnyside Ridge Road.
Establishment of a 66kV/11kV electrical substation.	ESA7, 8	ESA7 has an area of 1ha. ESA8 has area of 1.5ha. Comprises existing pine plantation.
Construction and operation of a Ventilation Facility.	ESA9	ESA9 has an area of 30.7ha and is a larger area than would be required. The Ventilation Facility itself, determined through the EA process, would be at S4. S4 has an area of 7.5ha and it comprises State Forest.
Development of underground roadways from the longwall 910 installation face to the Ventilation Facility and underground roadways for trial mining.	Subsidence Assessment Area	This comprises an area of 426ha. It comprises State Forest including part of Sunnyside Ridge Road, powerlines and tracks.

Each of the proposed elements is described in more detail below. This is followed by an outline of the approach to construction including the way in which the existing forestry resources would be addressed, local employment and the anticipated staging of the project. The approach to rehabilitation is described.

Likely interactions between the modification and existing operations are addressed in Section 9.21 Cumulative Effects.

4.2 Underground Roadways

4.2.1 Longwall 910 to the Ventilation Facility

Underground roadways would be constructed from the eastern limit of longwall 910 (beyond 35 cut-through) towards the Ventilation Facility. These underground roadways would be constructed using continuous miner units, mining the coal and then installing roof bolts and rib support bolts.

These underground roadways have been designed to be long term stable.

4.2.2 Trial Mining

Trial mining has been designed to explore from the western to the eastern extents of the Subsidence Assessment Area and would be accessed via the underground roadways developed from the eastern extent of longwall 910. This area has, to date, been the subject of a surface exploration program and pre-feasibility assessment. The trial mining would provide additional geological information to support the current surface exploration program and enable a more expansive view of the underground resource and mining conditions within the Angus Place Mining Lease area.

Whilst surface based exploration provides a holistic representation of an underground resource and overlying strata, the fact that it is a single point within a large resource area is a significant limitation. To provide a more expansive view of the underground resource it is important that trial mining is undertaken in conjunction with surface exploration activities.

The proposed trial mining involves the development of underground roadways. The term 'subsidence' generally refers to the potential for, or actual, deformation of the ground mass surrounding a mine due to mining activity. The majority of subsidence impact is derived through the extraction of coal. Whilst only trial mining is proposed, there is the potential for the underground roadways to subside. This was identified during the Environmental Risk Assessment (Section 8). Therefore, a Subsidence Assessment has been undertaken and is reported in Section 9.16. The DGRs do not specifically require a subsidence assessment to be undertaken, however out of an abundance of caution it was considered necessary by Centennial Angus Place Pty Ltd.

Approximately 709,575 tonnes of coal would be extracted over a period of 3.5 years as a result of the trial mining. This would be part of the approved production limit of 4Mtpa from the colliery. Coal from the trial mining would be transported underground to the pit top and via the two private haul roads. As the coal tonnage would be extracted over a 3.5 year period, current production levels would be sustained and as such no change to the number of truck movements or noise levels is expected.

4.3 Ventilation Facility (S4 within ESA9)

The site for the Ventilation Facility identified as S4 (within ESA9) is shown on Figure 2.1. The Ventilation Facility would have a footprint of approximately 7.5ha however the whole of ESA9 has been subject to assessment. The layout of the Ventilation Facility is identified on Figure 4.1. Further information about the way in which the precise location and layout of the Ventilation Facility was determined is provided in Section 5 Project Justification and Alternatives.

To support the trial mining and to comply with the NSW Coal Mine Health and Safety Regulation 2006, adequate ventilation is required. Therefore, ventilation shafts need to be constructed and linked to the underground roadways driven from longwall 910.

The proposed Ventilation Facility comprises an upcast and downcast ventilation shaft and associated infrastructure. It also allows for a 40m Bushfire Asset Protection Zone between buildings/equipment and vegetation. The identification of the Asset Protection Zones has been informed by a Bushfire Risk Assessment (Section 9.11).

Buffers of at least 50m would be established around the Hanging Swamp approximately 55m from the Ventilation Facility and also the two significant ecological areas (shown on Figure 2.5 and described in Section 9.3) within which no works or disturbance of native vegetation would be permitted.

4.3.1 Ventilation Shafts

A proposal for a geotechnical borehole has already been approved under Part 5 of the EP&A Act and this will be drilled in advance of shaft construction to obtain site specific geological and hydrogeological data'

Two shafts are required to maintain adequate underground fresh air supplies. The shafts (and the proposed boreholes) would be constructed using a blind boring technique. Drilling fluids would be managed to balance hydrostatic pressures, so that there is very little opportunity for flow into or out of the shafts (and boreholes). Cuttings are brought to the surface of the shaft sinking site where they are stockpiled. The cuttings (or blind bore tailings) would be used to backfill the shaft when decommissioned and would be stored at the shaft spoil emplacement area. However, these cuttings would first be tested to ensure they are within the required

limits (as specified in NEPC, 1999) and, if required, would be either treated prior to use for rehabilitation or instead disposed of at a licensed facility.

The ventilation exhausts would be laid horizontally. They would be approximately 8m in height and would expel a plume of water vapour to the side. A photograph of the existing Angus Place Colliery ventilation shaft is provided in Figure 4.2 as an example of the appearance of a horizontal ventilation exhaust.

The shafts would be lined using composite (concrete) and the bores lined with steel.

4.3.2 Site Infrastructure

In addition to the ventilation shafts, other infrastructure at the Ventilation Facility would comprise the following (as shown on Figure 4.1):

- One centrifugal ventilation fan;
- Air compressor station;
- A tube bundle atmospheric monitoring system. It is planned to install the equipment in a shipping container. The tube bundle system would be installed in the shaft or one of the service boreholes. This system enables underground atmospheric monitoring;
- Emulsion mixing and supply plant;
- Ventilation and gas monitoring station (required by legislation);
- Various service/supply boreholes of 200 - 450mm in diameter, fully cased and a similar depth to the shafts including:
  - Concrete borehole (including bunded deposition area)
  - Ballast borehole
  - Stone dust supply borehole
  - Emulsion supply and diesel supply borehole
  - Two boreholes to supply electrical power
  - Communications borehole (isolated to avoid interference)
  - Atmospheric monitoring tube bundle
  - Compressed air borehole from the compressor to the underground roadways;
- Site substation with appropriate protective fencing and signage (in line with relevant standards) as public and personnel safety measures;
- Backup generator;
- Above ground self bunded diesel tank (20,000L) to power the backup generator in the event of a mains power failure;
- Internal roadways, hardstand and car park, the surfaces would be unsealed;
- Security fencing and signage;
- Water management controls - process and sedimentation ponds (see Section 4.9);
- Two water tanks for fire fighting;
- Bushfire Asset Protection Zone – 40m from proposed buildings/equipment;
- Shaft spoil emplacement area;
- Lighting on poles of up to 12m above ground;

- CCTV; and
- Miscellaneous buildings including a demountable office block (including first aid), maintenance shed and toilet facilities.

4.4 New Access Track and Buried Cables (ESA5)

There would be a new unsealed track, incorporating buried cables, between Sunnyside Ridge Road and the proposed Ventilation Facility. The track would be approximately 369m long and up to 20m wide, comprising an area of approximately 0.7ha, and would incorporate two 11kV buried feeder cables.

4.5 Substation (ESA7/ESA8)

A new 66kV/11kV substation would be located on the western side of Sunnyside Ridge Road (identified as ESA7 on Figure 2.1). ESA8 forms an Asset Protection Zone to the south.

The substation would require an area of 40m x 40m and would have a maximum height of 5m from ground level. Surrounding this would be an Asset Protection Zone comprising 50m to the west, 25m to the north and east and the removal of the existing pine plantation and retention for use as another Asset Protection Zone to the south (ESA8). Within ESA8 would be a shaft liner laydown and preparation site during the project's construction phase. ESA7 would require an area of approximately 1ha and ESA8 1.5ha.The substation would have its base lined with sediment fencing to reduce the potential for erosion and sediment laden runoff.

Protective fencing and signage (in line with relevant standards) would be installed as public and personnel safety measures for the substation.

4.6 Switchyard (ESA6) and Track (ESA6a)

An existing 66kV powerline runs adjacent to Blackfellows Hands Road. The proposed switchyard would be located at the existing overhead powerline to the south of the road junction of Blackfellows Hands Road and Sunnyside Ridge Road. It would have a maximum height of up to 20m from ground level. The switchyard study area (ESA6) is 1.7ha.

Surrounding the proposed switchyard, the bushfire Asset Protection Zone would comprise 50m to the south west, west and north-west and 25m elsewhere.

A new section of unsealed dirt track would be constructed (ESA6a). This would be up to 20m in width. It sits within the Asset Protection Zone for the switchyard.

The existing section of track linking the two roads would be used in part for the proposed switchyard and the remaining section of existing track would be rehabilitated.

The switchyard would have its base lined with sediment fencing to reduce the potential for erosion and sediment laden runoff.

Protective fencing and signage (in line with relevant standards) would be installed as public and personnel safety measures at the switchyard.

4.7 Power Supply Along Sunnyside Ridge Road (ESA1, ESA2 and ESA3)

The proposed 66kV power supply following Sunnyside Ridge Road would be constructed to link the proposed switchyard, at the existing powerline, to the proposed substation. Buried 11kV feeder cables would be constructed from the proposed substation to the Ventilation Facility. Both the 66kV and the 11kV power supply would be trenched along Sunnyside Ridge Road to reduce the area of land clearance that would otherwise have been required for an overhead powerline with its associated Bushfire Asset Protection Zones. There would be overhead conductors at the link with the existing powerline to the proposed switchyard.

The proposed power supply line from the proposed switchyard to the proposed substation would have a length of approximately 4.8km along Sunnyside Ridge Road (ESAs 1, 2 and 3 on Figure 2.1). ESAs 1, 2 and 3 have a width of 25m, comprising the existing Sunnyside Ridge Road (of approximately 5m width) and 10m on either side. However, only one side would be used for the trenched power supply line therefore the study area is larger than would be required. The use of one side comprising 10m in width would require a clearance area of approximately 4.4ha.

As the proposed trenched power line would be above Springvale Colliery longwalls, the cable trench would be backfilled with loosely placed granular material (i.e. sand) as identified in the Subsidence Assessment for the project (Section 9.16).

4.8 Power Supply Along Sunnyside Ridge Road (ESA4)

Within ESA4, there would be two 11kV trenched feeder cables from the Sunnyside Ridge Road substation to the Ventilation Facility. This section would be 225m in length and the corridor width would be 20m comprising vegetation clearance of approximately 0.5ha.

4.9 Description of Proposed Water Management Controls

Erosion and sediment control measures would be implemented prior to and during construction throughout the Project Application Area.

There would be water management ponds comprising process ponds and a sedimentation pond at the Ventilation Facility (Figure 4.1).

4.10 Approach to Construction

Construction is proposed to take place 24 hours a day, 7 days a week. Centennial Angus Place Pty Ltd considers that work outside standard hours (as specified in the NSW Interim Construction Noise Guidelines) would be required for the following reasons. It is an industry standard that the shaft sinking and service borehole contractors work two ten hour shifts. The dayshift is 7am-5pm and the afternoon shift is 5pm-3am. The Ventilation Facility is being constructed to provide adequate ventilation of the mine workings for the safety of people working there. Shaft sinking is a critical path activity and needs to operate on two of ten hour shifts per day to achieve completion by the time underground workings reach that point. Failure to do so would cause a situation of inadequate ventilation. Secondly, the shaft sinking specification is written such that the contractor has to work 24/7 if the ground conditions encountered could allow the sides of the shaft to collapse if the work was slowed by working time restrictions. The collapse of the sides is a time dependent failure. The objective is to sink the shaft and line it as soon as possible. After lining, the shaft is long term stable. Similar circumstances apply for each service borehole which is effectively a smaller diameter shaft.

The duration and staging of the works are set out in Section 4.14 below.

A CEMP would be prepared for the construction works and would include the relevant measures identified in the EA.

4.11 Forestry Resources

The Project Application Area includes areas with timber production potential. Forests NSW has identified a volume of sawlogs that would be salvaged from within the Project Application Area prior to construction works. Also, a rental agreement between Centennial Angus Place Pty Ltd and Forests NSW to compensate Forests NSW for the loss of timber production potential is to be determined. Further information about the value of the forestry resource is provided in the AIS in Section 9.18.

4.12 Employment of Local Contractors and Services

During the consultation process (described in Section 6 Consultation) Lithgow City Council raised the desirability of employing local contractors and services. Whilst services such as shaft sinking and ventilation fan installation are provided by specialist contractors, a number of other services can be sourced locally. Angus Place Colliery is committed to offering local providers the opportunity to provide services. It is intended that preference be given to local contractors and other local providers where practical. Accordingly, local contractors and other local providers would be considered in the contract tendering and evaluation process.

4.13 Rehabilitation

Rehabilitation would be undertaken in accordance with the Rehabilitation Strategy for the project prepared by GSSE (Section 9.6). This strategy has been informed by the findings of the Flora and Fauna Assessment (refer Section 9.3), the Soil and Land Resources Assessment (refer Section 9.7), AIS (refer Section 9.18) and the Surface Water Assessment (refer Section 9.4).

4.14 Staging: Construction, Operation and Rehabilitation

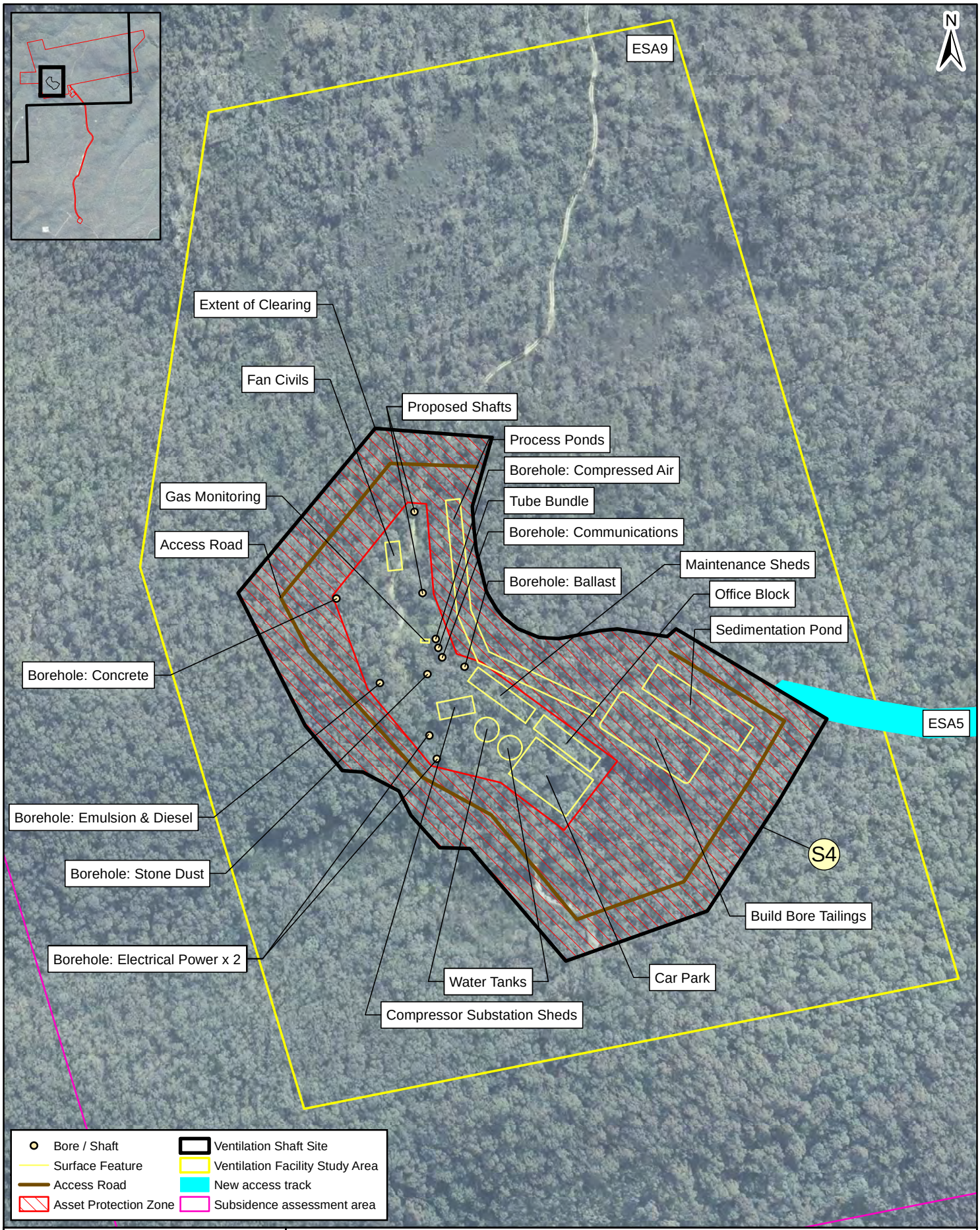
Construction works are expected to take approximately two years and nine months. Works are planned to commence in January 2013, pending project approval, and be completed by October 2015. The likely construction timeline of the works for the Ventilation Facility, as anticipated at this time, is set out in Table 4.2.

Table 4.2 Likely Staging of Construction Works

Construction Activity	Dates
Land preparation	January 2013
Sinking of first shaft	Late January 2013 to late October 2013
Fan construction	Late October 2013 to early December 2013
Fan start up	Early December 2013
Sinking of second shaft	Late October 2013 to mid March 2015
Connect fan and restart	Mid March 2015 to mid April 2015

The project would be operational from October 2015.

For the anticipated timescale for rehabilitation, whilst partial rehabilitation would be undertaken for construction areas no longer required for operation, the point at which full rehabilitation (including returning the land to its final landform) would be undertaken would depend in part on the results of the trial mining and any subsequent and separate applications for mining in this area if proven to be a viable resource.



Client:	Centennial Coal
Compiled by: TW	Date: 23/07/2012
Approved by: JAK	Date: 23/07/2012

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Datum: GDA94 / MGA Zone 56

RPS

Proposed Ventilation Facility

Figure 4.1

Project: Angus Place Colliery Ventilation Facility Project

Source: Project application features and orthophoto background © Centennial Coal 2012.

Tracking ID: 11-3671-010d Compiled: 23 July 2012

Client: Centennial Coal		**Example: Existing Ventilation Shaft at Angus Place Colliery**	
Compiled by: TW	Date: 23/07/2012	**Figure 4.2**	Project: Angus Place Colliery Ventilation Facility Project
Approved by: JAK	Date: 23/07/2012		

Source: Centennial Coal 2012.

RPS

5.0 Project Justification and Alternatives

5.1 Introduction

5.1.1 Need for the Project

It is proposed to develop underground roadways and a Ventilation Facility from the existing Angus Place Colliery workings to undertake trial mining to the east of the Wolgan River.

This area is subject to an ongoing exploration program and feasibility assessment to confirm the extent and viability of the resource area. If proven to be a viable source, Centennial Angus Place Pty Ltd would seek separate State and Federal approvals to mine this resource. Approvals would also be required for the associated mine infrastructure.

Mine planning has determined that additional ventilation capacity is required to ensure compliance with Clause 13(h) of the Coal Mine Health and Safety Regulation 2006 for the proposed trial mining. A Ventilation Facility is required to provide this capacity. To assist with the supply and transport of materials underground and to improve underground safety, it is proposed to situate several service/supply boreholes at the proposed Ventilation Facility. The boreholes would supply necessary services such as concrete, ballast, stone dust, emulsion, electricity, communications and compressed air. Ancillary infrastructure such as an adequate power supply would be required to support the Ventilation Facility.

In order to maintain adequate ventilation throughout the trial mining stage, the Ventilation Facility would need to be operational by the time underground development activities reach the proposed ventilation shaft site. Without this additional airflow, Angus Place Colliery would not be able to operate as scheduled.

5.1.2 Project Justification

The project is required to facilitate access to potential additional coal resources, which if proved viable by the trial mining and surface exploration program could sustain the life of the mine and potentially lead to associated socio-economic benefits. Additionally the project would facilitate continued safe operations by ensuring compliance with clause 13(h) of the Coal Mine Health and Safety Regulation 2006.

Following ventilation modelling for the project it was found that the capacity of the existing ventilation system was not adequate to support the proposed underground roadways and trial mining. Due to the distance of the proposed underground roadways from the existing Angus Place Colliery ventilation facility the project requires an independent ventilation system with limited reliance on the existing system. The location of the proposed Ventilation Facility was selected based on mining requirements, whilst limiting environmental impacts. One of the shafts has been designed for use as an escape shaft in the event of an emergency.

A number of design iterations have occurred throughout the EA process to minimise and, where possible, avoid impacts to the environment and community. Angus Place Colliery has a number of existing environmental management plans which would be implemented during the construction and operation of the project, if approved (refer Table 3.2). Additional mitigation measures identified in this EA and technical assessments (Appendices 9.1 to 9.14) would be implemented to further reduce impacts to the environment and community.

Mine safety is a key objective of the project and has been incorporated into all aspects of the design. For example, the Ventilation Facility has been designed with one of the shafts as a fresh air intake (downcast) shaft. In the event of an emergency, such as an underground fire in the existing part of the mine, employees

in the trial mining area would be able to evacuate to the bottom of the air intake shaft and access fresh air until they are rescued. Also, a potential mining hazard is an 'inrush' event. An inrush event occurs when a large amount of water or gas suddenly enters the working area from adjacent workings or shafts in an uncontrolled manner. As a preventative measure, the design has provided for an inrush protection zone of 50m radius. Mining would not be permitted within that zone until it had been confirmed that there was no accumulation of water in the shaft. Confirmation of this would be undertaken by firstly undertaking a surface based dip test and secondly by drilling from the current workings through the 50m inrush protection zone to the base of shaft. If approved, further detailed hazard assessment and management planning would be carried out.

The project's consistency with the objects of the EP&A Act and the principles of ecologically sustainable development (ESD) is discussed in Section 7 Planning Context and Section 11 Justification and Conclusion.

5.2 Alternatives Considered

A number of alternatives to the project have been considered by Angus Place Colliery. In particular, these enabled a number of amendments to the project during the course of the EA process to avoid and minimise adverse environmental effects where feasible.

The alternatives considered were:

- Alternative to undertaking the project: surface only exploration
- Alternative locations for the project;
- Alternative sites and layouts for the substation;
- Alternative sites and layouts for the Ventilation Facility;
- Alternative designs for the power supply; and
- 'Do Nothing'.

Each of the above alternatives is described below.

5.3 Alternative to Undertaking the Project: Surface Only Exploration

The alternative to the proposed combined surface and trial mining geological and geotechnical exploration is surface only exploration. This option was investigated and whilst surface only exploration has been undertaken by Angus Place Colliery it is best practice to combine the two approaches to achieve a more representative model. From past experience at Angus Place Colliery, surface based exploration is limited due to there being a single point within a large resource area assessed at a particular location. To provide a more expansive view of the underground resource it is important that trial mining is undertaken in conjunction with surface exploration activities. Surface only exploration would also involve a number of boreholes that may need to be drilled through aquifers to intersect the coal seam. Surface exploration can only be undertaken within areas of suitable topography and within non-sensitive environments. Cliffs, steep valleys, significant rock features and other environmental constraints can impact on the accuracy of a surface based exploration program.

Given that the above noted disadvantages exist for surface based exploration, the number of boreholes required can be reduced by combining the exploration activity with the proposed trial mining.

5.4 Alternative Locations for the Project

The purpose of the project is to provide access for exploration of the potential future coal resource to the east of the Wolgan River. The required access needs to be gained via the installation face of longwall 910.

To comply with the Coal Mine Health and Safety Regulation 2006, adequate ventilation is required. Therefore, shafts need to be constructed and linked to the underground roadways from longwall 910.

The selection of the location for the underground roadways was based on the most efficient means of accessing the Ventilation Facility and maximising the area of trial mining whilst taking into account surface and environmental constraints. There are no feasible alternatives to the location of the underground roadways.

The Ventilation Facility needs to be linked to an existing powerline (alternative methods of power supply are described in Section 5.7). The closest, most feasible powerline runs parallel with Blackfellows Hands Road to the south. The alternatives considered for the route and design of the power supply are described in Section 5.7 below.

5.5 Alternative Sites and Layouts for the Substation

At an early stage in the design process, Angus Place Colliery identified three potential sites and established three ESAs (ESA7/8, 10 and 11) for a substation (and an ESA within which the Ventilation Facility would be located as addressed below) as shown on Figure 5.1. These were subject to an Environmental Constraints Study. ESA7/8 largely currently comprises the current location of the proposed substation site on the west of Sunnyside Ridge Road. The initial ESA10 site subject to the Environmental Constraints Study is also on the western side of Sunnyside Ridge Road although further to the south. ESA11 covers an area on both the western and eastern sides of Sunnyside Ridge Road and further to the south again.

Environmental Constraints Studies were undertaken during Autumn 2011 by the EA team to provide initial advice to Angus Place Colliery on these sites and inform a revised project design. Key findings for the siting of the substation included:

- A preference for ESA7/8 for the substation site compared to the initial ESA10 and ESA11. The initial ESA10 contains a portion of *Persoonia hindii* in the southern section of site and ESA11 contains a large population of *Persoonia hindii* covering most of the site. It was therefore recommended that these two options be discounted; and
- Mandatory clearance requirements between vegetation and buildings/equipment and recommendations for separation distances were identified to minimise bushfire risk. These involve additional areas of vegetation clearance that would need to be identified.

Additional ground truthing was undertaken during mid August 2011 to provide more information about the locations of *Persoonia hindii* and to enable the identification of another alternative site to ESA7/8 that would preferably avoid, or if not feasible, minimise land take upon which this species is present. ESA11 was rejected as an option due to the findings of the Environmental Constraints Study and a revised ESA10 (shown on Figure 5.2) was identified on the eastern side (as opposed to the western side as was the initial ESA10) of Sunnyside Ridge Road that would provide an alternative substation site that also minimised loss and disturbance to *Persoonia hindii*.

The technical assessments reported in Section 9 Environmental Assessment and presented within Volume 2 have included this revised ESA10 on the eastern side of Sunnyside Ridge Road within their assessments. Whilst the inclusion of an alternative substation site was desirable for Angus Place Colliery from an engineering perspective, during the course of the EA the assessment findings and the results of consultation indicated a clear preference for the substation at ESA7/8, instead of ESA10. The assessment findings include:

- ESA7/8 is located within an area of MU59 Non Native Vegetation whereas ESA10 comprises three common native vegetation types – MU7, 14 and to a lesser extent 26a;

- Whilst no Aboriginal sites were identified during the survey on either site, there is greater potential for Aboriginal sites within ESA10 than for ESA7/8 because there remains old growth vegetation;
- ESA7/8 would replace a pine plantation whereas ESA10 comprises native vegetation. From an ecological and visual perspective it would be preferable to retain the native vegetation; and
- Whilst the bushfire potential is similar on both sites, ESA7/8 is preferable because it provides a large area of gently undulating land that falls to the north and permits the substation to be located adjacent to Sunnyside Ridge Road with a setback to the west which mitigates the risk to the external equipment.

The results of the consultation process included:

- Forests NSW stating a clear preference for ESA7/8 instead of ESA10 (Section 6 Consultation).

Therefore, the alternative substation site ESA10 has been rejected in favour of proposing a substation at ESA7/8 only.

For bushfire risk, during the course of the EA process, it was determined that the original Project Application Area needed to be modified to incorporate the Asset Protection Zones and make adjustments to the siting of the substation as recommended by the Bushfire Risk Assessment by ABPP (Section 9.11 and Appendix 9.8). As the Asset Protection Zones would require further vegetation clearance, these areas need to be included in the assessment. The Project Application Area was therefore revised to include the Asset Protection Zones and recirculated to the EA team during the course of the EA and addressed within the assessment.

5.6 Alternative Sites and Layouts for the Ventilation Facility

As part of the Environmental Constraints Study (discussed above) undertaken at an early stage in the design process, Angus Place Colliery identified an ESA within which the Ventilation Facility would be located – see Figure 5.1.

Key findings from the Environmental Constraints Study for the Ventilation Facility included the need to avoid the Newnes Plateau Hanging Swamp and allow for recommended protective buffers of 100m between the swamp and the works, the need to take subsidence into account for the precise location of the shafts and bores and to include measures to minimise bushfire risk.

During the course of the EA process, two significant ecological areas were identified within ESA9 in addition to the mapped swamps already identified (refer Section 9.3). Whilst these were not considered by RPS ecologists to constitute EECs, they displayed affinities with an EEC and were considered likely to have regional ecological significance.

Angus Place Colliery adopted a precautionary approach and relocated the Ventilation Facility within ESA9 to avoid the significant areas and the hanging swamp with protective buffers of at least 50m, within which no works or disturbance of native vegetation would be permitted, whilst still achieving engineering objectives. This precise site location is that proposed as S4 as shown on Figure 4.1. Whilst it is desirable to have as large a protective buffer as possible, a buffer of at least 50m exceeds the minimum reference of 40m identified in the *Water Management Act 2000* (WMA), and is informed by past experience of Office of Environment and Heritage (OEH) requirements for similar buffers. Further information is provided in the Flora and Fauna Assessment (Section 9.3 and Appendix 9.1).

The Ventilation Facility was also redesigned to accommodate the 40m Asset Protection Zones identified in the bushfire risk assessment by ABPP (as discussed above).

The proposed access track between the Ventilation Facility and Sunnyside Ridge Road was subsequently realigned to accommodate the new location. This resulted in a reduction in the length of track and therefore a reduction of vegetation clearance required to service the site.

5.7 Alternative Designs for the Power Supply

Two alternatives to the proposed option were considered for providing power to the Ventilation Facility. These alternatives comprise utilising the underground system to feed 11kV of power to the surface at the Ventilation Facility or having a diesel generator permanently running on the surface. Powering the new facility from the existing underground supply would mean losses through a voltage drop in the cables and the inability to power the whole facility. A permanent diesel generator would require a large amount of diesel fuel to continuously run the fan.

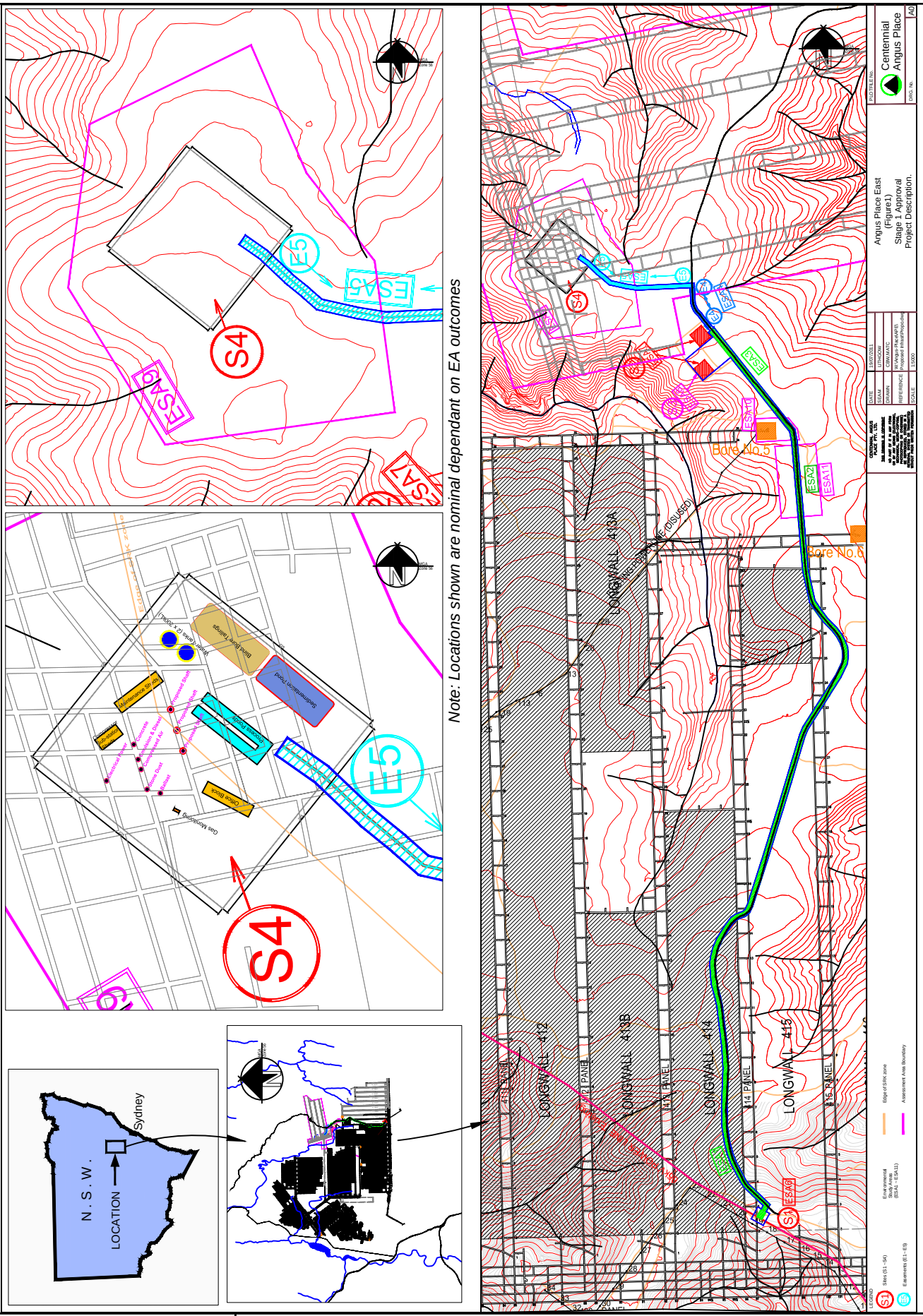
Angus Place Colliery has found that the most energy efficient method of supplying the ventilation facility with electricity is from the Newnes Plateau 66kV feed. This would entail less distribution losses at higher voltages compared to a supply from underground. This has therefore been identified as the proposed option.

Both overhead and trenched options for the proposed 66kV power supply line were considered. The Government Briefing Paper issued as part of the request for DGRs in December 2011 identified that the proposed power supply line would be either underground or overhead. An overhead powerline would require Asset Protection Zones to minimise bushfire risk and this would require more vegetation clearance than an underground line along an existing road.

During the EA process it was found an overhead powerline and its associated Asset Protection Zones along Sunnyside Ridge Road would impact upon *Persoonia hindii*. Angus Place Colliery considered the preparation of an offset strategy for this clearance and also the potential for an alternative route for an overhead powerline through the forest. The preparation of an offset strategy for the vegetation that would need to be cleared for an overhead line was rejected in favour of seeking to minimise the impact on this species in accordance with the principles of ecologically sustainable development. A potential alternative route through the forest was considered however whilst such a route might possibly avoid *Persoonia hindii*, there would be an impact on undisturbed native vegetation. Both of these options were both rejected in favour of trenching the power supply line along Sunnyside Ridge Road and abandoning the overhead line. A trenched powerline reduces the risk of bushfire (in an area that is bushfire prone) compared to an overhead line and therefore the clearance associated with the Asset Protection Zones would no longer be required. Therefore, this minimises the amount of vegetation clearance required for this part of the project and reduces biodiversity impacts, in particular to *Persoonia hindii*. A trenched power supply line also reduces the visual impacts compared to an overhead powerline.

5.8 Do Nothing

Based on the current mine schedule operations at Angus Place Colliery would cease, following the extraction of longwall 910, in March 2016. This would not address the need for the project identified above.



Client:	Centennial Coal		
Compiled by:	TW	Date:	25/06/2012
Approved by:	JAK	Date:	25/06/2012

Areas Subject To Environmental Constraints Study

Figure 5.1

Project: Angus Place Colliery Ventilation Facility Project

Source: Centennial Coal 2012.

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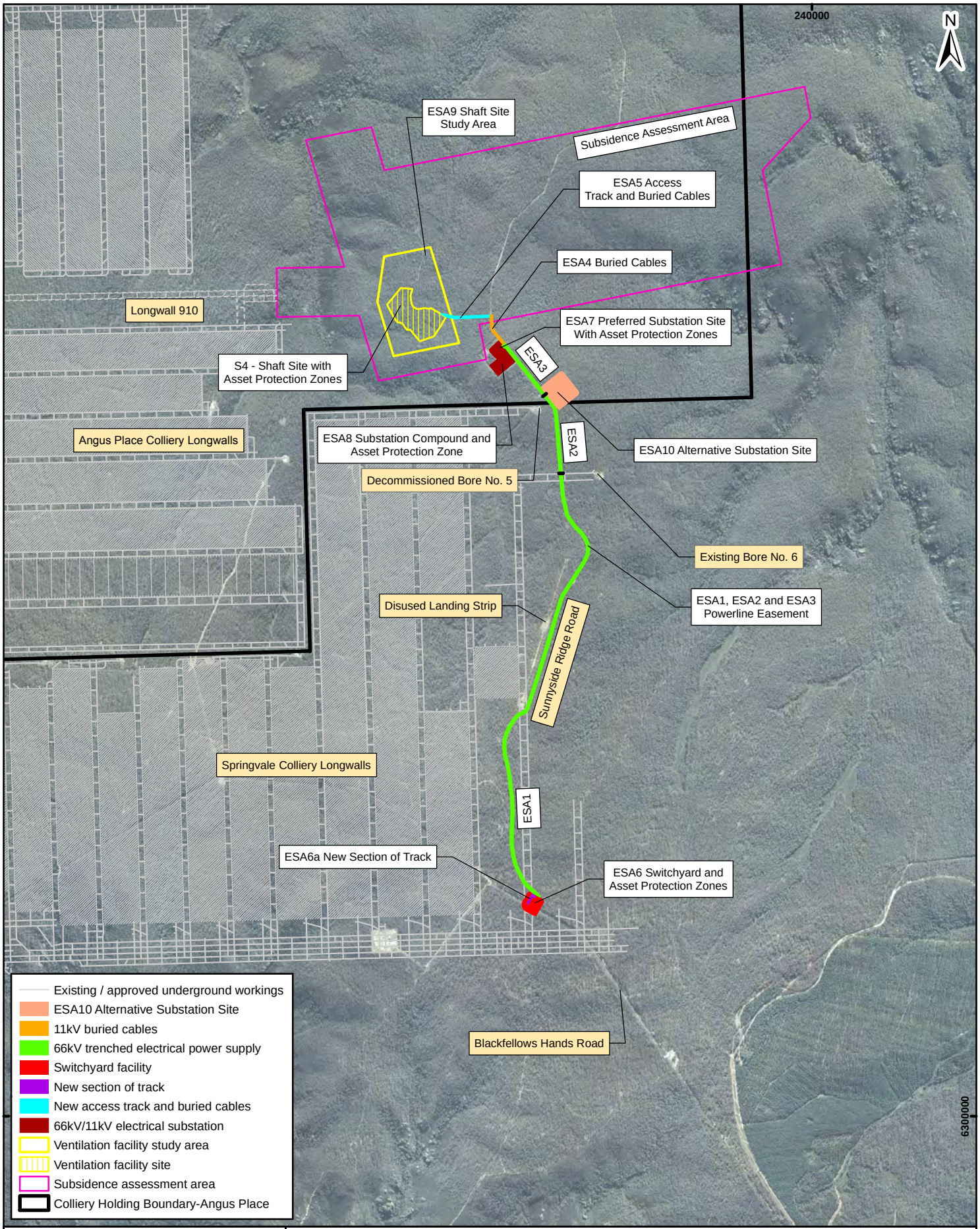

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Approved by:	JAK	Date:	23/07/2012

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Revised ESA10 Alternative Substation Site

Figure 5.2

Project: Angus Place Colliery Ventilation Facility Project

Source: Mine workings, project application features and orthophoto background © Centennial Coal 2012.

6.0 Consultation

6.1 Introduction

Land in close proximity to Angus Place Colliery is used for multiple purposes including power generation, open cut coal mining, forestry, pastoral farming, residential and recreational use. Consultation was undertaken with federal, state and local government agencies in addition to other stakeholders including the community during the preparation of this EA. The consultation was undertaken in accordance with the Angus Place Colliery Stakeholder Engagement Plan and is outlined below.

6.2 Service Providers and Landowners

As the land owners, Forests NSW were consulted with extensively. Forests NSW were initially briefed on the project during a meeting facilitated by Centennial Angus Place Pty Ltd on 28 February 2012. Discussion focused on the issue of whether the power supply would be overhead or trenched. Further dialogue between Centennial Angus Place Pty Ltd, Forests NSW and service providers resulted in a decision to trench the power supply which significantly reduced the area of land clearing.

Other topics of discussion included access agreements and leases to enable the construction and operation of the surface components. Occupation Permits issued under the *Forestry Act 1916* will initially be issued with some sites, such as the Ventilation Facility site, requiring a Mining Lease in the long term.

Several site inspections were conducted with delegates of Forests NSW. Potential timber values (including sawn timber and firewood) were discussed regarding the proposed disturbance area. The salvage of saw logs prior to construction has been incorporated into the project. A rental agreement was discussed for the net loss of timber resources to Forests NSW.

6.3 Community Consultation

6.3.1 Angus Place Colliery Community Consultative Committee

The Angus Place Colliery Community Consultative Committee (CCC) comprises representatives from local government and the community, and is independently chaired. The CCC was provided with a briefing regarding the project on 29 April 2012. A summary of the issues identified during the EA phase was discussed with the CCC. There were no specific issues raised regarding the project, however general concerns raised during the session related to groundwater and the contribution of natural groundwater outflows to the Wolgan River. It was discussed that as the project only involved the development of underground roadways and trial mining it was not expected that any groundwater impacts would occur. This was supported by the outcomes from the Subsidence Assessment (Section 9.16), Groundwater Assessment (Section 9.5) and Surface Water Assessment (Section 9.4).

6.3.2 Community Information Sessions

Regional community consultation was undertaken for the project in conjunction with other regional Centennial projects. This comprised:

- A letter box drop of leaflets during early March 2012 inviting the regional community to Community Information Sessions;
- An article appeared in the Lithgow Mercury, in Centennial's Local Lithgow Project Update page to provide the regional community with an update on the projects in the area;

- Further project updates appeared in the Lithgow Mercury advertising three forthcoming Community Information Sessions;
- An advertisement regarding the Community Information Sessions was placed in the Lithgow Mercury on 17 March 2012;
- Community Information Sessions were subsequently held at the Country Women's Association in Wallerawang on:
  - Wednesday 14 March, evening session from 4pm to 8pm
  - Saturday 17 March, morning session 9am to 1pm
  - Tuesday 20 March, morning session 9am to 1pm

  Centennial Angus Place Pty Ltd representatives were present at all three sessions. Information boards with project plans and illustrations were on display.
- An article appeared in the Lithgow Mercury on 21 April 2012 reporting on the three Community Information Sessions.

Issues raised during the Community Information Sessions for the Angus Place Colliery Ventilation Facility Project were:

- Impact to the environment from clearing activities;
- Potential opportunities for local contractors; and
- Employment opportunities.

Issues raised by the community in relation to the regional development included:

- Visual impact (open cut mining);
- Intensification of mining activities; and
- Recognition of impacts from sources other than Centennial such as the Pine Dale Coal Mine and Delta Electricity.

Also, in a regional context, there were concerns about visual impacts and cumulative effects.

6.3.3 Addressing Community Issues

The issues raised by the community identified above were discussed during the Community Information Sessions and have been addressed as set out in Table 6.1.

Table 6.1 Community Issues

Issue Raised	How Addressed
In relation to the project:	
Impact to the environment from clearing activities	The impact to the environment from clearing activities has been minimised during the EA process. In particular, the powerline along Sunnyside Ridge Road is proposed to be trenched whereas a previous version of the project comprised an overhead line. An overhead powerline requires clearance areas associated with minimising bushfire risk whereas a trenched powerline does not. Also, the Ventilation Facility has been refined to minimise environmental impacts. Further information about the alternatives considered and reasons for their rejection are provided in Section 5 Project

Issue Raised	How Addressed
	Justification and Alternatives.
Potential opportunities for local contractors	Whilst some specialist services might need to be sought outside the local area there are a number that can potentially be provided from the local area. Angus Place Colliery proposes to give preference to local contractors and services where practical during their tender and evaluation process.
Employment opportunities	Whilst no additional jobs would be generated by the project, this would enable trial mining and subject to the results of this and feasibility testing, may lead to subsequent applications to sustain mining at Angus Place Colliery.
In relation to regional development:	
Visual impact (open cut mining)	No open cut mining is proposed for this project. A visual assessment has been undertaken and is reported in Section 9.12 together with mitigation measures.
Intensification of mining activities	It is recognised that there are a number of other projects (including those related to mining) and activities occurring in the area and potential cumulative impacts are identified in Section 9.21.
Recognition of impacts from sources other than Centennial such as the Pine Dale Coal Mine and Delta Electricity	It is recognised that there are a number of other projects (including those related to mining) and activities occurring in the area and potential cumulative impacts are identified in Section 9.21. The project constitutes new infrastructure to support an approved facility.

6.3.4 Aboriginal Consultation

Aboriginal community consultation has been undertaken in accordance with the NSW Aboriginal Cultural Heritage Consultation Requirements (ACHCRs) for Proponents (DECCW 2010). Section 9.7 and the associated Appendix 9.13 (in particular Section 2) provide further information about the Aboriginal consultation undertaken. The following Aboriginal community stakeholders registered their interest in the project:

- Bathurst Local Aboriginal Land Council;
- Mingaan Aboriginal Corporation;
- Mooka Aboriginal Corporation; and
- Gundungurra Tribal Council Aboriginal Corporation.

Angus Place Colliery is subject to a Deed of Agreement entitled the Centennial Coal Projects Ancillary Deed of 2003. This document requires Angus Place Colliery to consult with the Gundungurra Native Title Claim Group (GNTCG). To this end, a Cultural Heritage Management Plan was developed by Centennial in order to avoid or minimise (where appropriate) the potential impact on Aboriginal sites. The requirements for specific situations which require Aboriginal cultural heritage surveys to be undertaken in conjunction with the

GNTCG are defined in clause 2 of the Cultural Heritage Management Plan. GNTCG did register an interest and participate in the pedestrian surveys of the Project Application Area. In addition, presentations of the project have been provided to the GNTCG through regular meetings set up in accordance with the Centennial Coal Projects Ancillary Deed.

A field survey which involved the Aboriginal groups was undertaken across the Project Application Area. No Aboriginal sites were identified within the Project Application Area. Further information is available in Section 9.17.

6.4 Government Consultation

Consultation with the relevant government stakeholders is identified in Table 6.2 below.

6.5 Future Consultation

Ongoing consultation would be undertaken in accordance with the Stakeholder Engagement Plan.

Table 6.2 Government Consultation Schedule

Agency/Date/ Consultation Type	Consultation Process Used	Issues Raised	Responses to Issues	Reference in EA
Department of Primary Industries/Forests NSW 28 February 2012 Presentation and meeting	Centennial Angus Place Pty Ltd presented the project to Forests NSW delegates.	Forests NSW agreed to determine the current status of the plantation. Forest NSW confirmed that a trenched power supply line would be their preference as opposed to an overhead powerline. Also, a substation at ESA7/8 is preferred compared to the alternative ESA10 site.	The powerline is proposed to be trenched instead of overhead. Alternative substation site ESA10 has been rejected and ESA7/8 is the only proposed site for the substation.	Section 4 Project Description Section 5 Project Justification and Alternatives
		Occupation Permits and Mining Lease issue were discussed with regard to surface infrastructure.	Initially Occupation Permits would be sought under the *Forestry Act 1916*. A MLA would be prepared to supersede these.	Section 7 Planning Context
OEH 2 March 2012 Presentation and meeting	Centennial Angus Place Pty Ltd presented the project to OEH delegates.	No issues raised regarding the project	n/a	n/a
DTIRIS (included Division of Resources and Energy (DRE)) 8 March 2012 Presentation/meeting and field inspection	Centennial Angus Place Pty Ltd presented the project to DTIRIS delegates.	Rehabilitation requirements were discussed. In particular, the Department's standard DGR for Rehabilitation needs to be addressed. A field inspection of the site was undertaken after the meeting.	Rehabilitation is proposed to be undertaken in accordance with the Rehabilitation Strategy by GSSE. This Rehabilitation Strategy has taken into account the Department's standard DGR.	Section 9.6 and Appendix 9.4 Rehabilitation Strategy
Department of Primary Industries/Forests	A field inspection of the proposed Ventilation Facility	Potential timber values (including sawn timber and firewood) were discussed	The salvage of sawlogs prior to construction has been added to the project.	Section 4 Project Description

Agency/Date/ Consultation Type	Consultation Process Used	Issues Raised	Responses to Issues	Reference in EA
NSW 12 March 2012 Field inspection	and the Springvale bore sites was undertaken as follow up to the earlier meeting.	regarding the proposed disturbance area.	The preparation of a rental agreement between Centennial Angus Place Pty Ltd and Forests NSW to compensate Forests NSW for the loss of timber production potential has been added to the project.	
Sydney Catchment Authority 19 March 2012 Field inspection	A field inspection of the components of the project within the Sydney catchment was undertaken.	Key concerns raised were that adequate sediment and erosion controls associated with the clearing are provided.	The provision of adequate sediment and erosion controls. This would be implemented in accordance with the detailed measures identified in the Surface Water Assessment.	Section 4 Project Description Section 9.4 and Appendix 9.2 Surface Water Assessment
SEWPaC 18 April 2012 Teleconference	Verbal presentation of the project and Briefing Paper supplied.	Referral under the EPBC Act was discussed.	A Referral under the EPBC was lodged in June 2012.	On 2 July 2012 a decision was made under S75 of the EPBC Act that the project is not a controlled action Therefore no further assessment or approval is required under the EPBC Act provided the project is undertaken in the way described in the referral. This is addressed in Section 4 Project Description.
Department of Primary Industries/NSW Office of Water 4 April 2012 Presentation and	Centennial Angus Place Pty Ltd presented the project to NSW Office of Water delegates.	Understanding of hydrogeological modelling and optimisation of monitoring.	Negligible subsidence has been predicted and a groundwater assessment has been undertaken. The extremely limited stratal disruption that would result from the project implies that there would be no significant change in vertical permeability. Development mining or blind boring would not produce zones of enhanced	Section 9.16 and Appendix 9.12 Subsidence Assessment

Agency/Date/ Consultation Type	Consultation Process Used	Issues Raised	Responses to Issues	Reference in EA
meeting			permeability beyond the construction period that could act as flow paths for groundwater to move from the surface or upper aquifers within the Project Application Area. Systematic underground hydrogeological monitoring and measurement methodologies are being designed and implemented at Angus Place and Springvale Collieries. On the basis of field monitoring and measurement results, a regional hydrogeological characterisation will be developed and established for both operations.	
Lithgow City Council 17 May 2012 Presentation and meeting	Centennial Angus Place Pty Ltd presented the project to Council delegates.	Consider use of local contractors and supplier for the proposed surface infrastructure.	For the provision of services, preference would be given to local contractors and other local providers when practical. Local contractors and other local providers would be considered in the contract tendering and evaluation process.	Section 4 Project Description
Department of Primary Industries/Agriculture and Fisheries 13 June 2012 Letter	Letter outlining the project accompanied by the Briefing Paper sent to the Department	DPI advised that the project would have a minor impact on limited agricultural resources and the rehabilitation does not require reinstatement of lands for agricultural use. Therefore, an AIS is not required. Although Angus Place Colliery's intention to undertake a cautionary approach and prepare an AIS was noted.	Cautionary approach adopted and an AIS undertaken.	Section 9.18 AIS
Department of Primary Industries/Catchments and Lands 13 June 2012	Letter outlining the project accompanied by the Briefing Paper sent to the Department	No issues raised regarding the project.		

Agency/Date/ Consultation Type	Consultation Process Used	Issues Raised	Responses to Issues	Reference in EA
Letter				
NSW Heritage Branch 13 June 2012 Letter	Letter outlining the project accompanied by the Briefing Paper sent to the Department	Requirements for the heritage assessment were specified.	The requirements specified have been addressed in the Cultural Heritage Impact Assessment as appropriate.	Section 9.17 Cultural Heritage and Appendix 9.13

7.0 Planning Context

7.1 Introduction

The EP&A Act provides the framework for environmental assessment in NSW. The project seeks to modify Project Approval (06_0021) under section 75W of the EP&A Act. Part 3A of the EP&A Act was repealed on 1 October 2011. However, Section 75W under Part 3A continues to apply for modifications to an existing Part 3A approval such as this and the project is a transitional Part 3A project. The Minister of Planning and Infrastructure (the Minister) has delegated the function to determine applications to modify projects under Section 75W of the EP&A Act to the Planning Assessment Commission.

The Project Application Area is within the Lithgow LGA and is zoned 1(f) – Rural (Forestry) under the Lithgow Local Environmental Plan (LEP) 1994. Mining is permissible with consent under the LEP. However, State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP) applies to the project. The Mining SEPP aims '*to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of* [New South Wales]'. Clause 6 of the Mining SEPP provides that development for the purposes of mining and mineral exploration may be carried out without development consent. Clause 6 applies despite the provisions of the Lithgow LEP. This has the effect that the project is required to be assessed under Part 3A of the EP&A Act.

To the extent the project was found to have a significant impact on a Matter of National Environmental Significance (MNES) such as to require assessment as a controlled action under the EPBC Act, the matter would be assessed as part of the NSW assessment process (due to bilateral agreement between the Commonwealth and the state of NSW).

This section outlines relevant legislation and policy at Commonwealth, State and Local levels.

7.2 Commonwealth Legislation

7.2.1 The Environmental Protection and Biodiversity Conservation Act 1999

The EPBC Act is administered by SEWPaC. Under the EPBC Act, approval by the Environment Minister is required for any action that has or will have, or is likely to have a significant impact on a MNES. The relevant provision of this legislation to this project relates to potential impacts on migratory species, threatened species, or ecological communities listed under the EPBC Act.

The species listed under the EPBC Act that are potentially affected are identified in the Flora and Fauna Assessment (refer Section 9.3 and the Appendix 9.1).

As part of the Flora and Fauna Assessment (Section 9.3 and Appendix 9.1) an EPBC Act Protected Matters Search Report was generated (April 2012) within 10km of the Project Application Area.

A threatened species and communities assessment has been undertaken as part of the Flora and Fauna Assessment (Section 9.3 and Appendix 9.1).

The view of Centennial Angus Place Pty Ltd was that the project did not constitute a controlled action. However, as a precaution, the action was referred. The referral was submitted to SEWPaC under the EPBC Act in June 2012 to determine whether the project constituted a controlled action. On 2 July 2012 SEWPaC

provided notification of the decision that the project does not constitute a controlled action under the EPBC Act. Therefore, the project does not require further assessment or approval under the EPBC Act.

7.2.2 National Greenhouse and Energy Reporting Act 2007

The *National Greenhouse and Energy Reporting Act 2007* (NGER Act) came into effect on 29 September 2007 and introduced a single national reporting framework for the reporting and dissemination of information about greenhouse gas emissions, greenhouse gas projects and energy use, and production of corporations. The NGER Act makes registration and reporting mandatory for corporations whose energy production, energy use or greenhouse gas emissions meet specified thresholds. Centennial Angus Place Pty Ltd reports emissions from the corporation including those from Angus Place Colliery.

7.2.3 Native Title Act 1993

The *Native Title Act 1993* recognises that Aboriginal people can have rights and interests to land which derives from their traditional laws and customs. Native title rights can include rights to live on the land, access the land for traditional purposes, protect important places and sites, collect food and medicinal resources from native plants, hunt and fish, teach traditional law and customs, and to have input into landuse practices and development planning.

7.3 New South Wales Legislation

7.3.1 Environmental Planning and Assessment Act 1979

As discussed in Section 7.1, the project is a transitional Part 3A project to which part 3A of the EP&A Act continues to apply (despite the repeal of this section in October 2011). The project seeks to modify Project Approval (06_0021) under section 75W of the EP&A Act. Based on the scope and scale of the project, it is not a radical transformation of the project originally approved and is likely to have limited environmental consequences beyond those which have already been the subject of assessment. Therefore, section 75W of the EP&A Act is the appropriate approval pathway.

The Director-General may notify (and has in this case notified) the proponent of environmental assessment requirements with respect to a proposed modification and the proponent must comply with those requirements before the matter will be considered by the Planning Assessment Commission (as delegate of the Minister).

Section 75U of the EP&A Act provides that the following authorisations are not required:

- Concurrence under Part 3 of the *Coastal Protection Act 1979* of the Minister administering that Part of the Act;
- Permit under section 201, 205 or 219 of the *Fisheries Management Act 1994*;
- An approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*;
- An Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*;
- An authorisation referred to in section 12 of the *Native Vegetation Act 2003* (or under any Act to be repealed by that Act) to clear native vegetation or State protected land;
- A permit under Part 3A of the *Rivers and Foreshores Improvement Act 1948*;
- A bush fire safety authority under section 100B of the *Rural Fires Act 1997*; and

- A water use approval under section 89, a water management work approval under section 90 or an activity approval under section 91 of the WMA.

Section 75V provides that the following authorisations cannot be refused if necessary for the carrying out of the project:

- An aquaculture permit under section 144 of the *Fisheries Management Act 1994*;
- An approval under section 15 of the *Mine Subsidence Compensation Act 1961*;
- A mining lease under the *Mining Act 1992*;
- A production lease under the *Petroleum (Onshore) Act 1991*;
- An EPL under Chapter 3 of the *Protection of the Environment Operations Act 1997* (POEO Act) (for any of the purposes referred to in section 43 of that Act);
- A consent under section 138 of the *Roads Act 1993*; and
- A licence under the *Pipelines Act 1967*.

The objects of the EP&A Act are set out in section 5 of the Act and are addressed in Section 11 of the EA.

Table 7.1 identifies other relevant NSW legislation and its relevance to the project.

Table 7.1 NSW Legislation

Act	Relevance to the Project
Coal Mine Health and Safety Act 2002	The principal object of the *Coal Mine Health and Safety Act 2002* (CMHS Act) is to secure the objects of the *Work Health and Safety Act 2011* in relation to coal operations. The CMHS Act imposes particular health and safety management obligations on operators of coal mines. Under section 100 of the CMHS Act, the approval of the Minister for Resources and Energy is required for the establishment of emplacement areas. The project includes the construction and operation of a spoil emplacement area. The relevant approval should be obtained before the emplacement areas are established.
Forestry Act 1916	Occupation Permits are provided for under the *Forestry Act 1916*. The proposed surface infrastructure would be incorporated into the existing Occupation permit between Centennial Angus Place Pty Ltd (Springvale Coal Pty Ltd) and Forests NSW. This will be obtained prior to the commencement of construction.
Mining Act 1992	Under the *Mining Act 1992* Section 73 – Rights under mining lease, Centennial Angus Place Pty Ltd has the following rights: 1) The holder of a mining lease granted in respect of a mineral or minerals may, in accordance with the conditions of the lease: (a) prospect on the land specified in the lease for, and mine on that land, the mineral or minerals so specified, and (b) carry out on that land such primary treatment operations (such as crushing, sizing, grading, washing and leaching) as are necessary to separate the mineral or minerals from the material from which they are

Act	Relevance to the Project
	recovered, and (c) carry out on that land any mining purpose. A Mining Lease Application (MLA) for the Ventilation Facility only has been prepared. This is MLA424 and is anticipated to be approved as a Mining Lease within a 3-6 months timeframe. If the project is approved, section 75V of the EP&A Act would ensure that the MLA could not be refused (Section 7.3.1). The proposed underground roadways (trial mining) will be undertaken in accordance with existing Mining Lease 1424.
Protection of the Environment Operations Act 1997	The POEO Act is administered by the OEH and requires licensing for environmental protection, including waste generation and disposal, water, air, and noise pollution. Angus Place Colliery currently operates under EPL467 and would continue to do so for the life of the project. Centennial Angus Place Pty Ltd does not anticipate that a variation to EPL467 would be required for the project.
Water Management Act 2000	The *Water Act 1912* and WMA contain provisions for the licensing of water capture and use. The Project Application Area is subject to the Water Sharing Plan for the Greater Metropolitan Groundwater Sources 2011. The rules applicable to: ▪ Sydney Basin Coxs River Groundwater Source; ▪ Coxs River Fractured Rock Groundwater Source; and ▪ Sydney Basin Richmond Groundwater Source; are contained in the Water Sharing Plan for the Greater Metropolitan Groundwater Sources 2011. The surface water sharing plan for the Project Application Area is covered by the Water Sharing Plan for the Greater Metropolitan Region Unregulated River Sources 2011. The rules applicable to: ▪ Colo River Management Zone (which falls within the Hawkesbury and Lower Nepean Rivers Water Source); and ▪ Wywandy Management Zone (which falls within the Upper Nepean and Upstream Warragamba Water Source); are contained in the Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2011. Centennial Angus Place Pty Ltd would need to obtain the relevant licences and those existing Water Licences approved under the *Water Act 1912* will need to be converted to Water Access Licenses under the WMA.

Act	Relevance to the Project
	As the project involves boring through aquifers, an aquifer interference licence will be obtained.
Threatened Species Conservation Act 1995	The TSC Act aims to protect terrestrial threatened species, populations and ecological communities. The Act is administered by OEH. The Flora and Fauna Assessment has been undertaken in accordance with this Act (Section 9.3 and Appendix 9.1). A Section 91 licence would be required for mitigation measures identified in Section 9.3 associated with seed collection and translocation of *Persoonia hindii*, a flora species listed as endangered under the TSC Act.
Roads Act 1993	Approval under Section 138 of the *Roads Act 1993* is required for any disturbance to the surface of a public road. This approval should be obtained prior to any such works commencing. Under section 75V of the EP&A Act such approval cannot be refused if necessary to carry out the project (refer Section 7.3.1).

The *National Parks and Wildlife Act 1974*, *Native Vegetation Act 2003* and the *Heritage Act 1977* would also be of potential relevance to the project but for the operation of Section 75U of the EP&A Act (refer Section 7.3.1).

7.4 State Environmental Planning Policies

State Environmental Planning Policies (SEPPs) are produced by the DP&I to provide guidance on significant issues for NSW. A review of current SEPPs was undertaken and those relevant to this project are addressed below.

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

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) (Mining SEPP) lists development that is considered complying, exempt and requiring approval.

Development permissible with consent is identified under clause 7 and relevantly includes underground mining carried out on any land. Clause 7, f, (a) refers to the extraction of a bulk sample as part of a resource appraisal of more than 20,000 tonnes of coal or of any mineral ore. The project would comprise extraction of approximately 709,575 tonnes of coal. The permissibility of the entire project including the Ventilation Facility derives from the Mining SEPP.

Part 3 of the Mining SEPP identifies matters for consideration by the consent authority as outlined in Table 7.2.

Table 7.2 Mining SEPP Clauses 12 to 17, Part 3

Clause	Applicability to project
Clause 12 Compatibility of proposed mine, petroleum production or extractive industry with other land uses	The project is located within the Newnes State Forest. Consultation with Forests NSW (the land owners) has been undertaken by the proponent including discussions about specific components of the project and access agreements and leases (refer Section 6). The AIS (Section 9.18) concludes that the project would have no significant impact on forestry. The recreation assessment (Section 9.13) concludes that the project would have residual impacts on recreational amenity within the immediate vicinity of the site and identifies mitigation measures.
Clause 13 Compatibility with proposed development with mining, petroleum production or extractive industry	The project is for mining infrastructure and is therefore compatible with mining.
Clause 14 Natural resource management and environmental management	Mitigation measures for surface water, groundwater, biodiversity and greenhouse gas emissions are identified in Sections 9.4.4, 9.5.4, 9.3.4 and 9.8 respectively.
Clause 15 Resource recovery	The purpose of the project is to undertake trial mining therefore resource recovery would be limited to extraction associated with this trial mining.
Clause 16 Transport	The coal extracted through trial mining would be transported underground to the pit top and via the two private haul roads. There would be minor traffic generation associated with the construction and operation of the project (refer Section 9.14).
Clause 17 Rehabilitation	Rehabilitation would be undertaken in accordance with the Rehabilitation Strategy (refer Section 9.6).

The permissibility of the project derives from the Mining SEPP.

7.4.2 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

The Department of Planning (now the DP&I) through the project assessment process for the current Project Approval was satisfied that the project did not comprise potentially hazardous or offensive development and was generally consistent with the aims, objectives and requirements of the SEPP. If the storage of Dangerous Goods was required, then a licence would be applied for from the WorkCover Authority NSW.

The project does not introduce any new activities that would alter the nature of the existing project or result in it comprising hazardous or offensive development.

Further information about hazards associated with the project is provided in Section 9.20.

7.4.3 State Environmental Planning Policy No. 44 – Koala Habitat Protection

State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44) aims '*to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline'*.

The Project Application Area is located within Greater Lithgow LGA which is listed within Schedule 1 of SEPP 44 – 'Koala Habitat Protection'. Therefore SEPP 44 applies to the land.

SEPP 44 requires that before granting development consent under Part 4 of the EP&A Act for development on land over 1 hectare in area, a consent authority must form a view as to whether the land is "potential"' or "core" koala habitat. Potential koala habitat is defined as:

> *'areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.'*

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.'*

Where core koala habitat is found to occur, SEPP 44 requires that a site-specific koala plan of management be prepared.

Schedule 2 of SEPP 44 lists ten tree species that are considered indicators of 'Potential Koala Habitat'. The presence of any of the species listed on a site proposed for development triggers the requirement for an assessment for 'Potential Koala Habitat'.

The Flora and Fauna Assessment (Section 9.3 and Appendix 9.1) reports that one Schedule 2 feed tree species (*Eucalyptus viminalis*) was recorded within the Project Application Area at densities of less than 15% of the total number of trees. Therefore the Project Application Area does not constitute Potential Koala Habitat and no further provisions of this policy apply. Importantly given the nature of the project and likelihood of impacts on vegetation and in turn habitat, it is unlikely that impacts to the Koala would result.

7.4.4 State Environmental Planning Policy No.55 – Remediation of Land

SEPP 55 - Remediation of Land requires consent authorities to consider contamination in determining development applications. The Project Application Area predominantly comprises forest that is unlikely to contain any potential contamination. Development in the vicinity comprises existing bore sites for Springvale Colliery and there is an old landing strip parallel to Sunnyside Ridge Road.

In the event that the presence of contaminated land is suspected during the construction works, the appropriate investigations would be undertaken in accordance with Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC) and the NSW *Contaminated Land Management Act 1997*.

7.4.5 State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011

The aim of the SEPP is to provide for healthy water catchments that will deliver high quality water. It applies to land within the Sydney Drinking Water Catchment. The proposed switchyard at ESA6 partly extends into the Marrangaroo Creek Catchment. Marrangaroo Creek is part of the Upper Coxs River sub-catchment which forms part of the Sydney Drinking Water Catchment. Clause 10 of the SEPP states that development consent under Part 4 of the EP&A Act cannot be granted unless the development would have a neutral or beneficial effect on water quality. While this clause is not directly applicable to this project (which is being

considered under Part 3A), impacts on the Sydney Drinking Water Catchment are a relevant consideration. The Surface Water Assessment (Section 9.4 and Appendix 9.2) concludes that without the implementation of mitigation measures, the project would have the potential to result in slight increases to water flow rates and volumes in Marrangaroo Creek, as well as slight increases in sediment export from the switchyard site (ESA6). With the implementation of the identified mitigation, it is predicted that the project would have a neutral effect on water quality of Marrangaroo Creek.

The area of the switchyard is anticipated to be approximately 0.36 ha while the total sub catchment areas of Marrangaroo Creek (as referred to in the Surface Water Assessment) totals 1,923 ha. Therefore the area of the switchyard represents less than 0.02% of the sub catchment areas identified within the larger Marrangaroo Creek catchment. When considering the total Marrangaroo Creek catchment to the confluence with the Coxs River the proportion reduces to less than 0.005% of the total Marrangaroo Creek catchment. The impact from the proposed switchyard on water quality and water quantity is predicted to be within the natural variability of the existing water quality and flow data within the Marrangaroo Creek catchment at its confluence with Coxs River and also within the Coxs River. The Surface Water Assessment (Section 9.4 and Appendix 9.2) identifies mitigation measures for the proposed switchyard including erosion and sediment controls.

As part of the stakeholder consultation, (see Section 6 Consultation), representatives from the Sydney Catchment Authority undertook a field inspection of the area subject to the project. Key concerns raised were that adequate sediment and erosion controls associated with the clearing are provided. Management controls are identified in the Surface Water Assessment ((Section 9.4 and Appendix 9.2).

7.5 Lithgow City Council Local Environmental Plan

The Project Application Area is within an area zoned 1(f) – Rural (Forestry) under the Lithgow LEP 1994. As referred to in Section 7.1, the effect of the Mining SEPP is to require the project to be assessed under the EP&A Act. However, consideration has been given to the nature and objectives of the zone. 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 Lithgow, while allowing compatible development, and*
(c) *to prevent pollution of water supply catchments and water quality in major water storages.*

The project is considered to be consistent with the objectives of the zone, as the land is managed by Forests NSW and underground mining is compatible development that would not impact on the preservation of the existing forest. The proposed post mining use following rehabilitation is State Forest.

8.0 Environmental Risk Assessment

An Environmental Risk Assessment was undertaken in May 2011 to identify the potential key environmental issues. Consequently a number of technical consultants were engaged to undertake specific technical assessments to determine the potential effects resulting from the project. The identification of potential hazards/impacts as part of the risk analysis was derived from Angus Place Colliery's extensive previous mining experience and through consideration of the issues raised during the original environmental assessments for longwalls 920-980 and those for the first modification of the Project Approval 06_0021 (including longwalls 910 and 900W).

The Environmental Risk Assessment involved:

- Identification of potential hazards/impacts;
- Determination of the consequence of the hazard/impact occurring;
- Determination of the likelihood of an event occurring;
- Assessment of the risk by determining the probability (likelihood) and consequence (effect) of each hazard/impact;
- Identification of the controls/safe guards to mitigate the hazard/impact; and
- Reassessment of the risk by determining the probability (likelihood) and consequence (effect) of each hazard/impact with the implementation of mitigation measures.

Centennial's Risk Management Standard Risk Matrix was used to calculate the consequence and likelihood of an event to evaluate the subsequent risk level (risk rank). This system operates in accordance with AS/NZS 4360:2004.

Through the Environmental Risk Assessment process, the potential environmental impacts were prioritised. The risk assessment addressed direct and indirect environmental impacts. The outcome of the risk assessment was a list of recommended controls that then guided the scopes of the technical assessments for the project. A copy of the Environmental Risk Assessment is provided in Appendix 8.1.

Table 8.1 lists the environmental considerations, their risk ranking (risk ranking ranges from Extreme to Low as identified in the risk rating table in Appendix 8.1), whether they have also been identified for assessment by the DGRs and how the issue has been addressed in the EA. The Environmental Risk Assessment was undertaken at an early stage of the project and in some cases, a technical assessment was identified as being potentially required. During the course of the EA process this was found to be a conservative approach. For example, subsidence from the underground roadways was later predicted by DGS as being negligible and a potential exceedance of EPL limits was since not found to be the case.

Table 8.1 Risk Ranking of Environmental Considerations

Stage	Environmental Considerations	Risk Rank	Identified in DGRs?	How Addressed in EA
Construction of Infrastructure	Bushfire risk	Extreme	Yes	Bushfire Risk Assessment undertaken
Construction of Infrastructure	Community impacts such as noise, dust and traffic	Extreme	Yes	Noise, Air, Traffic and Recreation Assessments

Stage	Environmental Considerations	Risk Rank	Identified in DGRs?	How Addressed in EA
				undertaken
Construction of Infrastructure	Cumulative effects from the project together with other projects/activities in the area	Extreme	Yes	Cumulative effects addressed
Construction of Infrastructure	Noise impacts from construction activities, equipment and construction	Extreme	Yes	Noise Impact Assessment undertaken
Construction of Infrastructure	Groundwater impacts from construction activities including bores, shafts and underground roadways	Extreme	Yes	Groundwater Assessment undertaken
Construction of Infrastructure	Hazardous goods	Extreme	Yes	Hazardous materials screening undertaken
Construction of Infrastructure	Impacts on heritage during construction	Extreme	Yes	Cultural Heritage Impact Assessment undertaken
Construction of Infrastructure	Air quality impacts such as dust from construction	Extreme	Yes	Air Quality and Greenhouse Gas Assessment undertaken
Construction of Infrastructure	Impacts on flora and fauna such as those associated with vegetation clearance and swamps during construction	Extreme	Yes	Flora and Fauna Assessment undertaken
Construction of Infrastructure	Land value such as forestry	Extreme	Yes	AIS and consultation with Forests NSW undertaken
Construction of Infrastructure	Impacts on soil and land	Extreme	Yes	Soil and Land Resources Assessment undertaken

Stage	Environmental Considerations	Risk Rank	Identified in DGRs?	How Addressed in EA
Construction of Infrastructure	Impact on surface water	Extreme	Yes	Surface Water Assessment undertaken
Construction of Infrastructure	Visual amenity	Extreme	Yes	Visual Assessment undertaken
Construction of Infrastructure	Risk to public safety	Extreme	Yes (hazards)	Bushfire risk and other hazards addressed
Construction of Infrastructure	Impacts from construction traffic	Extreme	No	Traffic Impact Assessment undertaken
Construction of Infrastructure	Waste generation and management	Extreme	Yes	Waste streams and management measures identified.
Construction of Infrastructure	Greenhouse gas emissions from construction activities	Significant	Yes	Air Quality and Greenhouse Gas Assessment undertaken
Construction of Infrastructure	Community concern about environmental impacts during construction	Significant	No	Community consultation undertaken and ongoing
Operation and Decommissioning of Infrastructure	Greenhouse gas emissions from operations	Significant	Yes	Air Quality and Greenhouse Gas assessment undertaken
Operation and Decommissioning of Infrastructure	Community concern about environmental impacts during operation	Significant	No	Community consultation undertaken and ongoing
Operation and Decommissioning of Infrastructure	Bushfire risk	Significant	Yes (hazards)	Bushfire Risk Assessment undertaken

Stage	Environmental Considerations	Risk Rank	Identified in DGRs?	How Addressed in EA
Operation and Decommissioning of Infrastructure	Community impacts such as noise, odour and views	Significant	Yes	Noise, Air, Visual and Recreation assessments undertaken
Operation and Decommissioning of Infrastructure	Cumulative effects from the project together with other projects/activities in the area	Significant	Yes	Cumulative effects addressed
Operation and Decommissioning of Infrastructure	Noise impacts from operation	Significant	Yes	Noise and Vibration Impact Assessment undertaken
Operation and Decommissioning of Infrastructure	Groundwater impacts such as to GDEs and groundwater make	Significant	Yes	Groundwater Assessment undertaken
Operation and Decommissioning of Infrastructure	Hazardous goods	Significant	Yes	Hazardous materials screening undertaken
Operation and Decommissioning of Infrastructure	Impacts on heritage during operation such as those from subsidence	Significant	Yes	Cultural Heritage Impact Assessment undertaken
Operation and Decommissioning of Infrastructure	Air quality impacts during operation such as odour	Significant	Yes	Air Quality and Greenhouse Gas assessment undertaken
Operation and Decommissioning of Infrastructure	Impacts on flora and fauna during operation	Significant	Yes	Flora and Fauna Assessment undertaken
Operation and Decommissioning of Infrastructure	Land value such as forestry	Significant	Yes	Rental agreement between Angus Place Colliery and Forests NSW to be determined.
Operation and Decommissioning	Impacts on soil and land	Significant	Yes	Soil and land Resources

Stage	Environmental Considerations	Risk Rank	Identified in DGRs?	How Addressed in EA
of Infrastructure				Assessment undertaken
Operation and Decommissioning of Infrastructure	Impacts on surface water such as changes to run off and impacts to water courses	Significant	Yes	Surface Water Assessment undertaken
Operation and Decommissioning of Infrastructure	Visual amenity	Significant	Yes	Visual Assessment undertaken
Operation and Decommissioning of Infrastructure	Risk to public safety	Significant	Yes	Bushfire risk and other hazards addressed
Operation and Decommissioning of Infrastructure	Traffic generation during operation	Significant	No	Traffic Impact Assessment undertaken
Operation and Decommissioning of Infrastructure	Waste generation and management	Significant	Yes	Waste streams and management measures identified
Operation and Decommissioning of Infrastructure	Rehabilitation of infrastructure – impacts on flora and fauna, visual, community, cumulative.	Significant	Yes	Rehabilitation Strategy prepared
Construction and Operation of Underground Roadways	Subsidence – impact on flora and fauna	Significant	No	Subsidence Assessment undertaken and followed through in Flora and Fauna Assessment
Construction and Operation of Underground Roadways	Subsidence – impact on heritage	Significant	No	Subsidence Assessment undertaken and followed through in Cultural Heritage Impact Assessment

Stage	Environmental Considerations	Risk Rank	Identified in DGRs?	How Addressed in EA
Construction and Operation of Underground Roadways	Depressurisation of groundwater aquifers – impacts to GDEs and/or groundwater users or mine dewatering activities	Significant	Yes	Subsidence Assessment undertaken and followed through in Groundwater Assessment
Construction and Operation of Underground Roadways	Greenhouse gas emissions	Significant	Yes	Air Quality and Greenhouse Gas Assessment undertaken
Construction and Operation of Underground Roadways	Community concern about environmental impacts	Significant	No	Community consultation undertaken and ongoing
Construction and Operation of Underground Roadways	Exceedances of EPL volumetric limits and exceedance of EPL and/or ANZECC water quality criteria caused by mine water discharge from underground roadways – community complaints and/or EPL non-compliance.	Significant	Yes	Surface Water and Groundwater Assessments undertaken
Construction and Operation of Underground Roadways	Subsidence – impacts to surface infrastructure	Moderate	No	Subsidence Assessment undertaken and design measures identified in Statement of Commitments
Construction and Operation of Underground Roadways	Subsidence – impact to river/creek geomorphology or sedimentation/erosion impacts	Low	No	Subsidence Assessment undertaken and followed through in Surface Water Assessment
Construction and Operation of Underground Roadways	Subsidence – impacts to soil, land and agriculture	Low	No	Subsidence Assessment undertaken and followed through

Stage	Environmental Considerations	Risk Rank	Identified in DGRs?	How Addressed in EA
				in Soil and land Resources Assessment and AIS

9.0 Environmental Assessment

9.1 Introduction

This section describes the DGRs for the EA and the way in which they have been addressed; and describes the environmental effects and mitigation measures, based upon the technical assessment reports appended to this EA.

9.2 Director General's Requirements

The DGRs were issued in January 2012 and a copy is provided in Appendix 1.1. The key issues and reference to where they are addressed within this EA are set out in Table 9.1 below. Detailed responses to the matters raised are provided in the technical assessment reports that are appended.

The DGRs made reference to the (then) draft requirements for AIS (DP&I, Draft Agricultural Impact Assessment Guidelines 2011). The Strategic Agricultural Land Assessment Guidelines were released in March 2012. Whilst the Department of Primary Industries (Agriculture and Fisheries) has advised that an AIS is not required for the project (refer Section 6, Table 6.2), Centennial Angus Place Pty Ltd has adopted a cautionary approach and prepared an AIS as part of the project (Section 9.18).

In addition to the matters identified in the DGRs, the following assessments have been undertaken because they were identified in the preliminary Environmental Risk Assessment and addressed in accordance with Centennial Angus Place Pty Ltd's risk based approach:

- Subsidence Assessment;
- Traffic Impact Assessment; and
- Economics Assessment.

The DGRs and the Environmental Risk Assessment have guided the scope of the EA.

Table 9.1 Director General's Requirements

Director General's Requirements	Reference within EA
General Requirements **The Environmental Assessment (EA) for the modification must include a:**	
▪ Detailed description of the modification, including: » need for the proposed modification; » justification for the proposed mine plan, including efficiency of coal resource recovery, mine safety, and environmental protection; » likely staging of the modification - including construction, operational stage/s and rehabilitation; » likely interactions between the modification and existing, approved and proposed mining operations in the vicinity of the site; » plans of any proposed building works;	Project need and project justification is provided in Section 5. The overall justification and conclusion is in Section 11. Likely staging is set out in Section 4.14. Likely interactions are addressed in Section 9.21 Cumulative Effects. The proposed building works are described in Section 4, the locations of buildings are shown in Figure 2.1 and an example of how the Ventilation Facility would look is in Figure 4.2.

Director General's Requirements	Reference within EA
▪ consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments;	Section 7 Planning Context
▪ risk assessment of the potential environmental impacts of the modification, identifying the key issues for further assessment;	Section 8 Environmental Risk Assessment
▪ detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: » a description of the existing environment, using sufficient baseline data; » an assessment of the potential impacts of all stages of the modification, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes; and » a description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the modification, including projects for adaptive management and/or contingency plans to manage any significant risks to the environment; and	Baseline data – Section 9 and technical reports in Appendices 9.1 to 9.13. Assessment of impacts and identification of mitigation measures - Section 9 and Section 10 Statement of Commitments.
▪ consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EA.	Section 10 Statement of Commitments
Key Issues **The EA must address the following matters:**	
Land Resources – including a detailed assessment of the potential impacts on: ▪ soils and land capability; and ▪ land use, including forestry, conservation and recreational use within Newnes State Forest – including impacts on forestry resources and forestry activities and consideration of appropriate compensation in relation to forestry production;	Soil and Land Resources Assessment in Section 9.7 and Appendix 9.5. Forestry is addressed in Section 4 Project Description and the AIS in Section 9.18. Conservation issues are addressed in Section 9.3 and the Flora and Fauna Assessment in Appendix 9.1. Recreational use in Newnes State Forest is addressed in the Recreation Assessment in Section 9.13
Water Resources – including: ▪ detailed assessment of potential impacts on the quality and quantity of existing surface and ground water resources; ▪ an assessment of proposed water discharge quantities and quality/ies against receiving water quality and flow objectives; ▪ identification of any licensing requirements or other approvals under the Water Act 1912 and/or Water Management Act 2000; and ▪ a detailed description of the proposed water management system and other measures to mitigate surface and groundwater impacts;	Surface Water and Groundwater Assessments in Sections 9.4 and 9.5 and Appendices 9.2 to 9.3 respectively. Existing licences and approvals are identified in Table 3.1, Section 3 Overview of Existing Operations. The need for any new approvals or licences relating to water are is identified in Section 7 Planning Context.
Biodiversity – including:	Section 9.3 and Flora and

Director General's Requirements	Reference within EA
▪ measures taken to avoid, reduce or mitigate impacts on biodiversity; ▪ accurate estimates of proposed vegetation clearing; and ▪ a detailed assessment of potential impacts of the development on any: » terrestrial or aquatic threatened species or populations and their habitats, endangered ecological communities and groundwater dependent ecosystems; and » regionally significant remnant vegetation, or vegetation corridors;	Fauna Assessment in Appendix 9.1.
Heritage – including an Aboriginal cultural heritage assessment (including both cultural and archaeological significance) which must: ▪ demonstrate effective consultation with Aboriginal communities in determining and assessing impacts, and developing and selecting mitigation options and measures; and ▪ outline any proposed impact mitigation and management measures (including an evaluation of the effectiveness and reliability of the measures);	Section 9.17 and Cultural Heritage Impact Assessment in Appendix 9.13.
Air Quality – including a quantitative assessment of potential: ▪ construction and operational impacts, with a particular focus on dust emissions and odour emissions; ▪ reasonable and feasible mitigation measures to minimise dust, diesel and odour emissions, including evidence that there are no such measures available other than those proposed; and ▪ monitoring and management measures, in particular real-time air quality monitoring;	Section 9.9 and Air Quality and Greenhouse Gas Assessment in Appendix 9.6.
Greenhouse Gases – including: ▪ a quantitative assessment of potential Scope 1, 2 and 3 greenhouse gas emissions; ▪ a qualitative assessment of the potential impacts of these emissions on the environment; and ▪ an assessment of reasonable and feasible measures to minimise greenhouse gas emissions and ensure energy efficiency;	Section 9.9 and Air Quality and Greenhouse Gas Assessment in Appendix 9.6.
Noise & Vibration – including a quantitative assessment of potential: ▪ construction and operational noise impacts; ▪ reasonable and feasible mitigation measures, including evidence that there are no such measures available other than those proposed; and ▪ monitoring and management measures;	Section 9.10 and Noise and Vibration Impact Assessment in Appendix 9.7.
Visual – including a detailed description of the measures that would be implemented to minimise the visual impacts of the project;	Section 9.12
Waste – including: ▪ accurate estimates of the quantity and nature of the potential waste streams of the development; and ▪ a description of measures that would be implemented to minimise production of waste, and ensure that waste is appropriately managed;	Section 9.19
Hazards – including bushfires; and	Section 9.11 Bushfire Risk and Section 9.20 Other Hazards and the Bushfire Risk Assessment in Appendix 9.8.
Rehabilitation – including the proposed rehabilitation strategy for the site, having regard to the key principles in the Strategic Framework for Mine Closure, including:	Proposed Rehabilitation Strategy in Section 9.6 and Appendix 9.4.

Director General's Requirements	Reference within EA
▪ rehabilitation objectives, methodology, monitoring programs, performance standards and proposed completion criteria; ▪ nominated final land use, having regard to any relevant strategic land use planning or resource management plans or policies; and ▪ the potential for integrating this strategy with any other rehabilitation and/or offset strategies in the region.	
Plans and Documents	
The EA must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the *Environmental Planning and Assessment Regulation 2000*. These documents should be included as part of the EA rather than as separate documents.	Figures in Volume 1
Consultation	
During the preparation of the EA, you must consult with relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with the: ▪ Commonwealth Department of Sustainability, Environment, Water, Population and Communities; ▪ Office of Environment and Heritage (including the Heritage Branch); ▪ Division of Resources and Energy within the Department of Trade and Investment, Regional Infrastructure and Services; ▪ Department of Primary Industries (including the NSW Office of Water; NSW Forestry, Agriculture and Fisheries sections; Catchments and ▪ Lands (Crown Lands Division)); and ▪ Lithgow City Council. The EA must: ▪ describe the consultation process used and demonstrate that effective consultation has occurred; ▪ describe the issues raised by public authorities, service providers, community groups and landowners; ▪ identify where the design of the development has been amended in response to issues raised; and ▪ otherwise demonstrate that issues raised have been appropriately addressed in the assessment.	Section 6 Consultation
Further consultation after two years	
If you do not lodge an EA for the development within 2 years of the issue date of these DGRs, you must consult further with the Director-General in relation to the requirements for lodgement.	Noted
References	
The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, Attachment 1 contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this development.	Taken into account as appropriate.

9.3 Flora and Fauna

RPS has prepared a Flora and Fauna Assessment and this is provided in Appendix 9.1. The key findings are outlined below.

Information was drawn from the previous Flora and Fauna Assessment prepared by RPS for the first modification of Project Approval 06_0021 in 2010, a review of records held by OEH within a 10km radius of the site, an EPBC Act protected matters search within a 10km radius of the site, aerial photographs, GIS data, relevant annual monitoring reports from Angus Place Colliery and Springvale Colliery undertaken for compliance purposes and surveys undertaken by ecologists.

Surveys across the Project Application Area were undertaken from July 2011 to March 2012 and included:

- Flora surveys and vegetation mapping;
- Habitat survey;
- Fauna surveys including bat trapping – harp traps, bat echolation call recording, avifauna survey, herpetofauna survey, spotlighting and secondary observations and incidental observations;
- Flora and fauna surveys to inform the Environmental Constraints Study to guide the location of the substation and the Ventilation Facility; and
- Subsequent surveys comprising four trap lines and to address design revision that included Asset Protection Zones and associated vegetation clearance.

Surveys focused on areas of potential disturbance associated with the proposed infrastructure. The Subsidence Assessment Area is predicted to have less than 20mm subsidence that is considered to be negligible by DGS (see Section 9.16).

The key findings of the Flora and Fauna Assessment are outlined below.

9.3.1 Existing Situation

Aquatic Species

The Wolgan River, small streams and drainage lines are present within the Project Application Area. A baseline survey investigating macro invertebrate and fish diversity occurring within the swamps and their surroundings has been undertaken by Marine Pollution Research during Spring 2010. Twenty two macro invertebrate species including a range of species that are highly sensitive to water pollution were recorded. The aquatic survey effort is ongoing at Angus Place Colliery.

There is not considered to be any suitable aquatic habitat within the Project Application Area for species listed under the *Fisheries Management Act 1994* (refer Appendix 9.1).

Vegetation

There are 15 vegetation communities within the Project Application Area including Newnes Plateau Narrow-leaved Peppermint - Mountain Gum - Brown Stringybark Layered Forest and Newnes Plateau Gum Hollows variant: Brittle Gum - Mountain Gum, Scribbly Gum - Snow Gum Shrubby Open Forest.

As stated in Section 2, there are two EECs within the Project Application Area: MU50 - Newnes Plateau Shrub Swamp and MU51 - Newnes Plateau Hanging Swamp. The locations of the swamps are shown on Figure 2.4.

MU50 corresponds to one EEC as listed under the TSC Act, Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion (both MU50 and MU51 correspond to the federally listed EEC, Temperate Highland Peat

Swamps on Sandstone under the EPBC Act). Both types are present within the Subsidence Assessment Area and an area of MU51 Newnes Plateau Hanging Swamp approximately 55m from the proposed Ventilation Facility.

MU 50 - Newnes Plateau Shrub Swamp and MU 51 - Newnes Plateau Hanging Swamp are also classified as GDEs as they are dependent on the groundwater sourced from the locally occurring bedding planes with permeable and impermeable layers.

As identified in Section 2.6, during the EA process two significant ecological areas were identified within proximity to the Ventilation Facility (the approximate locations are shown on Figure 2.5 and they are described and discussed in Appendix 9.1, Section 3.1.1).

One threatened flora species listed as Endangered under the TSC Act was observed within the Project Application Area, *Persoonia hindii*. As the Subsidence Assessment Area is predicted to have negligible subsidence *Persoonia hindii* are not likely to be impacted therefore the areas of the proposed infrastructure resulting in vegetation clearance (approximately 17.3ha) were focused on during surveys. Approximately 1,269 individual plants were recorded within this area where the removal of vegetation would occur. There are relatively high numbers of this species in the local area and across the Newnes Plateau. This is explained further in Section 9.3.2 below.

Corridors and Habitat

The Project Application Area is located within the Newnes State Forest. This area and its surroundings, for a distance of greater than 2km in any direction, contains continuous native vegetation which is broken only by occasional fire trails. Native vegetation is periodically selectively logged but there are no areas of clear-felling. The habitat linkages throughout the Project Application Area and surrounding area are in excellent condition.

Habitat within the Project Application Area comprises:

- Open forest communities (habitat for terrestrial mammals, small marsupial mammals and rats, common woodland bird species and reptiles);
- Swamp heath (providing resources for nectivorous mammals and birds and a range of common reptiles and amphibians);
- Canopy tree species and understorey proteaceous shrubs (foraging for a range of faunal guilds, including arboreal mammals, bats and birds);
- Hollow-bearing trees (providing roosting and nesting habitat for hollow-dwelling microchiropteran bat species);
- Roosting and den habitat for cave dwelling species; and
- Cleared areas provide foraging habitat along the ecotone between cleared and forested areas (such as for hunting by owls and microchiropteran bat species).

Fauna

Three species of macropod were observed within the Project Application Area *Macropus rufogriseus* (Red-necked Wallaby), *M. giganteus* (Eastern Grey Kangaroo) and *Wallabia bicolor* (Swamp Wallaby) and signs of *Vombatus ursinus* (Common Wombat) were encountered frequently during field surveys.

Two arboreal mammal species were recorded during spotlighting *Petauroides volans* (Greater Glider), *Pseudocheirus peregrinus* (Common Ringtail Possum). In addition, one Eastern Pygmy Possum (*Cercartetus nanus*), a species listed as vulnerable under the TSC Act 1995 was captured just outside

(approximately 120m) the Project Application Area boundary. This species is known to occur throughout the Newnes Plateau.

One microchiropteran bat species was positively identified, *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat – TSC Act: Vulnerable). Six further species of microchiropteran bats were previously identified through surveys undertaken in 2010 *Chalinolobus dwyeri* (Large-eared Pied Bat), *Chalinolobus morio* (Chocolate Wattled Bat); *Falsistrellus tasmaniensis* (Eastern False Pipistrelle); *Rhinolophus megaphyllus* Eastern Horseshoe Bat); *Saccolaimus falviventris* (Yellow-bellied Sheathtail Bat); *Vespadelus darlingtoni* (Large Forest Bat); and *Vespadelus regulus* (Southern Forest Bat).

The Blue Mountains Water Skink is listed as Endangered under the TSC Act and Endangered under the EPBC Act. Targeted and opportunistic searches for *Eulamprus leuraensis* (Blue Mountains Water Skink) were undertaken. Only a number of common skink species were recorded, including two species related to *Eulamprus leuraensis*, namely, *E. heatwolei* (Yellow-bellied Water Skink) and *E. quoyii* (Eastern Water Skink). The swamp areas are not considered to be suitable habitat for the Blue Mountains Water Skink (further discussion is provided in Appendix 9.1, 3.3.5).

9.3.2 Construction Impacts and Consequences

Aquatic

The Wolgan River and its contributing drainage lines and a small stream are within the Subsidence Assessment Area. As negligible subsidence resulting from the underground roadways is predicted (Section 9.16), there are not anticipated to be impacts on the surface aquatic environment. This is explained in further detail within the Subsidence Prediction and Impact Assessment (refer Appendix 9.16).

Whilst there are small streams and drainage lines within the Project Application Area, none are located within the areas proposed for vegetation clearance (17.3ha) as these are located on ridgelines rather than midslopes or gullies where no streams or drainage lines occur. Adequate sediment and accidental spill controls would be required and such measures are identified in the Surface Water Assessment (Section 9.4).

Flora

The area of vegetation clearance associated with the proposed infrastructure would be approximately 17.3ha comprising approximately 15ha of native vegetation. None of the vegetation communities to be impacted upon mapped within the Project Application Area correspond to any EECs as listed within the TSC Act 1995 (or EPBC Act 1999).

The clearance would result in the removal of up to approximately 1,269 individual Persoonia hindii plants (this would apply to the powersupply line along the western side of Sunnyside Ridge Road). By constructing the powerline along the eastern side of Sunnyside Ridge Road fewer individual plants would be lost, at approximately 1,180. The local population is estimated to consist of approximately 12,420 to 13,688 individual plants (depending on the approach taken – see Appendix 9.1, 3.1.2). Therefore this represents the removal of an estimated total of 9.3 to 10.2% of the known local population (based on the project proposed). Amendments to the design of the project during the EA process have resulted in avoiding the loss of significantly higher numbers of Persoonia hindii and this is described in detail in Appendix 9.1. Due to the remaining existence of over 11,000 individual plants in the local population and the removal of approximately 1,269 plants the project is considered unlikely to have an adverse effect on the ongoing viability of this species. There is potential for cumulative effects on *Persoonia hindii* resulting from loss due to a number of projects and activities in the area and this is addressed in Section 9.21. Mitigation measures for the project are identified below at Section 9.3.4.

The narrow, linear area of infrastructure works is not expected to disrupt or isolate any vegetated areas or disrupt any corridors allowing flora or fauna species or propagules to freely travel within the area.

Other potential impacts during construction of the project may include the introduction or spread of weeds or pathogens from construction plant and machinery and reduction in aquatic biodiversity from increased sedimentation of surface waters. The direct and indirect impacts to biodiversity are described in the section below.

Groundwater Dependent Ecosystems

The groundwater assessment (Section 9.5) reports that because the project is expected to have no impact on the groundwater aquifer levels that feed the swamps, there is not expected to be an impact from the underground roadways on GDEs. Therefore, there would be no adverse subsidence related impacts on the shrub and hanging swamps within the Subsidence Assessment Area.

For impacts from the proposed infrastructure, the design of the project has been revised during the EA process to avoid and minimise such impacts and buffers of at least 50m around the Hanging Swamp and the two potentially ecological significant areas (Figures 2.4 and 2.5; refer Section 9.3)) near the Ventilation Facility are proposed within which no disturbance to vegetation or works would take place. These areas would be protected from changes in water quality and quantity (such as from run off) through mitigation such as the sediment control and runoff measures identified in the Surface Water Assessment (Section 9.4). Whilst it is desirable to have as large a protective buffer as possible, a buffer of at least 50m exceeds the minimum reference of 40m identified in the WMA, and is informed by past experience of OEH's requirements for similar buffers.

The areas of identified GDEs MU50 and MU51 within the Project Application Area are relatively small at 0.38ha and 6.57ha respectively. Therefore, it is likely that the negligible impacts on these communities would not cause an adverse effect on the extent of the community such that their local occurrence is likely to be placed at risk of extinction.

Threatened Species Assessment

The project is considered unlikely to cause a significant adverse effect upon threatened species recorded within the Project Application Area or those which may potentially occur within it on an intermittent basis.

9.3.3 Operation Impacts and Consequences

Potential impacts during operation are stormwater runoff such as from the roof of the substation or the concreted surfaces, minor land disturbances, noise from the substation and Ventilation Facility and potential weed invasion into disturbed land and land surrounding the infrastructure.

9.3.4 Mitigation

Measures identified for the Surface Water Assessment, Rehabilitation Strategy and the Soil and Land Resources Assessment (Sections 9.4, 9.6 and 9.7 respectively) will be implemented to protect flora and fauna. In particular, such measures are the regrading and erosion and sediment controls for the Ventilation Facility, management and monitoring of the sedimentation ponds, harvesting of site runoff, the employment of soil stripping and handling techniques, an inventory of detailed soil resources and bunding of chemical and fuel storage areas.

The mitigation measures are as follows:

- Mitigation and management for *Persoonia hindii* will comprise:
  - » Seed collection and seed banking from plants/populations of *Persoonia hindii* that are identified for removal. This will be undertaken once relevant scientific approval has been granted. This may include the deposition of collected seeds in the NSW Seedbank at the Royal Botanic Gardens or the NSW Seedbank of Greening Australia. This approach assists in the conservation of the genetic pool held by the plants proposed for removal, may allow for their future propagation and therefore reduces the overall impact on the species.
  - » Translocation of plants / populations of *Persoonia hindii* that are scheduled for removal. This will only be undertaken once relevant scientific approval has been granted. Undertaking a 'salvage dig' of mature plants is often seen as being the least effective method of translocation (Vallee et al., 2004). However, in this situation where plant removal is unavoidable, it is considered an appropriate mitigation measure provided that adequate care is taken during the salvage dig and that translocated populations are monitored after re-establishment. Possible sites for the re-establishment of *Persoonia hindii* include other areas within 1km that already contain lower densities of the species (thus may contain unexploited habitat niches). Specific locations will be identified if this approach is approved by relevant authorities. Observations of this species growth habit could also be undertaken at the same time.
  - » Direct management of residual populations adjoining the Project Application Area in consultation with stakeholders and the landowner (Forests NSW). This includes undertaking weed management near populations of *Persoonia hindii* that may be threatened by weed invasion and an increased awareness of populations adjacent to road verges that could be impacted upon by roadworks on the Newnes Plateau (through consultation with Forests NSW) or working with other parties (e.g. Forests NSW, NSW Rural Fire Service) to ensure that appropriate fire regimes (at intervals of 5-50 years; considered the appropriate fire frequency for dry sclerophyll shrub/ grass forest after Kenny et al., 2004) occur, rather than very frequent fire which has the potential to reduce the abundance of *Persoonia hindii* across the Newnes Plateau. This will also include specific measures such as project staff training, specific inclusion of this issue in the CEMP (or any other applicable management plan for the project), and inductions for construction staff that includes specific education on protecting this species.
  - » A desktop review of the status of records other than those collected by RPS or that are within the NSW Atlas of Wildlife will be undertaken. These may include but are not limited to herbarium specimens within the Royal Botanic Gardens Sydney and other herbariums along with records of *Persoonia hindii* from other field surveys, for example those held by Forests NSW and from within the OEH YETI database;
- The minimum amount of vegetation clearing will take place;
- A Centennial Angus Place Pty Ltd Environmental Representative or Ecologist will be present to supervise vegetation clearing to ensure fauna is handled appropriately;
- Appropriate measures will be employed to ensure that machinery working within the Project Application Area does not bring materials (soils etc.) onto the sites that may infect onsite vegetation with *Phytophthora cinnamomi* or Myrtle Rust fungus;
- The Hanging Swamp to the west of the Ventilation Facility will be protected by a buffer of at least 50m within which no works and no disturbance to native vegetation will occur and the boundaries of the buffer zone will be physically marked and inspected during construction by Angus Place Colliery personnel;
- Ongoing weed monitoring to be instituted and potential weed infestations appropriately managed to ensure surrounding communities (particularly hanging swamps and shrub swamps) are protected from invasive species;
- The two areas of significant ecological value to the north of the Ventilation Facility identified in the Flora and Fauna Assessment (refer Section 9.3) will be protected by a buffer of at least 50m within which no works will occur and the boundaries of the buffer zone will be physically marked and inspected during

construction by Angus Place Colliery personnel;

- Training regarding the buffer zones will be provided to all personnel engaged at the relevant sites; and
- Minor land disturbances during operation will be subject to the same mitigation measures that are implemented for the construction stage as identified above.

9.3.5 Residual Consequences

There would be a loss of vegetation, including native vegetation, a portion of which would be harvested by forestry as intended. The loss of native vegetation would include the loss of *Persoonia hindii* plants that are listed as an endangered flora species under the TSC Act. Rehabilitation of the sites following decommissioning would be undertaken in accordance with the Rehabilitation Strategy (refer Section 9.6).

An application to OEH for a Section 91 Licence under the TSC Act would need to be made for the seed collection and translocation of *Persoonia hindii* as identified as mitigation in Section 9.3.4 above.

9.4 Surface Water

GHD prepared a Surface Water Assessment and an Updated Water Balance Assessment for the project and this is provided in Appendix 9.2. The key findings are outlined below.

9.4.1 Existing Situation

The Wolgan River passes through the western part of the Project Application Area and within the Subsidence Assessment Area. There are four unnamed tributaries from this river to the west of the Project Application Area. Carne Creek and two unnamed tributaries are to the east of the Project Application Area (Carne Creek is sometimes referred to as the Wolgan River (Eastern Branch). Marrangaroo Creek, a tributary to the Coxs River, and three unnamed tributaries are to the south of the Project Application Area.

Angus Place Colliery has five LDPs. Only LDP001 which discharges to Kangaroo Creek to the west of the Project Application Area which then flows to the Coxs River would potentially be affected by the project. EPL 467 sets the discharge limits for LDP001.

Water quality monitoring is conducted by Angus Place Colliery including the Wolgan River, East Wolgan Stream, Sunnyside Swamp and Marrangaroo Creek. Samples for pH, electrical conductivity and metals are collected on a monthly basis. Water quality monitoring results from January 2006 to June 2011 indicate the following:

- pH: The Wolgan River, East Wolgan Stream, Sunnyside Swamp and Marrangaroo Creek have mean pH values of 7.2, 7-8.3, 6.8-7 and 5.9 respectively;
- Electrical conductivity: Generally the electrical conductivity observations were below the default ANZECC trigger value for all sites except the East Wolgan upstream site which was consistently above the default trigger value. The minimum observation value for this site was 664 µS/cm compared to minimum values of below 60 µS/cm for the other sites;
- Iron: The observed values for Total Iron were almost exclusively in excess of the ANZECC guideline value which may be as a result of the iron content in surface runoff from the natural soils; and
- Manganese: Filtered Manganese and Total Manganese results showed 99.8% of observations were below the 95% species protection trigger of 1.9 mg/L at all sites.

The detailed results of this sampling are included in the Surface Water Assessment (Appendix 9.2).

9.4.2 Construction Impacts and Consequences

Potential impacts on surface water include those associated with:

- Increase in run-off;
- Soil erosion;
- Change in water quality resulting from sediment export;
- Mobilisation of spilt materials and leaks from chemical and fuel storage areas;
- Seepage from the sediment ponds into underlying strata. This would be limited by the bentonite slurry that would quickly seal any seepage path; and
- Ingress of drilling fluids into the adjacent rock strata.

An increase in run off rates or volume from the Ventilation Facility during construction could affect the hanging swamp and the two significant ecological areas (refer Section 9.3) and therefore detailed mitigation measures are identified below.

Spoil from the blind boring would be stored at the stockpile identified on Figure 4.1 and mitigation measures involving any fine material or bentonite being mobilised to the sedimentation pond in the event of rain are identified below.

There would be approximately 0.5ML per day of groundwater make from the proposed trial mining and this would be discharged to surface water systems through LDP001. This water from the construction of the proposed underground roadways would be discharged as part of the normal site mining operations through LDP001 and within the limits identified in EPL 476.

Trenching, as would be undertaken for the power supply, can lead to interception of groundwater and transportation of intercepted water along the trench. This is unlikely to be significant although mitigation is identified below.

9.4.3 Operation Impacts and Consequences

There would be an increase in the peak rate of runoff from the Ventilation Facility, the access track, the switchyard and the substation sites.

The change in runoff rates or volumes from the Ventilation Facility could potentially change the sensitive ecosystem structure of the hanging swamp and two significant ecological areas, causing either erosion within the areas or sediment deposition within the areas as a direct result of the change in runoff rates. A change in the long term runoff volumes would also be likely to change the ecosystem through a modification to the existing soil moisture regime. A change in the water quality resulting from sediment export off the Ventilation Facility would be most likely to result in sediment deposition within the sensitive ecological areas. Detailed mitigation measures are identified below.

Along the power supply line route of ESA1, 2 and 3 operational activities could result in additional compaction of the soils due to the increased vehicular traffic or the trench and the redirecting or intercepting surface flows and very shallow groundwater movements. There may be an increase in the peak rate of surface runoff.

To mitigate potential run off impacts to Carne Creek, tributaries to Marrangaroo Creek and tributaries to the Wolgan River, a number of measures are identified below. There may remain some hydrologic impact at the boundary of individual work areas for extreme rainfall events larger than the design events.

From a water quality perspective, there may be formation of localised soil erosion in areas that are disturbed and prior to stabilisation and mobilisation of fine material on the track surface and any spilt materials.

Toilets would be chemical facilities and no effluent would be produced.

Overall, GHD considers that as the project is located mainly along a ridgeline and not crossing significant waterways, the impacts, without mitigation measures, are generally predicted to only affect areas close to the proposed works. With the implementation of the mitigation measures identified below water quality and quantity impacts on the Wolgan River, Carne Creek and Marrangaroo Creek would not be significant and would be within the natural variability of the existing water quality data and flow data.

9.4.4 Mitigation

The following measures are to reduce runoff from the Ventilation Facility:

- The Ventilation Facility will be graded to enable surface runoff to drain toward the south east corner so that surface water is directed away from the hanging swamp located to the west of the site. The runoff water will pass into a sedimentation pond to retain sediment loads on site;
- The Ventilation Facility will be constructed as a sloping pad through the undertaking of balanced cut to fill earthworks. The works will include the formation of a pad that is graded downward from the north western corner toward the sedimentation pond at the south east corner. This grading will direct surface runoff away from the Wolgan River;
- Appropriate erosion and sediment control measures will be implemented in accordance with Figure 7.1 Concept Erosion Control Plan from the Surface Water Assessment for the project;
- Surface runoff water from the sedimentation pond in the boring processes will be reused on site;
- Waste from site will be trucked to appropriate off-site disposal locations;
- Management plans will be developed prior to undertaking the construction works so that techniques and practices will minimise potential adverse impacts on water including the monitoring of the sedimentation pond;
- As much surface runoff as practical will be diverted around any uncovered stockpiles of granular materials stored at the Ventilation Facility during the construction period to minimise the potential for erosion and transport of those materials to the sedimentation pond;
- The detailed measures to mitigate runoff volume to the hanging swamp comprising a diversion drain, stabilising disturbed areas and sediment basins as identified in the Surface Water Assessment for the project will be implemented;
- A recharge system will be provided to replace any loss of infiltration into the catchment area of the hanging swamp by recharging with water extracted from the sedimentation pond;
- During operation a management plan for the Ventilation Facility will be prepared to identify the management of the runoff from the site in accordance with the measures identified in the Surface Water Assessment for the project including the monitoring of the sedimentation pond; and

  Site runoff will be harvested from roofs and held in small storage tanks for use on site.

  The following measures are to mitigate runoff volume from the Ventilation Facility:

- The surface catchment draining to the hanging swamp will be identified by field survey;
- The reduction in the surface catchment area resulting from the grading of the Ventilation Facility that drains to the hanging swamp will be identified;
- The amount of reduced catchment infiltration will be identified for the catchment draining to the hanging swamp be evaluated using the reduction in catchment area draining to the hanging swamp and the

observed runoff rate discussed in Section 2.8 of the Surface Water Assessment for the project;

- Any reduction in the potential catchment infiltration in the catchment draining to the hanging swamp will be compensated by extracting supernatant from the sedimentation pond located in the Ventilation Facility and piping of a compensatory volume to the hanging swamp catchment area and releasing the compensatory volume onto the ground surface in a manner and at a rate that will not erode the catchment surface. A trial of the process will be undertaken to determine whether the supernatant would require further flocculation using gypsum, or an equivalent flocculating agent, to reduce the turbidity to an appropriate value prior to the water release being undertaken; and
- Implementation of the above process will be incorporated into the management plan for the Ventilation Facility so that a discharge is achieved in a weekly basis and the volume be quantified based upon the recorded rainfall in the preceding week.

Mitigation for other parts of the Project Application Area are:

- Development and implementation of a detailed erosion control plan in accordance with design guidelines such as those by Landcom, 2004 Managing Urban Stormwater: Soils and Construction Volume 1, 4th Edition March 2004 and DECC, 2008 Managing Urban Stormwater Volume 2E Mines and Quarries in accordance with the detailed measures identified in the Surface Water Assessment for the project ;
- Waste from site will be trucked to appropriate off-site disposal locations;
- For the substation, clean surface runoff from the site will be diverted around the facility through the use of clean water diversions and level spreaders to prevent flow concentration and erosion;
- The substation will be designed to minimise the concentration of flows;
- For the power supply measures will include restricting the spatial extent of vehicular movement to minimise soil compaction and the use of compacted clay bands (or equivalent barriers) to cut off or prevent flow along the trench where the longitudinal slope in the trench exceeds 8%;
- For the underground roadways, whilst no specific mitigation measures are proposed, a monitoring program, as described in the Subsidence Assessment for the project will be implemented to quantify the presence if an impact prior, during and for a period of two years post mining ingress is observed. Should any impact be observed then appropriate adaptive management measures will be implemented if considered necessary;
- The new access track will be designed to minimise the concentration of surface flows;
- Chemicals and fuels will be contained within bunded areas in accordance with AS1940 Storage and Handling of Flammable and Combustible Liquids. Spills will be managed in accordance with existing procedures;
- The existing surface water monitoring of the Wolgan River catchment will be continued as currently implemented; and
- Once construction period controls are implemented to mitigate water quality impacts, the measures will be regularly inspected and especially after daily rainfalls of 20 mm, or more, and works undertaken to maintain the implemented measures as soon as practical after the need for maintenance is identified.

9.4.5 Residual Consequences

There could still be an increase in the sediment export off the Ventilation Facility during the construction period in any rainfall event that exceeds the design capacity of the erosion control measures and the sedimentation basin.

With the implementation of the identified mitigation measures there would not be any quantifiable change in run off in the Wolgan River, Carne Creek or Marrangaroo Creek as a result of the project. As identified

above, there may remain some hydrologic impact at the boundary of individual work areas for extreme rainfall events larger than the design events.

There would be a minor increase in the flow discharged through LDP001.

9.5 Groundwater

Aurecon has prepared an Assessment of Hydrogeological Impacts and this is provided in Appendix 9.3. The key findings are outlined below.

9.5.1 Existing Situation

There are no listed groundwater bores in the vicinity of the Project Application Area that utilise the local groundwater. The closest significant groundwater use is at the village of Clarence, which is located over 20 km to the southeast and up dip. The distance to this site, and the hydrogeology of the Clarence groundwater resource, mean that activities in the Project Application Area would not have any impact on groundwater at Clarence village.

There are no known dykes or faults in the locality of the Ventilation Facility and the underground roadways that could affect permeability of the strata.

Sedimentary strata in the Western Coalfield generally comprise a varied sequence of interbedded rocks of differing grainsize and strength properties. This leads to layers of rock with a wide range of permeabilities that form a sequence of aquifers and aquitards/aquicludes in the overburden.

A series of aquifer zones in the overburden have been identified by CSIRO in their work for Springvale Colliery. Whilst it is not certain these zones also extend over Project Application Area, it is likely there will be some similarities. Figure 2.3 provides details of the inferred hydrogeological section from the CSIRO work.

There is no evidence of any major aquifers in the local sedimentary rock sequence in the Project Application Area. Most groundwater flow is generally in the horizontal direction along bedding planes, with some vertical flow occurring from the ground surface (infiltration), downward into the uppermost water bearing zone. A very limited volume of groundwater may also flow vertically from one water-bearing zone to another, depending on the magnitude of the permeability of the intervening strata and the degree of vertical jointing and faulting in the system. At Angus Place Colliery, the Mount York Claystone, which underlies the Banks Wall Sandstone, forms a low permeability barrier to this vertical infiltration, so that most of the natural groundwater flow occurs above this horizon. The general flow direction in the strata in this region is sub-horizontally towards the northeast, away from the subcrop zone, where recharge to the aquifers can occur. This potential recharge zone is located to the west and southwest of the existing workings and the Project Application Area.

The assessment by Aurecon has been informed by groundwater monitoring that has been undertaken at the Newnes Plateau since 2002. Three collieries on the plateau have established a network of groundwater observation bores for monitoring and the following installations are used:

- Swamp piezometers - there are eleven in the current Angus Place Colliery area and a further five to the north of the Project Application Area;
- Aquifer piezometers – there are two in the current Angus Place Colliery area and a further eleven adjacent to and north of the Project Application Area; and
- Multilevel piezometers – there are nine adjacent to and north of the Project Application Area.

A number of stream flow monitoring sites are also used to measure surface water flows.

Water chemistry data obtained from the nearest swamp piezometer (SS5) located at the adjacent Springvale Colliery between 2011 and 2012 shows the following:

- Salinity is low, as shown by the low conductivity, chloride and sulphate;
- Alkalinity is low due to acidic conditions in the wetland, as shown by the low pH;
- Nutrients (nitrate and total nitrogen) are high, indicating accumulation of organic matter from catchment runoff and decomposition within the wetland;
- Dissolved oxygen is just above the minimum recommended for ambient waters, probably due to consumption by the decomposing organic matter. Organic matter decomposition is also consistent with the low pH; and
- Trace metals are high, particularly iron and aluminium which are abundant in the groundwater in the area. Lower, but still enriched, levels of zinc and copper are also present in the groundwater.

9.5.2 Construction Impacts and Consequences

Subsidence from the proposed underground roadways is expected to be less than 20mm which is negligible (Section 9.16). With such a low level of vertical subsidence, accompanying movements and strains, in both the surface and subsurface, including cracking, tilt, valley bulging, valley closure, and far field movements, would be effectively undetectable. Therefore, there would not be an impact on groundwater from subsidence due to the underground roadways.

The limited mining-induced ground movements predicted in the Subsidence Assessment indicates that there would be no change in water chemistry expected as a result of mining of underground roadways.

Groundwater in the coal seam and in the overlying strata in the immediate vicinity of the underground roadways would drain into the workings. The extent of vertical drainage is expected to be very limited and no more than a few metres of surrounding strata over the roadways is likely to be affected. Drainage from the coal seam would extend laterally further from the underground opening, due to the slightly higher permeability in the coal seam (Figure 9.1). However the seam is already partly drained as a result of existing longwall extraction in the area and any additional drainage would be negligible. Therefore the proposed underground roadways are unlikely to produce any significant further reductions in the groundwater pressures, except in the strata immediately overlying the underground roadways. The proposed mining of underground roadways is expected to generate up to 0.5ML/day of water which would be discharged via LDP001. This would be within currently permitted limits and further information is provided in the Surface Water Assessment (Section 9.4 and Appendix 9.2).

It is not anticipated that there would be any short or long term impacts on aquifers as a result of the mining of underground roadways. There would be no impact on the quantity or quality of natural groundwater outflows to the Wolgan River or Carne Creek from the proposed underground roadways (refer Appendix 9.3).

The project is not expected to have an impact on the aquifers that feed the GDEs in the Project Application Area.

The installation of the services, including the power supply along Sunnyside Ridge Road, would not have an impact on groundwater, due to the area having a topographically elevated location and the lack of GDEs.

There are no registered water bores and no groundwater users in the vicinity of the Project Application Area and therefore there would be no impact on third parties.

The proposed shafts and bores would intersect aquifers and aquicludes in the overburden. A geotechnical trial bore would be undertaken at the shaft site to investigate geotechnical and hydrogeological conditions

prior to construction. This borehole would allow collection of valuable site-specific data that would aid in planning and construction. In particular, testing of the hydrogeological properties of the strata would be an important component of the trial borehole. Packer testing, with additional pump testing of any aquifers identified, would refine the hydrogeological model and help in management of drilling fluids during construction.

The proposed shafts would potentially intersect any aquifers in the cover sequence and there may be an impact on the groundwater regime during construction. During blind boring of the proposed shafts, there would be negligible depletion of the groundwater during construction because the bores would be full of drilling fluid and they will be fully lined to ensure that groundwater aquifers are isolated from materials carried in the boreholes. Also the drilling fluids would be managed to balance hydrostatic pressures, so that there would be minimal opportunity for flow into or out of the borehole. Additives used during blind boring are identified in Section 9.20 Other Hazards. The water make from shaft construction is unlikely to add any significant volume to the discharge at LDP001.

There are no geological structures known in the area and the likelihood of intersecting an unknown structure is low. However, this would be confirmed during the trial mining.

The Surface Water Assessment (Section 9.4 and Appendix 9.2) reports that installation of underground cables along ESA1, 2 and 3 could lead to the interception of groundwater by the trench and transportation of the intercepted water along the trench without the implementation of mitigation works. This is unlikely to be significant with the trench being located so close to the divide between the two catchments.

9.5.3 Operation Impacts and Consequences

Once the shafts and bores are lined there would be no interactions with groundwater during the operational phase.

At end of mine life, the shafts and bores would be backfilled with impermeable material. This would ensure that there is no likelihood of continuing impact on groundwater after mine life. Rehabilitation would be carried out in accordance with the Rehabilitation Strategy in Appendix 9.4 which has taken into account the DRE requirements.

It is unlikely that there would be any regional impacts to the groundwater regime from the proposed underground roadways because of the very small amounts of stratal disruption and subsidence associated with their construction. A small envelope of groundwater around the mine openings (Figure 9.1) would drain into the workings, but current experience at Angus Place Colliery indicates that this is likely to be only tens of metres in extent. There would be no pathway established for drainage of upper aquifers into lower aquifers or the workings.

9.5.4 Mitigation

There would be a protective buffer of at least 50m around the hanging swamp near the Ventilation Facility as described in Section 9.3 Flora and Fauna Assessment and the detailed mitigation measures are identified in that section. Additional measures for groundwater are as follows:

- In the event of encountering an unidentified geological structure, leaky structures will be grouted and concrete plugs will be used;
- The steel/concrete lining of the shafts and bores will be maintained during the life of the project to eliminate any impact on groundwater as part of the maintenance regime; and
- During rehabilitation at the end of mine life, the shafts and bores will be fully backfilled with impermeable material placed at the level of any aquifer horizons intersected, and for 2m above and below the aquifer

interval, to ensure no leakage occurs.

9.5.5 Residual Consequences

With the implementation of the mitigation measures above there are unlikely to be significant residual impacts.

9.6 Rehabilitation Strategy

The Rehabilitation Strategy has been prepared by GSSE and is provided in Appendix 9.4.

Angus Place Colliery is required by DTIRIS, DRE where necessary to return any land disturbed due to exploration or mining activities to its pre-mining capacity. The proposed post mining use for the area associated with the project is State Forest. The Rehabilitation Strategy specifies techniques that would ensure that land capability, agricultural suitability and forestry values are re-instated. The final landform would only consist of very minor changes in topography of that which already exists at the Project Application Area. The changes in topography would be caused by minimal subsidence and the construction of infrastructure which requires a level surface.

There are existing rehabilitation objectives from conditions within the Project Approval. Rehabilitation would be undertaken for both the construction and operation stages of the project. Whilst some rehabilitation measures would occur during operation, most would be undertaken following the decommissioning of surface infrastructure. The largest footprint of land that would be disturbed is associated with the construction stage. The rehabilitation of this land would be undertaken immediately following construction, with the exception of land required for the operational stage.

Rehabilitation would be targeted to areas that cease to be used for mining or mining related activities as soon as practical. This would reduce the amount of disturbed land at any one time. Areas relevant to the project are those subject to direct surface disturbance and clearing as well as areas affected by subsidence. Progressive rehabilitation would include revegetation to control and stabilise the land.

Whilst the predicted subsidence from the proposed underground roadways is negligible (Section 9.16), a management approach is provided within the strategy for the rehabilitation of any subsidence impacts. This would be in accordance with Trigger Action Response Plans and a Subsidence Management Plan.

At mine closure the infrastructure components of the project would be fully rehabilitated. This would involve the removal of any physical items prior to the re-establishment of vegetation. At the substation site, there is currently a pine plantation and there is potential for this area to be planted with endemic species and returned to native forest. The cuttings from the shafts and boreholes would be tested to ensure they are within the required limits (as specified in NEPC, 1999) and if required would be either treated prior to use for rehabilitation or instead disposed of at a licensed facility.

The primary objective of the rehabilitation of infrastructure areas would be revegetation to stabilise all retopsoiled batters, road verges, drains, banks, and cleared areas. All revegetation works would be scheduled to commence as soon as practicable and where access permits. Disturbance of native vegetation would be kept to a minimum and clearing would be constrained to the footprint area of the infrastructure items.

The importance of appropriate soil identification, stripping and management practises for successful rehabilitation is recognised. The details of the proposed topsoil management are provided in Appendix 9.4 as they are for revegetation.

Areas of completed rehabilitation would be regularly inspected and assessed against the rehabilitation objectives following consultation with Forests NSW.

Regular monitoring would be undertaken of the rehabilitated areas during the initial vegetation establishment and beyond to demonstrate whether the objectives are being achieved and whether a sustainable, stable landform has been provided. Details of the monitoring are provided in Appendix 9.4. Rehabilitation success criteria are identified that are performance objectives or standards against which rehabilitation success in achieving a sustainable system for the proposed mine land use is identified. The monitoring results would be used to determine satisfaction of the criteria to demonstrate the rehabilitated land is ready to be relinquished and handed back to stakeholders in a productive and sustainable condition.

Regarding the potential for integrating the strategy with other rehabilitation and/or offset strategies for the region, rehabilitation of exploration activities is currently undertaken in the area of the project on the Newnes State Forest.

At present rehabilitation works have been carried out to ensure that the mine infrastructure and surface disturbance areas are stable and non-polluting. Exploration drilling undertaken within mining lease areas are appropriately rehabilitated once activities are complete.

Rehabilitation is currently undertaken in accordance with the current Angus Place Colliery Mining Operation Plan and in addition to the existing commitments the activities of the project that require rehabilitation include the following:

- Surface disturbance – from the proposed surface infrastructure; and
- Subsidence disturbance – from the underground roadways.

9.7 Soil and Land Resources Assessment

GSSE prepared the Soil and Land Resource Assessment and this is provided in Appendix 9.5. The key issues are summarised below. The AIS is presented separately in Section 9.18 below.

9.7.1 Existing Situation

The soil landscape units that occur within the Project Application Area (refer Appendix 9.5) are:

- Newnes Plateau (covering approximately 45%);
- Wollengambe (covering approximately 25%);
- Medlow Bath (covering approximately 20%);
- Mount Sinai (covering approximately 8%); and
- Deans Creek Variant 1 (covering approximately 2%).

A soil survey was undertaken for the Project Application Area (refer Appendix 9.5). Soil samples were analysed to classify soil taxonomic classes, determine agricultural and land capacity classes and determine suitability of soil as topdressing material. Three soil types were identified in the Project Application Area:

- Soil Type 1: Melacic, Dystrophic, Yellow Kurosol comprises approximately 55% of the Project Application Area. They are the dominant soils within the Subsidence Assessment Area and also underlie a large portion of the Ventilation Facility;
- Soil Type 2: Acidic, Paralithic, Yellow Orthic Tenosol comprises approximately 10% of the Project Application Area. They are the dominant soils within the power supply corridor and also underlie a portion of the Subsidence Assessment Area; and

Soil Type 3: Acidic, Paralithic, Red Orthic Tenosol comprises approximately 35% of the Project Application Area. This soil type is distributed throughout the entirety of the Project Application Area and underlies a large portion of the area intended for surface disturbance. All three soil types are suitable to be stripped and reused for rehabilitation purposes, where surface disturbance occurs. Figure 3 of Appendix 9.5 illustrates the distribution of soil types across the Project Application Area.

Land Capability mapping by the former Soil Conservation Service of NSW classifies land into eight classes ranging from Class I - suitable for regular cultivation, to Class VIII - unsuitable for rural production. The Land Capability Classes identified within the Project Application Area are Classes VI (land use suitable for grazing only) and VII (land use unsuitable for rural production).

The agricultural suitability system uses the land capability assessment as a basis and then incorporates other specific factors such as closeness to markets, cultural factors, land location and adverse market demand to determine the appropriate agricultural suitability class. It consists of five classes that rank rural lands according to their productivity for a wide range of agricultural activities with the objective of determining the potential for crop growth within certain limits. Classes range from Class 1 which is land most suitable for agricultural activities to Class 5 the least suitable. The land within the Project Application Area comprises Class 4 (not suitable for cultivation although can be used for grazing) and 5 Land (not suitable for cultivation with only a low to very low productivity for grazing).

9.7.2 Construction Impacts and Consequences

The post mining land capability and agricultural suitability classes of the Project Application Area are not predicted to change provided that the measures presented within the Rehabilitation Strategy are implemented (Section 9.6 and Appendix 9.4).

Construction of the project would cause disturbance to soil resources during vegetation clearance.

Where soil stripping and transportation is required, handling techniques are identified in Appendix 9.5 to prevent excessive soil deterioration. These are identified as mitigation below.

9.7.3 Operation Impacts and Consequences

Subsidence would potentially impact soils during operation, however subsidence is predicted to be negligible (refer Section 9.16). There would be only minor land disturbance associated with operational activities such as vehicle movements in addition to that occurring during construction.

9.7.4 Mitigation

The Rehabilitation Strategy for the project will be implemented and weed management actions will be undertaken as specified for the Flora and Fauna Assessment (refer Appendix 9.1). The following soil handling techniques will be implemented to prevent excessive soil deterioration in accordance with the Soil and Land Resources Assessment (refer Appendix 9.5) for the project:

- Topsoil will be maintained in a slightly moist condition during stripping. Material would not be stripped in either an excessively dry or wet condition;
- Grading or pushing soil into windrows and retained as stockpiles for future rehabilitation;
- The surface of soil stockpiles will be left in as coarsely structured a condition as possible in order to promote infiltration and minimise erosion until vegetation is established, and to prevent anaerobic zones forming;
- A 3m maximum stockpile height will be maintained;

- Stockpiles will be seeded and fertilised as soon as possible. A rapid growing and healthy annual pasture sward would provide sufficient competition to minimise the emergence of undesirable weed species. The annual pasture species would not persist in the rehabilitation areas but will provide sufficient competition for emerging weed species and enhance the desirable micro-organism activity in the soil;
- Prior to re-spreading stockpiled topsoil, an assessment of weed infestation on stockpiles will be undertaken to determine if individual stockpiles require herbicide application and / or "scalping" of weed species prior to topsoil spreading;
- An inventory of available soil will be maintained to ensure adequate topsoil materials are available for planned rehabilitation activities;
- Soil will be re-spread directly onto reshaped areas where practical. Where topsoil resources allow, topsoil will be spread to a nominal depth of 100mm on all re-graded land. Topsoil will be spread, treated with fertiliser and seeded in one consecutive operation, to reduce the potential for topsoil loss to wind and water erosion. Soil respreading on steep slopes at depths exceeding 0.1m can be deleterious because of the "sponge" effect which can cause slippage of the topsoil from the slope. Flat areas will be topsoiled at a nominal depth of 0.2m. Specific topsoil respreading depths for different post mining landform elements are specified in the Landscape Management Plan; and
- Seedbed preparation will be undertaken to ensure optimum establishment and growth of vegetation. All topsoiled areas will be lightly contour ripped (after topsoil spreading) to create a "key" between the soil and the spoil. Ripping will be undertaken on the contour. Best results will be obtained by ripping when soil is moist and when undertaken immediately prior to sowing. The respread topsoil surface will be scarified prior to, or during seeding, to reduce run-off and increase infiltration.

As discussed in Section 7.4.4, if the presence of contaminated land is suspected during the construction works, the appropriate investigations would be undertaken in accordance with Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC) and the NSW *Contaminated Land Management Act 1997*.

9.7.5 Residual Consequences

With the implementation of the mitigation measures above there are unlikely to be significant residual impacts.

9.8 Greenhouse Gas Assessment

SLR prepared the Air Quality and Greenhouse Gas Assessment which is provided in Appendix 9.6. The greenhouse gas assessment was prepared in accordance with the guidelines listed on page 9 of Appendix 9.6. The modelling methodology contains a number of assumptions which mean that conservative 'worst case' scenarios were modelled. Therefore, all predicted levels are likely to be lower than those modelled during standard operations. The key issues for greenhouse gas are summarised below.

9.8.1 Existing Situation

The following direct emissions (referred to as Scope 1) were considered by SLR:

- Fugitive emissions from the release of coal seam methane and carbon dioxide (CO_2) as a result of coal mining;
- Emissions from the combustion of diesel – mobile and fixed plant and equipment;
- Consumption of Sulphur Hexafluoride for gas insulated switchgear and circuit breaker applications; and
- Consumption of oils and greases.

The following indirect emissions (referred to as Scope 2) were considered by SLR:

- Emissions associated with the consumption of generated and purchased electricity at the site.

The following indirect emissions (referred to as Scope 3) were considered by SLR:

- Estimated emissions attributable to the extraction, production and transport of diesel consumed at the project site. Contractor or outsourced activities performed as part of the project activities;
- Estimated emissions attributable to the extraction, production and transport of oils and greases consumed at the project site;
- Estimated emissions from the extraction, production and transport of fuel burned for the generation of electricity consumed at the project site and the electricity lost in delivery in the transmission and distribution network;
- Emissions associated with the disposal of solid waste to landfill; and
- Emissions from the combustion of coal from the project (based on the limit of 4Mtpa and the assumed combustion of 100% of this).

9.8.2 Impacts and Consequences

Emissions of CO_2 and other greenhouse gas emissions have been quantified. They have been assessed in terms of direct (Scope 1) emission potential, indirect (Scope 2) emission potential and significant upstream/downstream (Scope 3) emission potential.

Direct (Scope 1) greenhouse gas emissions (CO2-e) resulting from the project are estimated to be 185 tonnes per annum. This plus the existing/approved colliery would be 76,146 tonnes per annum. No net increase in coal seam methane generation is anticipated as a result of the project.

Indirect (Scope 2) greenhouse gas emissions (CO2-e) resulting from project are estimated to be 13,877 tonnes per annum. This plus the existing/approved colliery would be 50,628 tonnes per annum.

Indirect (Scope 3) greenhouse gas emissions (CO2-e) resulting from project operations are estimated to be 2,674 tonnes per annum. This plus the existing/approved colliery would be 954,418 tonnes per annum. The increased emissions are due to increases in diesel and electricity consumption and combustion associated with the project. Whilst the coal extracted through trial mining would be approximately 709,575 tonnes, this would remain within the approved production limit of 4Mtpa and this quantity has been used in the assessment. Scope 3 emissions are likely to have occurred without the project and Angus Place Colliery has limited capacity to reduce these emissions.

Emissions of greenhouse gas in NSW were reported to be 161 million tonnes (Mt) in 2009 that represents 27% of the Australian total greenhouse gas emissions of 545.8Mt. The total emissions of 1,081,192 (tCO2-e/annum) from the existing/approved mine with the project represents 0.7% of the NSW 2009 greenhouse gas emissions total and 0.2% of Australian 2009 greenhouse gas emissions total.

Angus Place Colliery is currently implementing a number of measures to minimise to the greatest extent practicable greenhouse gas emissions from the Colliery, these are:

- Maximising energy efficiency as a key consideration in the development of the mine plan. For example, significant savings of greenhouse gas emissions (through increased energy efficiency) are achieved by mine planning decisions; and
- The Colliery has developed and implemented an Energy and Greenhouse Management System and monitors and reports energy usage at the Colliery. KPIs including energy demand and greenhouse gas emissions per tonne of ROM coal produced are tracked.

Additional measures that Angus Place Colliery is currently progressing include:

- Identify and implement cost effective measures to improve energy efficiency;
- Regular maintenance of plant and equipment to minimise fuel consumption; and
- Consideration of energy efficiency in plant and equipment selection.

Centennial Angus Place Pty Ltd is currently investigating, at a corporate level, the measures which may be taken to offset Scope 1 emissions from its operations. This work is ongoing with measures being investigated. Measures to reduce Scope 1 emissions would be implemented in response to the Clean Energy Futures Package of the Federal government.

For the project, energy efficiency has been considered extensively:

- The Ventilation Facility has been designed to maximise energy efficiency. By equipping the proposed fan with a variable speed drive system which runs at unity power factor (the power delivered to the fan is totally utilised with minimal losses) it is anticipated to save 56.19 MWh per year;
- A surface based power supply would minimise losses incurred by alternatives such as long term generator use or supply via the underground mine. Per average year it is estimated that up to 1040 MWh would be saved by extending the surface 66kV supply when compared to possible alternatives;
- By incorporating a Power Factor Correction Unit additional losses are reduced further when the 66kV extension supplies infrastructure other than the ventilation facility (such as the compressor units and the supply to the underground mine via the borehole). By installing this component, losses of up to 96MWh per year would be avoided;
- Service boreholes are designed to reduce the number of underground vehicle movements required to transport materials to the working areas. In turn it is anticipated that this would reduce the quantity of diesel used by underground vehicles in addition to energy from the operation of compressed air used for the underground pumping networks.

Mitigation measures will be included within the Construction Traffic Management Plan (Section 9.14) to minimise fuel use, given the recommended speed restrictions, defined hours of construction and onsite operating practices.

Efforts to reduce, mitigate and offset greenhouse gas emissions will continue through the implementation of the Centennial Coal Climate Change Policy by Angus Place Colliery. Measures include monitoring and benchmarking of emissions, with continued improvement achieved through energy efficient opportunities and technology innovations.

9.8.3 Residual Consequences

Whilst mitigation measures are identified above to minimise greenhouse gas emissions where feasible, emissions would remain largely as detailed above.

9.9 Air Quality

SLR prepared the Air Quality and Greenhouse Gas Assessment and this is provided in Appendix 9.6. The key issues for air quality are summarised below.

9.9.1 Existing Situation

Residential and recreational receptors are identified in Figure 9.2.

The nearest residential properties, of which there are six (R1 to R6), are located approximately 7.6 to 8.8km to the west to north west of the Project Application Area. Recreational receptors surrounding the Project

Application Area addressed in the air quality assessment include Bungleboori Picnic and camping site (R7), Birds Rock Lookout (R13) and Wolgan Falls (R14).

The types of emissions addressed in the assessment are carbon monoxide (CO), oxides of nitrogen (NO_X), particulate matter (PM_{10} and TSP), sulphur dioxide (SO_2), volatile organic compounds (VOC) and odour.

Air quality in the area is influenced by emissions generated from a range of sources such as traffic, emissions from power stations, pollution transported into the area from more distant sources and from the mine itself.

Angus Place Colliery currently undertakes air quality monitoring for PM_{10}, TSP and dust deposition. PM_{10} and TSP monitoring is undertaken in the vicinity of R1 which is one of the receptors identified for this project. Project Approval criteria for PM_{10} and TSP have been achieved during the three years of monitoring (refer Appendix 9.6).

Dust levels are monitored at eight locations around Angus Place Colliery. Dust deposition data from January 2001 to December 2011 for dust gauge D2 (which is located to the north east of the mine and is considered to provide the best measure of ambient dust deposition levels without the influence of local mining). Levels range from 0.5 to 2.5 and show an average of 1.3 (g/m^2/month).

Data from OEH's air quality monitoring stations has also been used in the assessment as there would otherwise be insufficient data for the assessment. The closest OEH air quality monitoring station is at Bathurst approximately 50km to the northwest of the Project Application Area. This station includes measurements of PM_{10}. The 24-hour average PM_{10} levels are found to be generally well below the NSW OEH guideline of 50 $\mu g/m^3$. One exceedance was reported although was linked to a dust storm.

Background concentrations of NO_2, SO_2, odour and VOCs are considered to be negligible given the rural location of the Project Application Area. In general the area comprises dense vegetation which acts to reduce wind speeds and the dispersal of air pollutants. The physical barrier afforded by this vegetation would also act to mitigate air quality impacts resulting from project construction and operation.

Predicted concentration levels of pollutants at each of the six residential receptors taking into account a range of emission sources including the existing/approved Angus Place Colliery, Wallerawang Power Station have been identified through dispersion modelling. The detailed results are provided in Appendix 9.6. These projects have the potential to affect background levels at the residential receptors identified for this assessment.

9.9.2 Impacts and Consequences

During construction, there are potential emissions of particulate matter including those from the use of construction equipment, activities and traffic. During operation, there are potential impacts from a back up diesel generator (particulate matter, NO_2, SO_2, CO, VOCs) and from the ventilation shafts (particulate matter, CO, odour).

Nominated project criteria specifying pollutant concentration levels have been determined by SLR against which the predictions for the change to pollutant concentration levels associated with the project are assessed.

For all pollutants assessed (particulates, NO_2, CO and VOCs) concentration and deposition levels at the nearest sensitive receptors are well below the nominated project criteria.

For odour, the level at which an odour is perceived to be a nuisance can range from 2 odour units (OU)/m^3 to 10 OU/m^3 depending on a combination of factors. Odour impacts from the project are predicted to be less

than 0.7 OU at all sensitive receptor locations compared to a criterion of 5 OU (the criterion is informed by the number of residential receptors). The potential for nuisance impacts associated with odour is negligible as the nearest residential receptor is over 7km away. Therefore the construction and operation of the project would have a negligible impact on air quality (including odour) at the residential receptors.

Consideration was also given to recreational receivers in the Newnes State Forest, specifically the Bungleboori picnic and camping area (R7), Birds Rock Lookout (R13) and Wolgan Falls (R14). Similarly to the residential receptors negligible impacts are predicted at these locations. SLR has advised that odour may be noticeable in the immediate vicinity of the Ventilation Facility and that forest vegetation would act as a buffer between the facility and those using Sunnyside Ridge Road near the site with receptors likely to be transient.

9.9.3 Mitigation

Measures such as dust suppression and limiting plant use will be included in the CEMP and monitoring will be continued under the existing Environmental Monitoring Program.

OEH's Dust Stop program aims to ensure that the most reasonable and practical particulate control options are implemented by each coal mine. The Dust Stop program is being implemented through pollution-reduction programs (PRPs) as operating conditions under the EPL. A PRP was issued to Angus Place Colliery in December 2011 requiring that a Site Specific Particulate Matter Control Best Practice Assessment be prepared for the site. Angus Place Colliery will investigate further air quality management measures to decrease air quality impacts from the project in conjunction with other site practises.

To ensure that emissions from the diesel generator are mitigated on the occasions when it is needed, it will be maintained in accordance with the manufacturer's maintenance requirements.

For mitigation of odour in the vicinity of the Ventilation Facility the existing forest provides a vegetative buffer. Such a buffer will be maintained during the operation of the Ventilation Facility.

9.9.4 Residual Impacts

Significant impacts from the project have not been identified. Provided that Angus Place Colliery continues to implement air quality management measures to decrease air quality impacts from the project in conjunction with other site practices there are not likely to be significant residual consequences.

9.10 Noise

SLR prepared the Noise and Vibration Assessment and this is provided in Appendix 9.7. The key issues are summarised below.

9.10.1 Existing Situation

The closest potentially affected residential receptors, six properties (R1 to R6) and eight recreational receptors (R7 to R14) have been considered (Figure 9.2).

Project noise criteria for Angus Place Colliery are established for residential receptors at R1, R2 and R3 in the Project Approval and the EPL 467 identifies limits to noise emissions at the same receptors. These criteria have been established in accordance with the Industrial Noise Policy (INP) based upon background noise levels plus 5dBA. The project noise criteria specified in the Project Approval are as follows:

- R1 – 42dBA during daytime, 38dBA during the evening and 36dBA during the night.

- R2 – 41dBA during daytime, 37dBA during the evening and 35dBA during the night.
- R3 - 44dBA during daytime, 40dBA during the evening and 35dBA during the night.

Potentially affected receivers R4, R5, R6 and R7 to R14 have not been identified in either the Project Approval or the EPL. Project specific noise criteria of 35 dBA has been adopted at residences R4, R5 and R6 for the day, evening and night-time periods to provide a conservative assessment approach. The acceptable amenity criterion of 50 dBA for a passive recreational area has been adopted for R7 to R14 in accordance with the INP.

9.10.2 Construction Impacts and Consequences

During construction, there is potential for noise due to activities such as site preparation and clearance, drilling of the ventilation shafts, construction of foundations, installation of the fan structure and ducting, connection to the shaft and commissioning within the Ventilation Facility. Construction activities would be undertaken 24 hours a day, 7 days a week and this has been subject to noise modelling. The need for undertaking construction outside standard hours, as identified in the Interim Construction Noise Guidelines, is outlined in Section 4.10.

The Interim Construction Noise Guidelines identify management levels. For residences, the recommended standard hours are Monday to Friday 7am to 6pm and Saturday 8am to 1pm and no work on Sundays or public holidays. The management level for standard hours is the background level plus 10dBA. Outside recommended hours the Interim Construction Noise Guidelines recommends a noise management level of background plus 5dBA. The construction noise management levels for the project have been established in accordance with the Interim Construction Noise Guidelines based on the existing operational noise criteria. The proposed construction plant and equipment noise levels were generated from a database of sound power levels (Appendix 9.7, page 23).

For the recreational receivers, the management level specified in the Interim Construction Noise Guidelines is 60dBA for a passive recreation area.

The nearest potentially affected residential receivers are located over 7km from the Project Application Area. The predicted construction noise levels at the six residential receptors are less than 20dBA during the daytime, evening and night time and are therefore well below the project specific construction noise goals during daytime, evening and night time periods.

The predicted construction noise levels at the recreational receivers range from less than 20 to 29dBA during the daytime, evening and night time and are therefore well below the construction noise goals as specified in the Interim Construction Noise Guidelines during the daytime, evening and night time periods.

Given that the predicted noise levels the potential for noise impact from 24 hour construction is negligible, from a noise perspective, SLR considers there is no reason for restrictions on construction outside of standard hours.

Based on the road traffic movements predicted in the Traffic Impact Assessment (Section 9.14 and Appendix 9.10) SLR does not anticipate any additional road traffic noise impacts due to the construction of the project.

Taking into account the minimum distance of the residential properties from the construction works at over 7km, vibration levels are predicted to be negligible and below levels of human perception at the nearest residential receivers.

9.10.3 Operation Impacts and Consequences

The Project Specific Noise Criteria for R1, R2 and R3 are specified in the Project Approval as identified above. Potentially affected receivers R4, R5 and R6 are not identified in either the Project Approval or the EPL. Therefore, project specific noise criteria of 35 dBA has been adopted at these residences R4, R5 and R6 for the day, evening and night-time periods to provide a conservative assessment approach. The acceptable amenity criterion of 50dBA for a passive recreational area has been adopted for R7 in accordance with the INP.

During operation, there would be acoustically significant plant and equipment at the Ventilation Facility including a centrifugal surface ventilation fan, substation, diesel back up generator(s) and an air compressor. The 66kV/11kV substation would also be acoustically significant.

Noise emissions from the equipment associated with the project are predicted to be significantly below the Project Specific Noise Criteria at the nearest potentially affected residential and recreational receivers under calm, prevailing and temperature inversion meteorological conditions.

For recreational users of the State Forest, the acceptable amenity criterion of 50 dBA for a passive recreational area would be met at distances of approximately 550m and 700m from the Project Application Area under calm and prevailing meteorological conditions respectively. There is a small area of Sunnyside Ridge Road to the east of the Project Application Area which is predicted to experience small exceedences of the project specific noise criteria for a passive recreational area. Noise would potentially be noticeable close to the Ventilation Facility including a short section of Sunnyside Ridge Road. SLR notes that the road is promoted for use as a 4WD route and noise impacts on potential users are considered insignificant

Due to the predicted minor traffic generation during operation (Section 9.14 and Appendix 9.10), SLR does not predict any additional road traffic noise associated with the operation of the project.

9.10.4 Mitigation

The following mitigation measures are considered to be reasonable and feasible given the negligible impacts:

- The following ‘quiet work’ practices will be implemented for the Ventilation Facility:
  - Workers at the site will be regularly trained (i.e. toolbox talks) to use the equipment in ways that minimise noise.
  - Mobile plant will be operated in a quiet, efficient manner.
  - Plant and equipment will be well maintained including:
    - Regular inspection and maintenance of equipment to ensure it is in good working order.
    - Equipment will not be operated until it is maintained or repaired.
  - For equipment with enclosures (i.e. compressor rooms) it will be ensured that doors and seals are well maintained and kept closed when not in use;
- Noise monitoring on site and within the community will be continued in accordance with the Angus Place Noise Monitoring Program (refer Heggies Report 30-1942-R2 *Angus Place Colliery Noise Monitoring Program* dated 15 December 2008);
- Onsite noise mitigation measures and plant operating procedures will be refined where practical;
- Clear signage at the site including relevant contact numbers for community enquiries will be provided; and
- Community issues of concern will be addressed promptly.

9.10.5 Residual Consequences

There would remain an exceedence of the project specific noise criteria for a passive recreational area around the Ventilation Facility during operation. This includes a short section of Sunnyside Ridge Road that is promoted as a 4WD route.

9.11 Bushfire

Australian Bushfire Protection Planners Pty Ltd (ABPP) prepared the Bushfire Risk Assessment and a copy is provided in Appendix 9.8. The key findings are outlined below.

The project is located in a bushfire prone area. During the EA process ABPP identified the Asset Protection Zones that would be required and these were incorporated into the project as described in Section 4. As Asset Protection Zones require clearance of vegetation and maintenance of that clearance, the addition of these areas to the Project Application Area enabled assessment by other technical assessments such as for flora and fauna.

The proposed infrastructure is located on top of a series of ridgelines which are exposed to strong to gale force winds from the northwest, west and southwest. These winds, combined with the forest vegetation and steep topography of the landscape, produce circumstances where catastrophic bushfire events will occur.

Construction of the Ventilation Facility and associated infrastructure may present a short term threat of ignition of adjoining unmanaged forest vegetation, resulting in a risk to forestry assets and the broader community.

During operation of the Ventilation Facility, substation and switchyard, site operations such as cutting, grinding, welding and inappropriate storage/use of materials that may be subject to spontaneous combustion can cause the ignition of unmanaged vegetation within and external to the Ventilation Facility, substation and switchyard compounds and associated facilities.

The bushfire risk associated with an overhead line is greater than for an underground installation. Originally Centennial Angus Place Pty Ltd were to propose either an over or underground line, however during the assessment process it was determined that a buried (trenched) power supply line only be proposed (except for where the trenched supply connects to the existing overhead line). There is potential for the overhead connection to be destroyed by bushfire. Lightning strikes to poles and aerials can also provide a bushfire ignition source and pole fires can occur during periods of dry weather.

The substation site at ESA7/ESA8 comprises an area of remnant *Pinus Radiata* plantation located to the west of Sunnyside Ridge Road on land which falls gently to the north. This former plantation is surrounded by Dry Sclerophyll Forest vegetation with the topography of the land to the west falling at more than 18 degrees into the Wolgan River Valley. The terrain and vegetation to the west has the potential to create bushfires with a calculated tilted flame length of 50m, measured from the edge of the unmanaged forest vegetation, west of the perimeter track to the plantation. As stated in Section 4, the minimum separation between the equipment and the bushfire prone vegetation to the west of the perimeter track would be 50m and 25m to the north. There would be a separation of 25m to the east with the compound located in the north-eastern corner of the former plantation site. Also, the *Pinus Radiata* would be removed and the area of the former plantation managed as an Asset Protection Zone.

The proposed Ventilation Facility within ESA9 is exposed to uphill fire paths from the north, northwest, west and southwest with an open exposure to wind turbulence from the Wolgan River Valley. The site is unsafe during fire events in the local area with the means of escape via Sunnyside Ridge Road not providing a safe egress. ABPP has advised that this will need to be addressed in operational procedures and evacuation

planning. As stated in Section 4, the demountable buildings, maintenance sheds and compressors would have a minimum setback to unmanaged vegetation from these structures of 40m.

The site for the proposed switchyard, ESA6, is exposed to uphill fire paths from the northeast and southwest with an open exposure to wind turbulence from the surrounding valley systems. ABPP has advised that the site would be unsafe when occupied during fire events in the local area with the means of escape via Sunnyside Ridge Road and Blackfellows Hands Road not providing a safe egress. This will need to be addressed in operational procedures and evacuation planning. The minimum setback to unmanaged vegetation is 50m to the northwest and southwest and 25m to the northeast and southeast. These recommendations from ABPP have been incorporated into the project.

Regarding the proposed access track at ESA5 to the Ventilation Facility, design measures are specified as mitigation below in order to accommodate fire fighting vehicles.

Design measures for water supplies, protocols for emergency management and bushfire hazard management are identified as mitigation below.

9.11.1 Mitigation

Ventilation Facility

- Operational procedures and evacuation planning will be prepared in order to address the unsafe location of the site and unsafe access/egress;
- The provision of a Helipad within or, in close proximity to, the Ventilation Facility will be investigated;
- The site will not be manned during Total Fire Ban days and catastrophic fire weather days;
- All 'hot work' within the site will be assessed and monitored to determine the risk of ignition of surrounding unmanaged vegetation;
- In order to reduce the risk of flame contact on the structures i.e. office block, maintenance sheds and compressors, the minimum setback to unmanaged vegetation from these structures will be 40m;
- In order to minimise the ignition of the structures by burning embers the structures will be constructed to Bushfire Attack Level (BAL) 40 in accordance with A.S. 3959 – 2009;
- The whole of the site will be managed as an Inner Protection Area (IPA) as defined by the NSW Rural Fire Service's 'Specifications for Asset Protection Zones';
- A 'back-to-base' radio network will be installed in the Office Building, complete with either back-up power or solar power supply;
- All vehicles will be equipped with a two-way, back to base radio system; and
- At least one building within the site will be constructed and equipped as a safe refuge, capable of protecting occupants against ember and smoke impact (refer to Performance Standards for Private Bushfire Shelters, ABCB, 2010).

Substation Site ESA 7 and ESA 8

- Operational procedures and evacuation planning will be prepared in order to address the unsafe location of the substation site and unsafe access/egress;
- The substation equipment will be located within the north-eastern corner of the site, adjacent to Sunnyside Ridge Road as identified in the Bushfire Risk Assessment for the project;
- The minimum separation between the equipment and the bushfire prone vegetation to the west of the perimeter track will be 50m and 25m to the north. A separation of 25m will be to the east with the compound located in the north-eastern corner of the former plantation site as identified in the Bushfire

Risk Assessment;

- The *Pinus Radiata* will be removed and the area of the former plantation managed as an Asset Protection Zone;
- The equipment yard will be maintained free of vegetation and combustible materials; and
- All 'hot work' within the site will be assessed and monitored to determine the risk of ignition of surrounding unmanaged vegetation.

Switchyard

- A 50m wide Asset Protection Zone will be provided to the south-western, western and north-western aspects of the switching equipment and a 25m wide Asset Protection Zone provided to the remaining aspects; and
- Operational procedures and evacuation planning will be prepared in order to address the unsafe location of the Switching Yard and unsafe access/egress.

Access Track ESA5

- The minimum width of the proposed access road to the Ventilation Facility will be 4m, within a cleared corridor of 6m. The road formation will be all weather and have a carrying capacity of 28 tonnes GVM. Passing bays will be provided at 200m intervals.

Power line – aerial connection

- Bundled or insulated cable will be used;
- Periodic inspection of the line/poles will also be undertaken by a qualified power line technician and the base of the poles shall be kept clear of tall grasses/shrubs; and
- Clearance to the aerial connection to the underground cables will be undertaken and maintained in accordance with the electricity supply company's best practice standards. Trees located on the western side of the overhead line connection will be assessed and removed if the 'drop-zone' of the tree impacts the overhead line.

Water supplies for fire-fighting operations

- The onsite water storage tanks will be equipped with 65mm outlet to enable fire service tanker replenishment. The outlet/s will be fitted with a 65mm Ball Valve and Stortz Coupling (a type of hose connection);
- A fire-fighting water supply will be installed within the Ventilation Facility, including a diesel powered pump-set supplying hydrants and hose reels to the buildings supplied from the water storage tanks. The pump-set will be remote start from the office and maintenance shed with back-up power provided to the pump from batteries charged by solar panels;
- Hose Reels will be strategically located in order to provide a wet-down of the buildings and the hydrants will be located on the periphery of the compound with two-way Millcock Valves (fire hydrant valve) complete with ball valves and Stortz Couplings; and
- Lay-flat canvas hose, nozzles and spanners will be stored on the maintenance shed in sufficient quantities to enable at least 2 x 30m hose line lengths to be used on three hydrant points at any one time.

Emergency Management Protocols/Training

- Protocols will be established in the form of operational policies for the safe occupation of the Ventilation Facility and access/egress during potential bushfire emergencies;
- These protocols will include training in emergency management / evacuation, bushfire fighting, the use of

structural and bushfire fighting equipment and clear guidelines on (emergency) attendance at the facility during bushfire danger days (high to catastrophic);

- During the construction phase the Site Manager/s key engineering personnel will undertake, and be certified in, the NSW Rural Fire Service's Basic Fire Fighting Course; and
- During the operations phase key engineering personnel will undertake, and be certified in, the NSW Rural Fire Service's Basic Fire Fighting Course;

Management of Asset Protection Zones (Defendable Spaces) within the Ventilation Facility, the substation and switchyard compounds will comply with the following:

- Maintain a clear area of low cut lawn, pavement or gravel adjacent to the asset;
- Keep areas under shrubs and trees raked and clear of combustible fuels;
- Trees and shrubs should be maintained in such a manner that tree canopies are separated by 2m and understorey vegetation is not continuous (retained as clumps).

The maintenance of the vegetation within the Ventilation Facility, substation and switchyard compounds will be monitored to determine the risk posed by machinery undertaking this work. Operators must be trained in bushfire fighting and have appropriate 'first response' fire-fighting capabilities (knapsacks / fire extinguishers).

Bushfire Risk Created During Construction Works

- The risk created through activities such as the use of earth moving machinery, welding and drilling equipment will be assessed, monitored and addressed through the implementation of protocols which mitigate the chance of ignition caused by sparks or other ignitions sources (molten metal). If this risk prevails on Total Fire Ban Days all works will be suspended until cessation of the ban.

Bushfire Risk Created During Operation

- This risk will be assessed, monitored and addressed through the implementation of protocols which include the examination of the work proposed; training of operators and the establishment of work methods which mitigate the chance of ignition caused by sparks or other ignition sources (molten metal).

9.12 Visual

A Preliminary Visual Assessment has been undertaken by RPS to determine the potential for visual impacts. The report is provided in Appendix 9.9 and the key findings are outlined below.

9.12.1 Existing Situation

Visual Character

The Project Application Area is wholly within the Newnes State Forest located on Newnes Plateau. The proposed surface infrastructure is at an elevation of between 1,123m and 1,182m. The Project Application Area includes a section of Sunnyside Ridge Road which is an unsealed public road, managed by Forests NSW. There are overhead powerlines in the vicinity of the Project Application Area and various areas of mining related infrastructure such as the concreted and fenced areas associated with bores.

Six residential properties are located to the north and west of the Project Application Area all of which are over 7km away. There are no residential properties closer than this to the Project Application Area.

Recreational activities such as walking, driving (4WD), camping and picnicking are undertaken in the Newnes State Forest.

National Park is located to the north and east of the Project Application Area as follows:

- Gardens of Stone National Park approximately 9km to the north:
- Wollemi National Park approximately 15km to the north east; and
- Blue Mountains National Park approximately 14km to the east.

Visual Receptors

The immediate area (approximately 1km from the Project Application Area) includes Sunnyside Ridge Road (which passes through the Project Application Area) and Blackfellows Hands Road and therefore those using these roads would potentially be receptors. Sunnyside Ridge Road (part of which is within the Project Application Area) is used by recreational 4WDs and promoted as a 4WD route. There would be views of the project components from this road, Blackfellows Hands Road and within the immediate vicinity.

Residential and recreational receptors are located approximately within 1-9kms from the Project Application Area. Residential properties are located between 7 and 9kms to the west and north west of the Project Application Area as shown on Figure 9.2.Their elevations range from 760 to 930m. These are the same receptors as identified for the noise and air assessments. In addition to the residential receptors above, potential recreational receptors are located between 1.6 and 8km from the Project Application Area. The locations of the recreational receptors, the same as those used for the noise impact assessment by SLR are shown on Figure 9.2.

An analysis has been undertaken which identifies the potential visual envelope from the receptors, taking into account topography and is used to identify any significant visual impacts. It does not take into account any vegetation. The proposed works are within forest and therefore the analysis is conservative. However, the analysis is useful in identifying potential views and any need for further assessment.

It is unlikely that there would be significant changes in views from the national parks towards the Project Application Area due to topography, distance and the vegetation in the vicinity of the Project Application Area. Any potential views from National Parks would comprise a small element within a distant view and would not be a significant impact.

9.12.2 Construction Impacts and Consequences

The results of the analysis of visual envelopes from the residential and recreational receptors are provided in Appendix 9.9.

Due to the elevations in the region and the mature vegetation the works are not likely to be seen from the residential receptors.

There are potential adverse impacts on views of those using the area for recreation. Construction works would be visible from within the immediate area, in particular Sunnyside Ridge Road and Blackfellows Hands Road and there would be a greater number of large vehicles using the road due to the construction works. The analysis (Appendix 9.9) shows that parts of the works would potentially be seen from the recreational receptors R8 Lost City, R9 Bald Trig and R11 Carne Creek Shrub Swamp. The analysis was undertaken without taking into account the presence of vegetation and therefore represents worst case scenario conditions. Any adverse impacts would be temporary for the duration of construction (approximately two years and nine months).

Night lighting would be noticeable to recreational users in the vicinity such as those driving along Sunnyside Ridge Road. This would be a temporary adverse effect at night time and mitigation is identified below.

9.12.3 Operation Impacts and Consequences

Within the immediate area, the proposed substation, switchyard and clearance associated with the power supply line would be visible to those using Sunnyside Ridge Road and those in the immediate vicinity using the area for recreation. In the case of a substation, this would be a visual change from the current plantation that is not endemic, to a building with cleared vegetation around it. Sunnyside Ridge Road would change on one side in terms of vegetation clearance associated with the trench. These changes would be in the context of an area that already includes mining infrastructure. The switchyard would also be seen by recreational users of Blackfellows Hands Road.

Due to elevations in the region and vegetation the surface infrastructure is not likely to be seen from the residential receptors.

Similarly to the works during construction, the project components would potentially be seen from three recreational receptors as follows:

- From R8 Lost City parts of the switchyard have potential to be seen;
- From R9 Bald Trig parts of the powerline, substation and the Ventilation Facility have potential to be seen;
- From R11 Carne Creek Shrub Swamp part of the power supply has potential to be seen.

As stated previously the analysis does not take into account vegetation, only topography, and the area is predominantly forested.

Following rehabilitation, the Project Application Area would be returned to State Forest and the consequent reversal visual changes. The substation site, currently comprising a pine plantation, would be returned to endemic planting and therefore a potential improvement in the immediate area.

9.12.4 Mitigation

The Project Application Area is located within a State Forest which is used for recreational purposes. The project may be viewed from three recreational receptors and this issue is important to the community and was raised during community consultation. Methods to minimise the impact upon views and visual amenity values are to be considered and implemented during detailed design. Ideally, the proposed substation would be screened by native vegetation to mitigate views to it from the surrounding area. However this would entail moving the substation westwards towards the slope. During the course of the assessment, the findings of the bushfire risk assessment have shown that the substation should be kept away from the slope to reduce bushfire risk.

Mitigation measures are as follows:

- Methods to minimise the impact of the project upon views and visual amenity values are to be considered and implemented during detailed design;
- Where feasible, buildings and structures will be coloured to blend into the surroundings;
- Night lighting during construction will be restricted to the minimum required for operational and safety requirements. Also it will be directed away from sensitive receptors where practicable;
- The potential for native vegetation screens at the substation site will be investigated, subject to bushfire risk considerations;
- The height of all buildings will be kept to a minimum;
- Cleared areas that are no longer required to be clear will be revegetated with suitable native vegetation in

accordance with the rehabilitation strategy; and

- Opportunities to enhance the area currently supporting a pine plantation will be investigated, following rehabilitation of the substation site.

9.12.5 Residual Consequences

Some night lighting would still be visible from surrounding receptors during construction. Impacts would be minor due to the temporary use of the lighting and the screening provided by vegetation surrounding the Project Application Area. Parts of the project such as the substation and the clearance area along Sunnyside Ridge Road would be visible from the immediate area and also potentially from three recreational locations within the Newnes State Forest to the south, south east and east. In the long term, impacts would be managed through the Rehabilitation Strategy (Section 9.6 and Appendix 9.4).

9.13 Recreation

An assessment of impacts on recreation has been undertaken by RPS and is reported below. The assessment has been informed by other assessments prepared for this project including air refer Section 9.9), noise (refer Section 9.10), views (refer Section 9.12), traffic (refer Section 9.14) and hazards (refer Section 9.20).

Areas of study relating to visual impacts are based upon those identified in Section 9.12.1 which are:

- Immediate area – approximately 1km from the Project Application Area; and
- Residential and recreational receptors located approximately 1-9km from the Project Application Area.

9.13.1 Existing Situation

The Project Application Area is located to the east of the existing mine and within the Newnes State Forest. In addition to uses such as timber production, the Newnes State Forest is an area used for recreational activities such as bushwalking, 4WD, picnicking and camping.

Forests NSW identifies a range of values and uses of State Forests in general including:

- Aesthetic views;
- Recreation;
- Wildlife conservation;
- Aboriginal and heritage sites;
- Education; and
- Timber supply.

Recreation in the Newnes State Forest is promoted on tourism related websites and publications. For example, Sunnyside Ridge Road is promoted as part of a 4WD route on www.tourism.lithgow.com and bushwalking in the area is promoted.

For the purposes of the EA, a number of recreational places within proximity to the Project Application Area have been identified as recreational receptors. These recreational receptors are identified below in Table 9.2 and their locations are identified on Figure 9.2.

Table 9.2 Recreational Receptors

Recreational Place	Approximate Distance to Project Application Area (km)
R7 Bungleboori Picnic Area	1.6
R8 The Lost City	2.5
R9 Bald Trig	7.8
R10 Bungleboori Lookout	7.8
R11 Carne Creek Shrub Swamp	6.5
R12 Lurlene Jack Lookout	5.2
R13 Birds Rock	4.5
R14 Wolgan Falls	4.5

Whilst the recreational receptors are places where people using the Newnes State Forest for recreation might seek out and spend time at, others may be closer to the Project Application Area enjoying transient activities such as walking and 4WD.

The Gardens of Stone National Park is approximately 9km to the north of the Project Application Area, Wollemi National Park is approximately 15km to the north east and the Blue Mountains National Park is approximately 14km to the east.

9.13.2 Construction Impacts and Consequences

Impacts from construction activities, equipment and traffic have the potential to combine to affect the amenity, or relative pleasantness, of an area or place. This section considers impacts for air, traffic, noise, views and hazards (as reported within this EA) and the extent to which they may, together, affect amenity for those undertaking recreational activities. The recreational places identified above, and the area within the immediate vicinity of the project, are addressed below as are changes that may affect nearby recreational users generally. National Parks are a substantial distance from the project (and at lower elevations from a visual perspective) and therefore significant impacts to amenity at these places are unlikely.

Changes in Amenity at the Recreational Receptors

As part of the Air Quality Assessment (Section 9.9 and Appendix 9.6), consideration was given to impacts at the Bungleboori picnic and camping area (R7), Birds Rock Lookout (R13) and Wolgan Falls (R14). SLR concluded that given the distances from the Project Application Area, negligible air quality impacts would be experienced at these locations.

The Noise and Vibration Assessment (Section 9.10 and Appendix 9.7 reports the noise impact associated with construction plant and equipment to recreational receptors during construction would be negligible. Also, any noise from construction vehicles would not be significant.

For those using recreational places R8 Lost City, R9 Bald Trig and R11 Carne Creek Shrub Swamp there are potential changes to views of the construction works from these locations (refer Section 9.12).

Therefore, there would be potential views of the construction works from R8, R9 and R11. These locations would not be affected by construction dust and noise. Given that the visual assessment is conservative and that views are likely to be minimised by intervening vegetation the affect on amenity at R8, R9 and R11 is likely to be minor. There are unlikely to be amenity effects on the other recreational receptors.

Changes in Amenity in the Immediate Vicinity of the Project

There would be dust and noise generated by construction in the immediate vicinity of the project that may therefore affect recreational users close to the project.

The Traffic Impact Assessment (Section 9.14 and Appendix 9.10) reports that the traffic generation during construction would be minor and would not compromise safety for the Newnes State Forest road network. However, the preparation and implementation of a Construction Traffic Management Plan is identified as a management measure for the Traffic Impact Assessment.

Construction works would be visible from the immediate vicinity of the Project Application Area, along parts of Sunnyside Ridge Road (and some from Blackfellows Hands Road) and there would be a greater number of large vehicles using the road.

Regarding matters of public safety, the Bushfire Risk Assessment (Section 9.11) identifies the risk of a short term threat of ignition during construction and has identified mitigation in this regard. Other hazards such as risks associated with unauthorised access and contact with voltage are identified in Section 9.20 during construction. Construction sites would need to be secure and clearly signed and mitigation identified in Section 9.20 includes security fencing, signage and alarm systems and/or trespass alerts. Incidents caused by subsidence, whilst unlikely to be caused by the proposed underground roadways (negligible subsidence of less than 20mm is predicted), could include cracking to the proposed powerline corridor and Sunnyside Ridge Road due to the Springvale longwalls and mitigation is identified in Section 9.16.

Therefore, for those undertaking activities such as walking or using 4WDs in the immediate vicinity of the project there would be changes to views, noise, dust, traffic and new hazards introduced and therefore an adverse impact to the general amenity of the immediate area during the temporary construction period.

General

Hazard associated with bushfire would potentially affect all recreational users of the Newnes State Forest through the introduction of the project within a bushfire prone area. Asset Protection Zones around buildings and equipment are proposed as part of the project and detailed mitigation measures have been identified as set out in Section 9.11 and Appendix 9.8.

9.13.3 Operation Impacts and Consequences

Changes in Amenity at the Recreational Receptors

The Air Quality Assessment (Section 9.9) reports negligible air quality and odour impacts at the recreational receptors during operation.

The project has the potential for views of the proposed infrastructure from R8, R9 and R11. Mitigation, such as investigating the potential for vegetation screening (taking into account bushfire risk), colouring of

buildings and minimising the height of buildings and structures is identified in Section 9.12 to minimise the visual impact where feasible

Therefore, there may be views of the buildings and structures from R8, R9 and R11, although they would not also be affected by operational noise and odour. Given that the visual assessment is conservative and that views are likely to be minimised by intervening vegetation the affect on amenity at these locations is likely to be minor. There are unlikely to be impacts on amenity to the other recreational receptors.

Changes in Amenity in the Immediate Vicinity of the Project

During operation, it is possible that those undertaking recreational activities such as walking and 4WD in the immediate vicinity of the Ventilation Facility, including along the stretch of Sunnyside Ridge Road near to the facility, might notice odour. SLR has advised that the existing forest would act as a buffer however odour might still be noticeable in close proximity to the Ventilation Facility (refer Appendix 9.6). Mitigation in Section 9.9 includes the maintenance of this buffer.

The Traffic Impact Assessment (Section 9.14 and Appendix 9.10) reports that the operational traffic that would be generated is minor and significantly lower than would be generated during construction, and would not compromise safety. However, the preparation and implementation of an Operational Traffic Management Plan is identified as a mitigation measure.

The Noise and Vibration Assessment (Section 9.10 and Appendix 9.7) reports that at distances of 550m and 700m from the Ventilation Facility, the amenity criterion for a passive recreation area would be met. Within these distances, there is a small area of Sunnyside Ridge Road to the east of the Ventilation Facility which is predicted to experience a small exceedance of the project specific noise criteria during operation for a recreational use. Measures to mitigate noise from the Ventilation Facility are identified in Section 9.10. Traffic noise would not be significant.

For views, whilst the Ventilation Facility would be largely screened by the existing vegetation, the proposed substation and clearance for the trenched powerline would be visible from the immediate vicinity including parts of Sunnyside Ridge Road. Whilst the connection to the existing powerline would be overhead, the proposed powerline would be predominantly trenched. The proposed switchyard and overhead conductors would be visible from Blackfellows Hands Road and Sunnyside Ridge Road. Therefore there would be changes to views that would be seen by those using the immediate vicinity for recreation (refer Section 9.12 and Appendix 9.9) and therefore adverse effects. Mitigation to minimise the impact on views is identified in Section 9.12.4.

Regarding matters of public safety, the Bushfire Risk Assessment (Section 9.11) identifies amongst the risks those associated with site operations such as cutting, grinding, welding and inappropriate storage/use of materials. Asset Protection Zones are proposed around the proposed Ventilation Facility, substation and switchyard and a number of mitigation measures are identified (Section 9.11 and Appendix 9.8). Other hazards are identified in Section 9.20 during operation including hazardous materials, site security and contact with voltage. Regarding security, at the Ventilation Facility there would be security fencing, security lighting and CCTV and at the substation and switchyard there would be fencing and signage in line with relevant standards. Incidents caused by subsidence, whilst unlikely to be caused by the proposed underground roadways, could include cracking to the proposed powerline corridor and Sunnyside Ridge Road due to the Springvale Colliery longwalls and mitigation measures are identified in Section 9.20.

As with the construction effects above, whilst by themselves the individual impacts (such as noise, odour or views) to recreational receptors would be negligible to minor, together, they would combine to affect the overall amenity, or pleasantness, of the area for recreation during operation of the project. Therefore, in the immediate vicinity of the infrastructure, in particular near the Ventilation Facility, there would be potential

changes to noise, odour and views and therefore an adverse effect on amenity for those undertaking recreational activities in the immediate area of the project. Receptors in this area are likely to be transient such as walkers and those in 4WDs.

General

Hazard associated with bushfire would potentially affect all recreational users of the Newnes State Forest through the introduction of the operational project within a bushfire prone area. Asset Protection Zones around buildings and equipment are proposed as part of the project and detailed mitigation measures, identified in Section 9.11 and Appendix 9.8.

Whilst mining heritage is an aspect of local tourism, the project is not considered to be of interest in this respect. However, the project is within an area known for its mining industry and would potentially be considered within a context of other mining infrastructure in the area.

Rehabilitation

Rehabilitation is proposed to be undertaken in accordance with the Rehabilitation Strategy (Section 9.6 and Appendix 9.4). This involves returning the Project Application Area to State Forest. Whilst some measures would be instituted during operation, key rehabilitation activities would be undertaken following the decommissioning of surface infrastructure. However, rehabilitation of any public access area affected by subsidence from the proposed underground roadways would be undertaken upon identification. At mine closure the infrastructure components of the project would be fully rehabilitated. This would involve the removal of any physical items and prior to the re-establishment of vegetation. Whilst the timescale for this is currently unknown, as it is partly dependant on the viability results of the trial mining, these areas would be returned to forest use and therefore recreational amenity restored with respect to the project.

9.13.4 Mitigation

The mitigation measures identified for the Air Quality Assessment (Section 9.9), Noise Impact Assessment (Section 9.10), Traffic Impact Assessment (Section 9.14) including the traffic management plans, Visual Assessment (Section 9.12), Bushfire Risk Assessment (Section 9.11) and Other Hazards assessment (Section 9.20) for the project will be implemented. Rehabilitation will be undertaken in accordance with the Rehabilitation Strategy for the project (Section 9.6).

The following additional measures are identified to minimise adverse impacts to those using the Newnes State Forest for recreation:

- Existing operational procedures designed to minimise impacts to the local community will be implemented and updated to include those using the Newnes State Forest for recreation;
- A CEMP will be prepared for the project to minimise impacts during construction including measures to minimise noise and dust;
- Appropriate signage will be provided to advise recreational users of the Newnes State Forest of the construction works, hazards associated with them and contact details for complaints and enquiries;
- Continue stakeholder consultation, existing complaints handling procedures and continue to operate the CCC in accordance with the Project Approval; and
- Investigate ways to include those who use the Newnes State Forest for recreation in future stakeholder consultation.

9.13.5 Residual Consequences

Impacts on recreational amenity are mainly confined to the immediate area. Construction would be temporary and impacts would be mitigated through a CEMP although some noise and dust may still be noticeable. Residual operation impacts in the immediate area, and particularly near the Ventilation Facility, would comprise noise, odour and changes to views.

The area would be returned to forest as a result of rehabilitation.

9.14 Traffic

Anton Reisch Consulting Pty Ltd (ARC) prepared a Traffic Impact Assessment (TIA) and this is provided in Appendix 9.10. The key issues are summarised below.

9.14.1 Existing Situation

Key access roads are shown on Figure 9.3 and are Inch Street, Atkinson Street, State Mine Gully Road, Glowworm Tunnel Road, Blackfellows Hands Road, Old Bells Line of Road, Sunnyside Ridge Road and Bells Line of Road (State Road 40).

A traffic survey has been undertaken to obtain information about traffic at three locations (refer to Appendix 9.10) where additional traffic associated with the project would be generated. Classified counter surveys (tube counters) were installed to provide 24 hour counts by vehicle type over a period of one week in mid July 2011. Average daily vehicle flows are identified in Appendix 9.10 for Sunnyside Ridge Road, Old Bells Line of Road and Glowworm Tunnel Road (north of Old Bells Line of Road). The highest flows were on Sunday.

AM peak period intersection surveys were conducted at the intersection of Bells Line of Road and Old Bells Line of Road and Petra Avenue.

The Newnes State Forest roads have spare capacity as do the key access routes and intersections for light vehicles provided from Lithgow via Inch Street and Atkinson Street. Similarly, for access for heavy vehicles, from Bells Line of Road at the intersection of Old Bells Line of Road and Petra Avenue this intersection operates at a good level of service.

Access to the Project Application Areas during both construction and operation would be via existing Newnes State Forest roads and tracks. For light vehicles the route would be via State Mine Gully Road and for trucks via Old Bells Line of Road. Both of these roads then lead to Glowworm Tunnel Road which provides access to Blackfellows Hand Trail, Sunnyside Ridge Road and the proposed access track between Sunnyside Ridge Road and the proposed Ventilation Facility.

9.14.2 Construction Impacts and Consequences

Construction traffic is anticipated to generate an average of less than 20 daily vehicle trips over a construction period of approximately two years and nine months. The peak generation is anticipated to occur around the 13th to 14th month of construction for approximately one month. The peak generation would comprise approximately 42 daily trips (20 truck trips and 22 light vehicle trips). There would be no significant impact on either the sub-regional network providing access to the Newnes State Forest or on the access roads within the Newnes State Forest providing access to the Project Application Area.

9.14.3 Operation Impacts and Consequences

During operation, an average of less than 10 vehicles per week would be generated to/from the Ventilation Facility with an expected peak of 4 vehicle trips on a single day. These would be mainly light vehicle trips but also a small number of truck trips would be generated each week. The unsealed road network would require ongoing maintenance.

9.14.4 Mitigation

Management measures are:

- Consultation with Forests NSW will be undertaken to determine the detailed design of the proposed access track to the Ventilation Facility. The design will also take into account other key environmental factors as outlined in the EA, as well as traffic considerations such as sight distance at its intersection with Sunnyside Ridge Road;
- Prior to the commencement of construction, Angus Place Colliery, in consultation with Forests NSW and Lithgow Council, will prepare and implement a Construction Traffic Management Plan In accordance with the Traffic Impact Assessment for the project;
- Prior to the commencement of operations, Angus Place Colliery, in consultation with Forest NSW and Lithgow Council will prepare and implement a Traffic Management Plan in accordance with the Traffic Impact Assessment for the project;
- Any changes associated with the project to the condition of the unsealed road network within the Newnes State Forest will be managed in conjunction with Forests NSW and in accordance with Forest Practices Code: Part 4 Forest Roads & Fire Trails ; and
- General maintenance procedures for the access routes between the sub-regional network and the project sites will be undertaken during the construction and operation stages of the project in accordance with the Traffic Impact Assessment for the project.

9.14.5 Residual Consequences

With the implementation of the mitigation measures above there are not likely to be any significant residual impacts. The additional low level of traffic that would be generated during construction and operation of the project is not expected to compromise the safety and efficiency of the road network.

9.15 Economic

AIGIS Group has prepared an Economic Assessment for the project. A copy of the report is provided in Appendix 9.11 and the key issues are summarised below.

Centennial's operations and the regional mining industry are important to the economic sustainability of the Lithgow LGA. This is apparent within Lithgow City Council's Economic Development Strategy and through the results of stakeholder and community consultation. Without investigating the additional potential resource to the east operations at Angus Place Colliery could cease in 2016, whereas if the resource is proven to be viable, mine life could potentially be extended by an estimated 17 years (subject to separate and future applications for approval). The probability of progressing to full mining of this resource is currently anticipated to be approximately 40%.

The capital cost of the project is $67.55million. The revenue is less because the project is for exploration and therefore the project has a net cost for Centennial Angus Place Pty Ltd.

There would be no net employment increase from the project. Angus Place Colliery currently has provision for 225 employees and 75 contractors on site at any one time. During construction, the mine contractor workforce provision would include construction related employees. There would be a temporary reduction in the number of mine related positions. Centennial Angus Place Pty Ltd has a preference for this being carried out by local contractors and suppliers where practical and it is proposed that this preference be applied during the tendering and evaluation process.

A comparison of the alternatives discussed in Section 5 Justification and Alternatives is provided within Appendix 9.11. Whilst the project presents risks to Centennial Angus Place Pty Ltd in relation to the capital investment required to investigate the mining resource, this is considered to be the best option for the sustainability of Angus Place Colliery. An alternative do nothing scenario would also present risk associated with the mine ceasing operation in 2016 if there are no further reserves available for production at that point. This would likely result in the loss of 225 FTE positions and 75 contractor positions with associated knock on effects.

The project would lead to multiplier effects associated with additional economic activity during construction that would stimulate other industry sectors from a requirement for goods and services for construction and trial mining. There would also be contributions to the State due to royalties associated with the trial mining coal yield and taxes to the Commonwealth Government.

There would be costs associated with environmental impacts identified within this EA (including its technical assessments). These include those from vegetation clearance, removal of forestry land and greenhouse gas emissions.

9.16 Subsidence

Ditton Geotechnical Services (DGS) has prepared a Subsidence Assessment for the project. A copy of the report is provided in Appendix 9.12 and the key issues are summarised below.

The assessment has taken into account the existing and approved longwalls at both Angus Place Colliery and the adjacent Springvale Colliery. In addition to the subsidence predictions from the proposed underground roadways associated with the Subsidence Assessment Area, the assessment has also considered the subsidence effects to the proposed infrastructure from the neighbouring Springvale Colliery longwalls.

9.16.1 Existing Site Conditions

The surface conditions above the proposed underground roadways comprise mildly undulating and relatively flat terrain associated with the Newnes Plateau and the Wolgan River. The proposed access headings would pass beneath the Wolgan River which is an incised, alluvium filled valley. On the plateau and valley floor, ground slopes are generally less than 5^{o} and increase to between 10^{o} and 28^{o} on the valley side slopes.

The underground roadways would be beneath the Wolgan River and areas of Newnes Plateau Shrub Swamp and Newnes Plateau Hanging Swamp (information about these swamps is provided in Section 9.3). Sunnyside Ridge Road also passes above the proposed underground roadways. The proposed trenched power supply line would run along Sunnyside Ridge Road, which is above Springvale Colliery's longwalls 414 to 416 as is the proposed switchyard.

9.16.2 Impact Assessment

An analytical subsidence prediction analysis (refer Appendix 9.12) has been undertaken by DGS and the predicted subsidence contours are shown in Figure 9.4. It considered both the potential subsidence impacts from the proposed underground roadways and the subsidence impacts from the adjacent Springvale Colliery longwalls to the proposed infrastructure along Sunnyside Ridge Road.

Underground Roadways

The worst-case subsidence is likely to be less than 20mm after the development of the proposed underground roadways. The analysis concludes that this is 'very unlikely' to result in surface cracking or erosion within the Subsidence Assessment Area. The subsidence impact to the Wolgan River and the Newnes State Forest and the proposed infrastructure due to the proposed underground roadways are predicted to be negligible. The 20mm subsidence contour is an industry defined limit and represents the practical detectable limit of subsidence.

Figure 9.4 shows the predicted subsidence contours resulting from the proposed underground roadways in the context of subsidence associated with the approved longwall panels at Angus Place and Springvale Collieries. The area predicted for less than 20mm of subsidence is in the area of the proposed Ventilation Facility and to the north-west and south east. Based on experience and monitoring data, the impact to overlying aquifers from the proposed underground roadways would be minor and mitigation measures below include for the development of a groundwater management plan.

It is considered very unlikely that valley closure and uplift of creek beds associated with the Wolgan River or significant surface and/or subsurface impacts would occur.

Infrastructure Along Sunnyside Ridge Road

The proposed Ventilation Facility and the substation site would not be affected by subsidence from the Angus Place and Springvale Collieries longwalls.

The proposed power supply along Sunnyside Ridge Road is located above the Springvale Colliery longwalls. The road and proposed power supply line may subsided by up to 1.53m and the proposed switchyard may subside by up to 0.43m.

Surface cracking of up to 20mm wide could occur within the proposed power supply line corridor because of the predicted subsidence from Springvale's longwalls. Worst case cracks are expected to range from 30 to 50mm in near surface rock and less than 20mm in deep soil/alluvial soil profile areas.

Changes of surface gradients of around 1% could result in some minor erosion and sedimentation adjustment of surface runoff across exposed soils and gravel surfaces.

Whilst subsidence impacts from the Springvale Colliery longwalls will be managed under the Springvale Public Safety Plan it will be necessary to update this to include the proposed infrastructure.

9.16.3 Mitigation

The project is not anticipated to cause significant subsidence, however, for the purposes of due diligence, the following mitigation will be implemented.

- The following impact management strategy will be adopted:
  - » Pre-mining and post-mining inspections of the section of Wolgan River within a 26.5^{o} angle of draw

from the underground roadways will be undertaken;

  - » Photographic records will be taken of this section of river prior to undermining; and
  - » Annual inspections and reporting of the condition of the river following completion of the roadways will be conducted;
- The shafts and boreholes will be located away from the geological structure zones identified in Figure 3d of the Subsidence Assessment report for the project;
- The groundwater management plan will be updated to include the sub surface management strategies, previously applied at Angus Place Colliery, for the proposed underground roadways;
- The Ventilation Facility will be designed to tolerate mine subsidence settlements and horizontal displacements of up to 20mm and structures will be designed to tolerate reactive clay soil movements (to be estimated from a Site Classification report by a geotechnical consulting firm);
- The underground development roadways beneath sensitive surface facilities will be protected from longwall abutment loads by a minimum barrier width of 100m;
- The Springvale Colliery Public Safety Plan will be updated to address the proposed Sunnyside Ridge Road infrastructure including the switchyard;
- The proposed power supply and switchyard will be designed to tolerate the predicted range of movements and design considerations will include:
  - » Where electrical power supply cables are installed in a trench, the trench will be backfilled with loosely placed granular material (i.e. sand) to minimise strain transfer into the cable during subsidence development.
  - » Flexible couplings will be installed between the switchyard unit and the power line conductors.
  - » The switchyard will be designed to tolerate mine subsidence settlements of up to 0.5m;
- Appropriate impact management and mitigation plans will be developed for the access road (Sunnyside Ridge Road) and buried powerline between the switchyard and the Ventilation Facility, switchyard and the buried cables between the substation and the Ventilation Facility;
- Existing relevant management plans will include the design of structures and associated infrastructure to have flexible couplings and structural detailing to tolerate the predicted movements or be Safe, Serviceable and Repairable in accordance with Mine Subsidence Board Guidelines; and
- Extraction Plans (or equivalent) for both Springvale and Angus Place Colliery will be updated to include the Ventilation Facility and the proposed infrastructure before undermining occurs.

DGS also specifies requirements for any future longwall panels that may be the subject of separate applications. These should not be extracted within a minimum angle of draw distance of 26.5^{o} (i.e. half the cover depth) from the ventilation facility boundary limits, unless the appropriate engineer design measures are applied to tolerate movements associated with >20 mm of subsidence. This would need to be taken into account for any future and separate applications.

9.17 Cultural Heritage

RPS has prepared a Cultural Heritage Impact Assessment (CHIA) and this is provided in Appendix 9.13. The key findings are outlined below.

9.17.1 Existing Situation

Aboriginal Heritage

A desk top study and survey has been undertaken. A search was undertaken of the OEH Aboriginal Heritage Information Management System (AHIMS) on 21 July 2011 within a 5 km radius of the Project Application Area. A total of 41 sites were identified within that search radius. The most common site types within the local landscape are shelters with deposit (51.21%), followed by artefact scatters (17.07%) and shelters with art (12.20%).

There are no sites recorded within the immediate vicinity of the Project Application Area. The nearest recorded site to the Project Application Area is a scarred tree site, located approximately 140 m to the west of Sunnyside Ridge Road (ESA 1-3) and 60m west of the northern end of the old runway.

Aboriginal community consultation has been undertaken in accordance with the Aboriginal Cultural Heritage Consultation Requirements (ACHCRs) for Proponents (DECCW, 2010). The following Aboriginal community stakeholders were registered as wishing to be consulted in association with this project:

- Bathurst Local Aboriginal Land Council;
- Mingaan Aboriginal Corporation;
- Mooka Aboriginal Corporation; and
- Gundungurra Tribal Council Aboriginal Corporation.

An archaeological field survey was undertaken on 16-17 November 2011 in conjunction with Aboriginal community stakeholders.

The Project Application Area was divided into seven Aboriginal heritage survey units for ease of surveying. Unit 7 represents the Subsidence Assessment Area and due to the size of the area and the predicted negligible subsidence reported in the Subsidence Assessment a targeted sampling strategy was adopted for this area. No Aboriginal sites were identified within the seven Aboriginal heritage survey units and therefore the Project Application Area.

With respect to Survey Unit 7, it is possible that some old growth vegetation remains in areas not surveyed, as a result of the targeted sampling strategy adopted. Should subsidence or other surface impacts exceed predicted values, further investigation of the affected area should be undertaken. It is highly unlikely that the project would impact Aboriginal material.

Non Aboriginal Heritage

A search of the Australian Heritage Database has identified no items registered on the following lists:

- National Heritage List;
- Register of the National Estate; and
- Commonwealth Heritage List.

A search of the NSW Heritage Inventory shows no heritage items listed within the vicinity of the Project Application Area.

The Project Application Area is wholly located within the bushland of the Newnes Plateau, with the closest European settlement at Lidsdale, approximately 9.7 km to the west of the Project Application Area. A review of the Lithgow City LEP 1994 shows the closest heritage item to the Project Application Area as the State Mine Site at State Mine Gully, approximately 12 km to the south west.

There are no registered heritage items within, or in the vicinity of, the Project Application Area and it is therefore considered that there are no European heritage constraints associated with the project.

9.17.2 Construction Impacts and Consequences

There are no non Aboriginal heritage sites registered within the Project Application Area or its vicinity and therefore there are not anticipated to be any impacts.

9.17.3 Operation Impacts and Consequences

Subsidence has the potential to affect Aboriginal heritage items such as rock shelters. While no new Aboriginal objects or places were identified, it is nonetheless possible that sites may be identified, particularly subsurface, during construction. Given that subsidence would be negligible, such impacts are considered unlikely. In the event that subsidence exceeds predicted values, mitigation measures are identified below. Beyond this, there is not anticipated to be an impact associated with the operation of the project because no heritage sites have been identified and there is low potential for unknown sites to be found.

9.17.4 Mitigation

The measures below include standard measures to be applied in the event that any new (currently unknown) sites are identified or suspected at any stage of the proposed works:

- Should subsidence or other surface impact exceed predicted values, additional archaeological investigation of the area affected will be undertaken;
- All relevant Centennial Angus Place Pty Ltd staff will be made aware of their statutory obligations for heritage under NSW *National Park and Wildlife Act 1974* and the *NSW Heritage Act 1977*;
- If during the proposed works any Aboriginal sites are identified in the Project Application Area, then all works in the area will cease, the area cordoned off and contact made with OEH Enviroline 131 555, a suitably qualified archaeologist and the relevant Aboriginal stakeholders, so that it can be adequately assessed and managed;
- In the unlikely event that skeletal remains are identified, work will cease immediately in the vicinity of the remains and the area cordoned off. The proponent, Centennial Angus Place Pty Ltd, will contact the NSW Police Coroner to determine if the material is of Aboriginal origin. If determined to be Aboriginal, the proponent, will contact the OEH Enviroline 131 555, a suitably qualified archaeologist and representatives of the local Aboriginal Community Stakeholders to determine an action plan for the management of the skeletal remains, formulate management recommendations and to ascertain when work can recommence; and
- If, during the course of development works, significant European cultural heritage material is uncovered, work will cease in that area immediately. The OEH Enviroline 131 555 will be contacted and works only recommence when an appropriate and approved management strategy instigated.

9.17.5 Residual Consequences

With the implementation of the mitigation measures above there are unlikely to be significant residual impacts.

9.18 Agricultural Impact Statement

GSSE has undertaken an AIS and has prepared this section of the EA to address the requirements under the Guidelines for Agricultural Impact Statements (DP&I, 2012a). These guidelines (AIS Guidelines) were released in conjunction with the draft NSW Strategic Regional Land Use Plans for the Upper Hunter and

New England North West (DP&I, 2012b). In September 2012, the Strategic Regional Land Use Policy was released (DP&I, 2012c) which identifies a requirement for the preparation of an AIS for exploration and development application stages and includes two final Strategic Regional Land Use Plans for the Upper Hunter and New England North West Regions.

The purpose of an AIS is to undertake an assessment of the potential impacts of mining and petroleum (including coal seam gas) projects on agricultural resources or industries. The term 'agricultural resource' is used to describe the land on which agriculture is dependent and the associated water resources (quality and quantity) that are linked to that land (DP&I, 2012).

In total the area assessed for potential surface disturbance comprises approximately 46ha of land. However, the actual total area that would be cleared is approximately 17.3ha. Land within the Subsidence Assessment Area associated with the proposed underground roadways will be subject to negligible subsidence (Section 9.16) and is therefore not considered to have an impact on agricultural resources.

9.18.1 Stakeholder consultation

Throughout this assessment forestry was determined to be the sole agricultural enterprise potentially impacted by the project. Forests NSW were consulted directly through the Bathurst and Forbes offices. Forest representatives from each office visited site and assessed the forest values within the Project Application Area. Communications between Forests NSW and Centennial Angus Place Pty Ltd has resulted in a proposed strategy for extraction of valuable saw logs prior to the projects construction phase, and a potential rental agreement for use of the forestry resource across the Project Application Area by Centennial Angus Place Pty Ltd. In accordance with conditions for the original Project Approval, Angus Place Colliery has established a CCC comprising representatives from Forests NSW. Therefore, Forests NSW are already part of a regular consultation process that will be continued during the lifetime of the project.

9.18.2 Existing Situation

Whilst the Lithgow area was established on coal mining, steel manufacturing and other industrial enterprises, the grazing of cattle and sheep, along with some cropping for grain production have been carried out in the region since the 1830s. There are records of flour milling from locally grown wheat as far back as 1837, and later in 1857 a wool mill was developed to produce tweed from locally sourced wool. The wool mill operation continued for 115 years, ceasing operation in 1972.

The Project Application Area may have experienced minor forestry activities to assist in the coal mining industry since early settlement. However, given the terrain and soils within the area, very little agricultural enterprises occurred in the immediate vicinity of the Project Application Area.

There is limited agricultural support infrastructure in the Lithgow LGA. There are a number of rural merchandise and agricultural supply businesses, however the nearest livestock selling centre is located at Carcoar CTLX, approximately 52 kilometres away outside of the Lithgow LGA. Grain production is of little consequence in the area and there are no grain delivery sites in the Lithgow LGA.

Forests NSW has advised that the Central Tablelands, incorporating the Lithgow LGA, hosts a timber industry with $525 million in output, $226 million in gross regional product, $91 million in household income and almost 2,000 full-time equivalent jobs (Lithgow City Council, 2007). The forests are not only a source of timber but provides for a range of recreational vehicle activities and also some forests in the LGA are located above coal mining activities. The forestry resources overlying the Project Application Area are managed by Forests NSW. Mobile forestry crews are located within the surrounding locality and can be mobilised to work near to the Project Application Area if deemed feasible.

In the broad regional context, agriculture is a contributor to the local economy but not the extent of other surrounding regions. Of the land suited to agriculture within the Lithgow LGA only 1.4% (2,945ha) is capable of sustaining regular cultivation. Only 64% (134,563ha), of the land zoned Rural General (210,357ha), which is largely fragmented, in the Lithgow LGA is capable of sustaining regular agricultural production such as sheep or cattle grazing. There is a bias towards cattle and to a lesser extent sheep grazing for agricultural enterprises in the Lithgow LGA (Lithgow City Council, 2007).

There are no agricultural enterprises such as sheep and cattle grazing within the Project Application Area or the immediate surrounds.

Forest NSW has advised that a small volume of sawlogs can be salvaged from the roadside during clearance associated with the proposed power supply. The amount of sawlogs is dependent on which side of the road is cleared. The site of the Ventilation Facility (S4) is not considered by Forests NSW to have commercial forestry value (Forests NSW e-mail dated 07-05-2012). There is also a small area of pine plantation at the site for the proposed substation (ESA7/8) which comes under control of the Planted Forests Division. The forestry value of the remaining Project Application Area is being determined within a rental agreement between Forests NSW and Centennial Angus Place Pty Ltd, however the approximate value is $400/ha/year (Forests NSW e-mail dated 07-05-2012).

There is no agricultural production, such as sheep and cattle grazing, within the Project Application Area and therefore no production value has been calculated for these enterprises.

There are only 263 (out of 7,633) employees in the agriculture, forestry and fishing sector in the Lithgow LGA according to the 2006 Australian Bureau of Statistics, Census of Population and Housing. Whilst forestry jobs exist within the surrounding locality, no specific agricultural jobs are based within the Project Application Area.

The soil landscapes and soil types are described in Section 9.7 and detailed in Appendix 9.5. The soil landscape units that occur within the Project Application Area are consistent with those found in nearby localities which are utilise for forestry activities, however very little traditional agriculture such as grazing and cropping occur on these soil landscapes.

The relevant Land Capability Classes for the Project Application Area are Classes VI and VII Land. These are described in Section 9.7 and detailed in Appendix 9.5

There is no land currently considered Strategic Agricultural Land (SAL) within the Project Application Area. The draft strategic land use plan for the Lithgow region has not been released and therefore no biophysical SAL or industry cluster maps have been developed, however the soil assessment has demonstrated that the Project Application Area is not considered highly valuable agricultural land.

The Newnes State Forest contains both native forest and pine plantations. The vegetation associated with the Project Application Area is dominated by native bushland. However, apart from potential forestry harvesting activities, the Project Application Area does not exhibit any grazing agricultural value.

Regarding water resources, information about rainfall and climate is provided in Section 2.

Water from Kangaroo Creek, Coxs River and the Carne Creek and Wolgan River eventually flows out to the Hawkesbury, which is used for various agricultural activities many kilometres downstream from the Project Application Area. The creeks and rivers have the potential to be used for agricultural activities and irrigation, however limiting biophysical factors such as topography and soil type limit opportunities to utilise this resource. There are no immediate agricultural users of the surface water within or near the Project Application Area.

There are no agricultural activities reliant on the use of groundwater in the immediate area. There are no extraction bores being operated for agricultural purposes within the Project Application Area or the immediate surrounding locality.

9.18.3 Construction Impacts and Consequences

The term 'agricultural resources' is defined in the AIS Guidelines as the land upon which agriculture is dependent and the associated water resources (quality and quantity) which are linked to that land.

Some vegetation on this land has the potential to be harvested by Forests NSW. Pre construction harvesting is currently being negotiated between Angus Place Colliery and Forests NSW. No other agricultural activities occur on the land to be disturbed during the construction phase. Whilst the construction phase is planned for approximately two years and nine months, the land disturbed would remain removed from forestry activities for many years during the operational phase. The construction phase of the project is temporary and therefore there would be no land capability reduction of agricultural resources.

Forests NSW identified a small volume of sawlogs that can be salvaged from the roadside where clearing for the power supply would occur, the amount of which is dependent on which side of the road is cleared. Forests NSW has advised that the Ventilation Facility (S4) does not have commercial forestry value. There is also a small area of pine plantation at the site for the substation (ESA7/8) which comes under control of the Planted Forests Division of Forests NSW.

A security deposit bond is to be lodged with DRE. Forests NSW recommended the substation be located on the pine plantation site (ESA7/8 instead of the previously considered alternative site of ESA10) and all the pine should be harvested for pulpwood, leaving only small quantities of residue. There are no other agricultural enterprises within the Project Application Area or immediate locality. Therefore, the impact from the proposed project on agricultural enterprises, support services, processing and value adding agricultural industries is negligible.

The construction phase of the project would see no changes to employment numbers in the agricultural sector.

No agricultural enterprises are considered to be reliant on the landscape or visual values of the area that would be affected by the addition of the proposed infrastructure of the project.

The assessment does not identify any tourism infrastructure in the local or regional area, upon which agricultural enterprises are reliant, that would be impacted by the project.

In summary, there would be approximately 17.3ha of land temporarily disturbed during the construction phase of the project which is currently not used for any agricultural purposes such as grazing or cropping. However, the bushland located on the Project Application Area is managed by Forests NSW as part of a forestry enterprise. The land has been assessed as land capability class VI & VII and is used for forestry purposes only.

Forests NSW have assessed the proposed disturbance area to determine the value of sawlogs, pulp wood and fire wood and have proposed to extract the valuable timber prior to the construction phase. Given the proposed activities of Forests NSW to extract timber prior to the construction phase the risk of impact to agricultural (forestry) production is negligible.

9.18.4 Operation Impacts and Consequences

During the operational phase, the land used to facilitate operations would be considered not suitable for agricultural uses. Forests NSW and Angus Place Colliery would negotiate a rental value for the land upon which the project is undertaken, however it is anticipated that this land could be suitable for forestry activities following the project life. The Rehabilitation Strategy for the project (Section 9.6 and Appendix 9.4) identifies a proposed end use of State Forest.

The post-mining land capability and agricultural suitability of the Project Application Area landforms would not be changed as the Rehabilitation Strategy (Section 9.6 and Appendix 9.4) for the Project Application Area indicates that disturbed areas would be returned to their original forest condition following mining activity. The strategy details the process by which this would be achieved.

Given the lack of agricultural enterprises within and around the Project Application Area the predicted minor impacts to surface water as outlined in the Surface Water Assessment (Section 9.4 and Appendix 9.2) is not expected to impact on agricultural enterprises or forestry production.

Following construction, the operational phase would not require further vegetation clearance apart from that required for maintaining bushfire clearance zones and rehabilitation activities. Forests NSW would be advocating that Angus Place Colliery should be granted the task of maintaining the Ventilation Facility access road, as well as providing a rental agreement and cost associated with temporarily tying up the potential forestry resources within the Project Application Area for the duration of the project (Forests NSW 2012).

During the operation phase of the project, an Occupation Permit and/or Mining Lease for the site (including the powerline easement) would be established. Preliminary estimates provided by Forests NSW indicate that the forestry resource in the Project Application Area is approximately 5m3 per annum of sawlogs and other products. With a current value of about $80/m3 which would imply a Security Deposit of $400/ha/yr (Forests NSW 2012).

The impact on soil and water resources during the operational phase is considered negligible. Apart from forestry activities, there are no other agricultural enterprises within the Project Application Area or immediate surrounding locality, therefore the impact from the proposed project operational phase on agricultural enterprises, support services, processing and value adding agricultural industries is negligible.

The operational phase of the project would see no changes to employment numbers in the agricultural sector.

There are no agricultural enterprises considered reliant on the landscape values of the area that would be affected by the operational phase of the project.

The assessment did not identify any tourism infrastructure in the local or regional area, upon which agricultural enterprises are reliant, that would be impacted by the project.

In summary, the temporary loss of potential timber harvesting values of the Project Application Area has been identified by Forests NSW and a preliminary agreement and appropriate security deposit will be addressed. There are no other resources or land values, upon which agricultural enterprises are reliant and therefore the risk of the project impacting on such enterprises is negligible.

The land and water resources within the Project Application Area would be monitored for impacts to the environment and agricultural resources during the operational phase. Given the impact predictions above,

the anticipated risk of impact on agricultural resources and enterprises during the operational phase is considered negligible.

9.18.5 Mitigation Measures

The mitigation measures identified in the Soil and Land Resources Assessment for the project will be implemented and Rehabilitation will be undertaken in accordance with the Rehabilitation Strategy for the project. The following additional measures will be implemented:

- Prior to construction, Forest NSW will be liaised with to enable the harvesting of timber by Forest NSW;
- Angus Place Colliery will maintain the proposed access track;
- Prior to construction, Angus Place Colliery will agree a Security Deposit and rental arrangement with Forests NSW for the temporary use of the land; and
- Prior to the operational phase, an Occupation Permit and/or Mining Lease for the Project Application Area will be established.

9.18.6 Residual Consequences

With the implementation of the mitigation measures above there are unlikely to be significant residual impacts.

9.19 Waste

Waste at Angus Place Colliery is managed in accordance with relevant regulatory requirements including the POEO Act, the DECCW NSW Waste Classification Guidelines 2009 and the *NSW Waste Avoidance and Resource Recovery Act 2001*.

The POEO Act is administered by the OEH and requires licensing for environmental protection, including waste generation and disposal, water, air, and noise pollution. Under Schedule 1 of the POEO Act Angus Place Colliery holds and currently operates under EPL467. The EPL requires that licensed activities be carried out in a competent manner and this includes the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity. This license would continue to operate for the life of the project.

Table 9.3 below identifies the wastes that are anticipated to be generated by the project during construction and operation. Where possible, estimated quantities are identified and the management measures to minimise waste production are set out.

Table 9.3 Waste and Management Measures

Waste	Estimate of Quantity	Management Measures
Construction: Solid Waste		
Spoil from the construction of the ventilation shafts and boreholes.	Two shafts = total 7,150m^3 Eight boreholes = total 1,809 m^3	A dedicated spoil emplacement area will be provided within the Ventilation Facility as shown on Figure 4.1. The spoil would be tested to ensure they are within the required limits (as specified in NEPC, 1999) and if required would be either treated prior to use for rehabilitation in accordance with the Rehabilitation Strategy or disposed of at a licensed facility.

Waste	Estimate of Quantity	Management Measures
Spoil from construction (other than the shafts and boreholes) from the construction of Ventilation Facility, site services and supporting surface infrastructure.	Surface works = 8,280 m^3	Centennial Angus Place Pty Ltd will aim to balance areas of cut and fill. In the event of any surplus spoil this will be taken to the proposed tailings dump.
General waste from construction	There will be two 23m^3 skips on site that will contain general waste and one 23m^3 recyclable material bin. Therefore, up to 529m^3 waste.	Minimise and manage general construction waste. Where possible, all quantities of waste or recyclable material will be quantified and recorded for benchmarking and continuous improvement purposes. Contractor induction training will be included in the CEMP and managed in accordance with it.
Construction: Liquid and Hazardous Waste		
Excess process water and dirty water	Process water and dirty water = 21,000 m^3	Excess process water will be removed offsite by a licensed waste contractor. Dirty water will be managed through water management controls. The existing surface water management system relies on separation of clean and dirty water and treatment of dirty water before discharge. Practise currently occurs in accordance with the SWMP.
Fluids such as oil and chemicals associated with maintenance and use of construction equipment and plant.	Minor quantities in lined with standard maintenance schedules.	There will be preventative measures to ensure controlled use of fluids during construction. All chemicals including oils, drilling muds etc will be on self bunded storage pallets. Disposal will follow the appropriate guidelines for the disposal of such wastes. Measures will be included in the CEMP.
Sewage	None as would be two chemical portable toilets.	Chemical toilets will be provided, maintained and removed by appropriate/accredited service provider.
Operation: Solid Waste		
General waste generated at the Ventilation Facility	Unknown	Angus Place Colliery will implement a waste free site i.e. all waste must be removed from site during the operational phase. As appropriate, it will then be separated, classified

Waste	Estimate of Quantity	Management Measures
		and recycled or disposed of at an appropriately licensed facility.
Operation: Liquid Waste		
Waste fluids such as oils and contaminated water	Quantities unknown although Centennial Angus Place Pty Ltd consider they will be minimal.	There will be preventative measures to ensure controlled use of liquids. All chemicals including oils, drilling muds, etc will be on self bunded storage pallets. Measures will be included in the CEMP.
Sewage	None as will be one chemical portable toilet.	A chemical toilet will be provided and maintained by appropriate/accredited service provider.
Dirty water	Vehicle wash down - create a washdown facility with water being removed offsite once per quarter from bunded area. Sump will be 20m x 15m x 1.5m	Management of dirty water currently occurs in accordance with the SWMP which will be updated to include the project.
Hazardous goods	Any spills from the 20,000L diesel for generator (bunded storage). Identified as a combustible liquid.	Spill kits will be provided on site.

9.19.1 Mitigation

The construction waste management measures identified in the EA report will be implemented through a CEMP.

For operational waste, the management measures identified in the EA report will be implemented.

The existing EMS and its associated procedures will be revised to ensure appropriate waste management and recycling processes and to address continual improvement as part of the EMS requirements.

9.20 Other Hazards

In addition to Bushfire risk (addressed in Section 9.11 and Appendix 9.8), other potential hazards associated with the project include:

- Construction:
  - Shaft sinking;
  - Unauthorised access and risk of damage and/or injury;
  - Contact with voltage;
  - Spills of hazardous materials during storage, handling and transportation;
  - Interception of utilities; and
  - Traffic.

- Operation:
  - » Unauthorised access and risk of damage and/or injury;
  - » Contact with voltage;
  - » Spills of hazardous materials during storage, handling and transportation;
  - » Traffic; and
  - » Incidents caused by subsidence such as damage to roads.

The works will be carried out in accordance with relevant health and safety legislation as applies to underground roadways in NSW. Other key hazards to public safety and staff are addressed below.

9.20.1 Construction

Shaft Sinking

The construction of the proposed shafts could pose a hazard. Whilst the site would be manned most of the time, security measures are identified as mitigation below.

Unauthorised Access

A member of the public could enter construction sites and cause damage to themselves such as from voltage, property or others. Security measures are identified as mitigation below.

Contact with Voltage

Electricity would be introduced to the area and therefore there is a risk of contact with voltage. Security measures and signage are identified as mitigation below.

Spills of Hazardous Materials

A risk screening has been undertaken to determine if the project falls under the SEPP 33 Hazardous and Offensive Development based upon information provided by Centennial Angus Place Pty Ltd on the anticipated potentially hazardous materials that would be used during the construction and operational stages of the project. Figure 4 'Risk Screening Procedure' in the 'Applying SEPP 33' guidelines of January 2011 has been used. The results of this screening are presented in Appendix 9.14. Hazardous materials anticipated to be used during construction are identified in Appendix 9.14. Material Safety Data Sheets are provided in Appendix 9.15.

These materials are not classified as hazardous with regard to SEPP 33 and would be stored in relatively small quantities.

Interception of Utilities

There is potential for the interception of utilities during construction and mitigation is identified below.

Traffic

The Traffic Impact Assessment (Section 9.9.14) predicts low levels of construction traffic and mitigation includes that a Construction Traffic Management Plan would be prepared and implemented which includes safety measures.

9.20.2 Operation

Unauthorised Access and Risk of Damage and/or Injury

There is potential for a member of the public to enter the sites and cause damage to themselves, property or others. It is proposed (Section 4) that the Ventilation Facility would have security fencing, security lighting, signage and CCTV and the proposed substation and switchyard would have fencing and signage in accordance with relevant standards. Further mitigation is identified below.

Spills of Hazardous Materials During Storage, Handling and Transportation

Emulsion fluid would be produced and stored to be used in various types of longwall hydraulic equipment. This would comprise a 20,000 litre water storage tank, a 30,000 litre emulsion storage tank and a 50,000 litre mixing tank all located within a bunded area.

There would be hydraulic and gear oil storage facilities to receive and store hydraulic and gear oil prior to it being pumped underground to supply underground mining equipment. The storage of such fluids is estimated at 20,000 litres of hydraulic and 20,000 litres of gear oil.

Diesel oil would also be stored for use underground and would be in the form of a self-bunded surface storage tank of approximately 20,000 litres with a smaller batch tank located alongside. The batch tank would be used to limit the amount of diesel that can be pumped underground at any one time.

Storage bays would be bunded to provide for a minimum retention capacity of not less than 150% of the largest tank's capacity. Bund walls would be designed to be impervious to the stored materials and able to withstand the full hydrostatic head.

Hydraulic, gear and diesel oil are not deemed as flammable. Diesel is classified as Class 1 - Combustible Liquid but not classified as Dangerous Goods according to the Australian Code for the Transport of Dangerous Goods by Road and Rail and according to the SEPP 33 guidelines. There are no pressurised toxic or flammable gases being stored or used on this installation. This facility has no intent to store or dispense flammable fluids to the public.

At the proposed substation and the proposed switchyard gear box oil/mechanical oil might be stored at the sites for use on the equipment.

Screening thresholds for stored materials and fluids as provided in the SEPP guidelines would not be exceeded. Therefore a Preliminary Hazard Analysis for the project is not required. The project does not comprise potentially hazardous or offensive development.

Traffic

The Traffic Impact Assessment (Section 9.14) predicts very low levels of operation traffic and mitigation includes that an Operational Traffic Management Plan would be prepared and implemented which includes safety measures.

Incidents Caused by Subsidence

Subsidence has the potential to cause cracking in roads and consequently is a public safety issue. Subsidence from the proposed underground roadways is predicted as being negligible (Section 9.16). However, there could be surface cracking due to subsidence from Springvale Colliery longwalls along the proposed power supply line route, Sunnyside Ridge Road and in the areas of the switchyard. Mitigation is identified in Section 9.16.

9.20.3 Mitigation

- The Public Safety Management Plan, Infrastructure Management Plan, Land Management Plan and Environmental Management Strategy will be revised to cover the project;
- Prior to the commencement of construction works at the Ventilation Facility, an alarm system and/or trespass alert system will be implemented and man-proof fences of 2m high and signage will be installed;
- During construction all sites will be fenced and signage will be installed to warn the public of the risks associated with unauthorised access and contact with voltage;
- Prior to any ground disturbance of the ground surface, existing relevant plans will be checked and 'Dial Before You Dig' will be undertaken to avoid interception with utilities;
- Plant will be appropriately maintained;
- Storage, handling and transportation of materials will be in accordance with relevant Australian Standards and legislation;
- Implement and maintain security fencing, security lighting and CCTV at the Ventilation Facility during operation;
- Implement and maintain fencing and signage to warn the public of the risks associated with unauthorised access and contact with voltage at the substation and switchyard sites and other parts of the works where appropriate during operation; and
- To protect further against unauthorised access during construction and operation, there will be regular site based inspections and contractor inspections.

9.21 Cumulative Effects

Cumulative effects associated with the project together with the existing/approved Angus Place Colliery and other activities/projects in the area have been considered.

Other activities and projects considered comprise existing/approved activities/projects, applications not approved but are advanced within the planning system and an initial scheme for Centennial that whilst is not advanced within the planning process, would be within close proximity of the project as follows:

- Existing Wallerawang power station including approval for a Development Application (024/11DA) in July 2011 for new storage silos;
- Existing Mount Piper power station including the following applications:
  - Application for a Western Rail Coal Unloader (06_0271) approved in June 2009;
  - Application for a new Base Load Power Station (MP 09_0119) approved in January 2010; and
  - Application for the Ash Emplacement project under part 3A (MP 09_0186) not yet determined.
- Activities such as those related to forestry operations and recreational activities (such as motorised vehicles on the Newnes State Forest);
- Existing Springvale Mine including:
  - longwalls 415 to 417 beneath Sunnyside Ridge Road;
  - an application to be made for one new dewatering bore 8; and
  - the existing ventilation facility and its approved upgrade
- Existing Pine Dale including:
  - Part 3A approval in 2011 for the Yarraboldy extension of an open cut mine; and

  - » A request for DGRs was lodged in December 2011 for an additional and larger extension to the open cut mine.
- The Lidsdale Siding Upgrade Project is a Centennial project to improve rail loading facilities including a reclaim tunnel and train track extension, near Wallerawang. DGRs issued in January 2012;
- The Coal Services Washery Upgrade and Coal Distribution Project is a Centennial project for new washery, haul road (via a bridge from the existing haul road between Angus Place Colliery and Mount Piper), new reject emplacement areas. DGRs requested February 2012 through the provision of a Government Briefing Paper.
- Expansion of Invincible Mine is part of the Coalpac Consolidation project 10_0178 and includes an extension to the north by open cut and high wall mining.

Springvale Colliery's existing bore 6 is within proximity of the project. The approximate locations of the other projects above are shown in Figure 9.5.

The project would provide new ventilation facilities and associated infrastructure to the east of the existing and approved mine. This would therefore extend existing operations to the east and into the Newnes State Forest. As no significant extraction of coal is part of the project, existing and approved coal handling operations would not be affected by the project.

Centennial's Springvale Colliery is adjacent to Angus Place Colliery and is located beneath parts of and to the south and south east of the Project Application Area. In the vicinity of the Project Application Area for the project are existing Springvale Colliery surface infrastructure (this includes the Springvale Ventilation Facility) and a scheme yet to be lodged for one new Springvale dewatering bore a few kilometres to the east of the Project Application Area. The Springvale longwalls 414 to 417 are in the process of being extracted and are located beneath part of the Project Application Area for the project.

Applications for Project Approval are also being made by Centennial for upgrades to infrastructure at Lidsdale Siding and Coal Services to the west and north west of Angus Place Colliery respectively. Both these facilities process coal from both Angus Place and Springvale Collieries. Therefore, the project is part of a growth of Centennial operations in the local area. There are also other projects in the area such as Pine Dale mine and Mount Piper Power Station. Therefore, there are a number of mining related projects in the area. During community consultation for the project one of the issues raised in relation to regional development was about concerns related to the intensification of mining.

There is potential for cumulative effects associated with:

- Flora and Fauna;
- Surface Water;
- Groundwater;
- Soil and Land Resources;
- Air Quality and Greenhouse Gas;
- Noise;
- Visual;
- Recreation; and
- Economics.

9.21.1 Flora and Fauna

There would be combined clearance associated with the Springvale dewatering bore project together with the project. These projects would increase impacts to the local ecological environment to a minor degree only. The direct impacts to vegetation and threatened species habitat are comparatively minor when compared to the extensive contiguous areas of similar vegetation and habitats throughout the region to the north and south along the Great Dividing Range.

There is a potential cumulative impact on the local population of *Persoonia hindii*. An application for Springvale Colliery Bore 8 is being prepared and it is currently anticipated that it might impact upon a further approximate 155 stems. No other impacts in the locality or region are known that would increase the cumulative impact to this species. A package of mitigation measures are proposed to mitigate the impact to *Persoonia hindii* for the project and mitigation measures are to be proposed for Springvale bore 8.

No significant impact from the project is predicted to the swamps and therefore there is no cumulative impact with other projects or activities.

9.21.2 Surface Water

The project would involve relatively small areas of vegetation clearance and there are also clearance activities associated with forestry operations and the proposed Springvale dewatering bore project. Each area of clearance has localised implications for changes to run off, the magnitude of the change in runoff being dependent primarily upon the area of clearance, the extent of soil disturbance and the extent of tree removal and the undertaking of any soil stabilisation works. Unless the cumulative clearance areas are concentrated together and of a large area it is most likely that the impact will be minimal as all works are undertaken with the intent of minimising adverse impacts. Changes in run off from the project are expected to be localised and mitigation measures are identified for the project. Therefore, there are not anticipated to be significant cumulative effects due to run off from these collective projects.

When considering the broader operations of mining and other sites in the general Lithgow area there are several operational mines that collectively discharge waters into the Coxs and Wolgan Rivers and their tributaries. Within that broader area there is also a powerstation and the Lithgow and smaller urban areas. Whilst the project would lead to an increase in discharge via LDP001 to Kangaroo Creek which drains to the Coxs River, this discharge remains within the limits set by EPL 476. GHD reports that there would not be any quantifiable impact beyond the natural climatic variability within the regional watercourses of the Coxs River. GHD has advised that Invincible Mine is located within the Cullen Creek catchment which drains eventually into the Turon River and there is not likely to be any surface water related interaction between Invincible Mine and the project. Therefore, cumulative effects on watercourses from the project together with the other projects in the area are not likely.

9.21.3 Groundwater

There are not anticipated to be any impacts to GDEs due to the project and therefore there would not be cumulative effects on GDEs with other projects.

The coal seam is already partially drained from by previous longwall extraction in the area. Any additional drainage from the project into the workings would be negligible.

The installation of the proposed underground roadways is unlikely to result in a further reduction of groundwater pressure, except in the strata immediately overlying the seam above the underground roadways. However, the groundwater impacts of the proposed underground roadways are negligible.

There are potential cumulative effects associated with water make. The project is expected to generate 0.5ML/day that would be discharged through LDP001 and to Kangaroo Creek. This would be in addition to the water make generated by the existing/approved mine that is discharged through LDP001 which together would be within the limits set by EPL476. There would be minor groundwater inflow from Springvale and Angus Place Colliery existing mining operations together with the proposed underground roadways. Therefore there would be a potential cumulative increase in groundwater extraction from deep aquifers.

Bore and shaft drilling from the project and those associated with those in the vicinity has potential cumulative effect of aquifer drainage and contamination of aquifers. The project includes that preventative measures will be taken during construction and bores and shafts would be fully cased to protect groundwater.

9.21.4 Soil and Land Resources

The cumulative effect on soils and land capability within Angus Place Colliery is negligible, based on the small scale of surface disturbance and the current level of land capability within the Project Application Area.

Cumulative effects would include:

- Land clearing, soil stripping and disturbance: In the context of the broader landscape, the proposed land clearing activities for the project would consist of 50.5ha, which lies within approximately 300km^2 of the Newnes State Forest. This area is dominated by undisturbed bushland. Other projects in the area may also require land clearing, soil stripping and disturbance and therefore a potential cumulative effect;
- Changes in Land Capability: There would be no change in land capability post disturbance due to the implementation of the Rehabilitation Strategy, therefore the project would have no contributing impact to cumulative effects on land capability; and
- Changes in Agricultural Suitability: There is no change in agricultural suitability post disturbance; therefore the project would have no contributing impact to cumulative effects on agricultural suitability.

9.21.5 Air Quality and Greenhouse Gas

The Air Quality Assessment (Appendix 9.6) took into account a number of other projects and activities in the area as well as the project for the modelling. Air quality was found to exceed certain air quality criteria without the project. No additional exceedances of the nominated project criteria would be experienced at the six nearest residential receptors due to the construction and operation of the project. This is because the contribution from the project to air quality in the area (and at the six residential receptors) would be negligible.

Odour impacts from the project are predicted to be less than 0.7 OU at all sensitive receptor locations compared to a criterion of 5 OU, as a 99th percentile nose response time average (1-second). Given the similar distance and bearing of the Springvale Colliery Ventilation Shaft to the sensitive receptors when compared to the project, it may be a conservative assumption that similar odour impacts may be experienced from the Springvale Ventilation Shaft, which may result in a maximum odour concentration of 1.4 OU. This still complies with the 5 OU criterion identified in the Air Quality and Greenhouse Gas Assessment in Appendix 9.6. There would be odour from the Springvale ventilation facility, the existing Angus Place Colliery ventilation facility and the proposed Ventilation Facility that is part of the project. The Springvale ventilation facility is also located within the Newnes State Forest, approximately 5km from the proposed Ventilation Facility. The existing Angus Place Colliery ventilation facility is approximately 10km from the proposed Ventilation Facility. Odour may be noticeable at the immediate vicinity of each of these ventilation facilities. Following construction of the project, there would be two odour producing sites in the Newnes

State Forest, and due to their relative proximity cumulative odours may be noticeable by those using this part of the Newnes State Forest.

The greenhouse gas assessment by SLR took into account the existing/approved operations at Angus Place Colliery together with the project. Emissions in NSW were reported to be 161Mt in 2009, representing 27% of the Australian total greenhouse gas emissions of 545.8Mt. Emissions from the project are predicted to be 0.06% of the NSW greenhouse gas emission total (as recorded in 2009). There would be potential cumulative effects with Angus Place Colliery (as modified) together with other projects and activities in the area. For example, emissions from Wallerawang and Mount Piper power stations, emissions from vehicles for forestry and recreational activities in the Newnes State Forest, emissions from the various activities at nearby Springvale Colliery (the upgrade of the ventilation shaft and the dewatering bore) and also activities at Pine Dale, Lidsdale Siding and Coal Services. Emissions associated with the other projects were considered by SLR qualitatively. Concentrations predicted in other assessments were reported to be insignificant when compared to other emission sources or were considered to be at a distance where cumulative impacts would not occur (refer Appendix 9.6). Angus Place Colliery is implementing a range of measures to reduce greenhouse gas emissions where practical and energy efficiency has been considered in the specifications of the equipment that would be used.

9.21.6 Noise

During operation, the acceptable amenity criterion of 50 dBA for a passive recreational area would be met at distances of approximately 550m and 700m from the Project Application Area under calm and prevailing meteorological conditions respectively. There is a small area of Sunnyside Ridge Road to the east of the Project Application Area which is predicted to experience small exceedences of the project specific noise criteria for a passive recreational area. Noise would potentially be noticeable close to the Ventilation Facility including a short section of Sunnyside Ridge Road. SLR notes that the road is promoted for use as a 4WD route and noise impacts on potential users are considered insignificant. Sunnyside Ridge Road will also be used by traffic associated with other activities and mitigation for the project is identified (refer also to Section 9.21.9 Recreation). Cumulative noise effects with the nearby Springvale ventilation fan are predicted to be negligible given the distances (approximately 5km between the Springvale and proposed ventilation facilities). Noise levels of less than 20 dBA are predicted at the residential and recreational receptors due to the project operations and SLR considers any increase to cumulative industrial noise levels due to the project operations would be negligible (less than 0.1 dBA) (refer Appendix 9.7).

9.21.7 Visual

Views of the project are largely confined to the immediate area and would therefore be seen by those using the area for recreational purposes. There could also be potential views from the Lost City (R8), Bald Trig (R9) and Carne Creek Shrub Swamp (R11) although intervening vegetation may provide screening (refer Section 9.12). There is potential for views from these areas to also include parts of the existing colliery to the west. This would be seen within a context of forest with areas of mining related infrastructure. Section 9.12 identifies mitigation measures to minimise views of the project.

The construction of works for the project and the Springvale projects for the ventilation shaft upgrade and the dewatering bore may occur at a similar time. In this event such works and the associated construction traffic may be visible to recreational users of the Newnes State Forest within the immediate area of the project and particularly along the adjacent stretch of Sunnyside Ridge Road.

Similarly, once operational, the surface infrastructure of the project and potentially the Springvale ventilation shaft upgrade and dewatering bore may be visible from the immediate area to recreational users. The project would be potentially visible from Bald Trig, Carne Creek Shrub Swamp and the Lost City. There is

therefore potential for cumulative visual impacts from the three recreational locations identified if these and other local projects are visible from these recreational places. Section 9.12 identifies mitigation measures to minimise views of the project.

9.21.8 Recreation

The activity of the modified Angus Place Colliery together with other forestry related activities and those of nearby Springvale Colliery may lead to combined air, noise, traffic and visual effects and hazard risks to recreational users. Mitigation measures to minimise effects from the project are identified in this EA. Combined construction effects with projects in the immediate vicinity would be temporary and are likely to be minor and any cumulative effects with other schemes would therefore also be temporary. For operation, based on recent traffic surveys the Traffic Impact Assessment (Section 9.14 and Appendix 9.10) the Newnes State Forest roads can accommodate the minor increase in traffic (including during the summer months when there may be an increase in traffic due to recreational users).

During operation there is predicted to be a small noise exceedance within 550m and 700m of the Ventilation Facility that would affect a small section of Sunnyside Ridge Road which may also be used for traffic associated with other activities and mitigation is identified. Cumulative noise effects with other projects in the area and also the Springvale ventilation fan are predicted to be negligible. Regarding views, the substation and clearance for the powerline would be visible from Sunnyside Ridge Road and the switchyard from Blackfellows Hands Road and Sunnyside Ridge Road and there may be views from recreational places to the south, south east and east. It is possible that components of other schemes are also visible from these locations. As discussed in Section 9.21.6, odour may be noticeable at both the Springvale and project ventilation facilities. Both are within the Newnes State Forest and are approximately 5km apart. Odour may be noticeable to those in the area for recreation within the immediate vicinity of each of these sites. Visual and cumulative impacts were identified during community consultation as being of concern in the regional context. Therefore, there is potential for cumulative effects associated with views and noise for those using the Newnes State Forest for recreation in the immediate vicinity and potentially in views from recreational places to the south, south east and east of the Project Application Area.

9.21.9 Economics

This project, together with other mining related projects, in the area is important to the economic sustainability of the Lithgow LGA. Whilst the project does not provide for a net increase in employment there would be multiplier effects associated with the additional economic activity during construction. This together with similar effects for other projects in the area has the potential for beneficial cumulative effects on the economy.

There would also be costs associated with environmental impacts of the different projects and therefore a potential adverse cumulative effect.

The Economics Assessment (Appendix 9.11) reports that cumulative impacts principally affect resident persons, households or others accessing the region. The location of the Project Application Area is relatively remote. Apart from the initial construction phase, activity around the site would mainly be confined to security and maintenance requirements. The remainder of activity relating to the trial mining stage would be centred on the existing mine-site infrastructure at Angus Place Colliery. The economic analysis of environmental risks and effects reported in the Economic Assessment identifies that the project would have little perceptible economic impact on the most proximate potential receptors of impacts (refer Appendix 9.11).

9.21.10 Conclusion

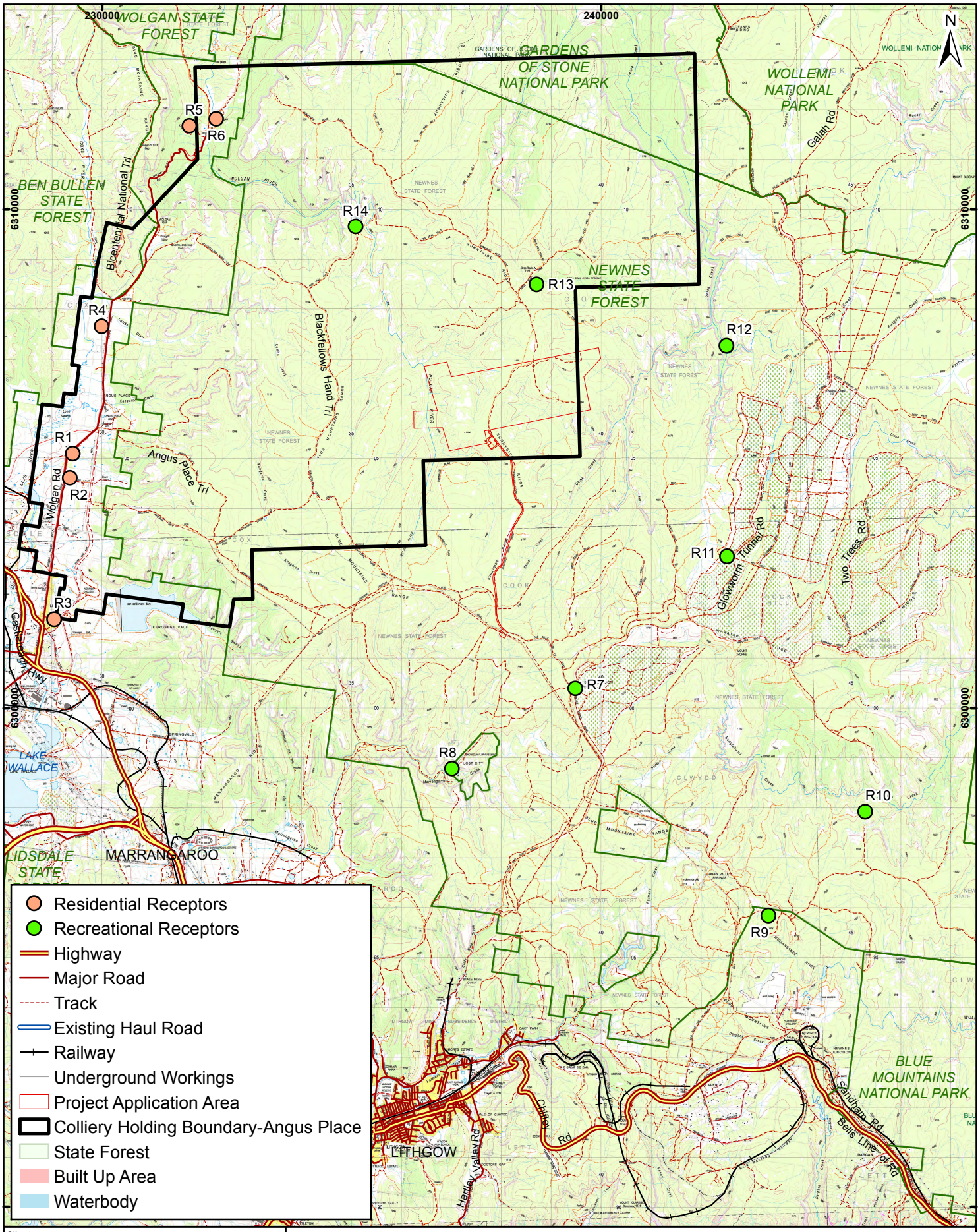
A key potential local cumulative impact is the loss of *Persoonia hindii.* Mitigation measures including seed collection, translocation and management of residual populations will be implemented (refer Section 9.3.4). There would also be cumulative impacts associated with changes to recreational amenity within this part of the Newnes State Forest.

In the context of other projects such as Wallerawang and Mount Piper power stations, Pine Dale Mine, Lidsdale Siding and Coal Services there is the potential for the project to contribute to a cumulative increase in greenhouse gas emissions and the intensification of mining in the region. However, cumulative impacts are mainly associated with other projects closer to the Project Application Area, such as existing and proposed developments in the Newnes State Forest.

Red groundwater drawdown

Black underground roadways

Figure 9.1 Schematic Area of Groundwater Drawdown Around Underground Roadways



Client:	Centennial Coal		
Compiled by:	TW	Date:	25/07/2012
Approved by:	JAK	Date:	25/07/2012

0 0.5 1 2 3 km

Datum: GDA94 / MGA Zone 56

RPS

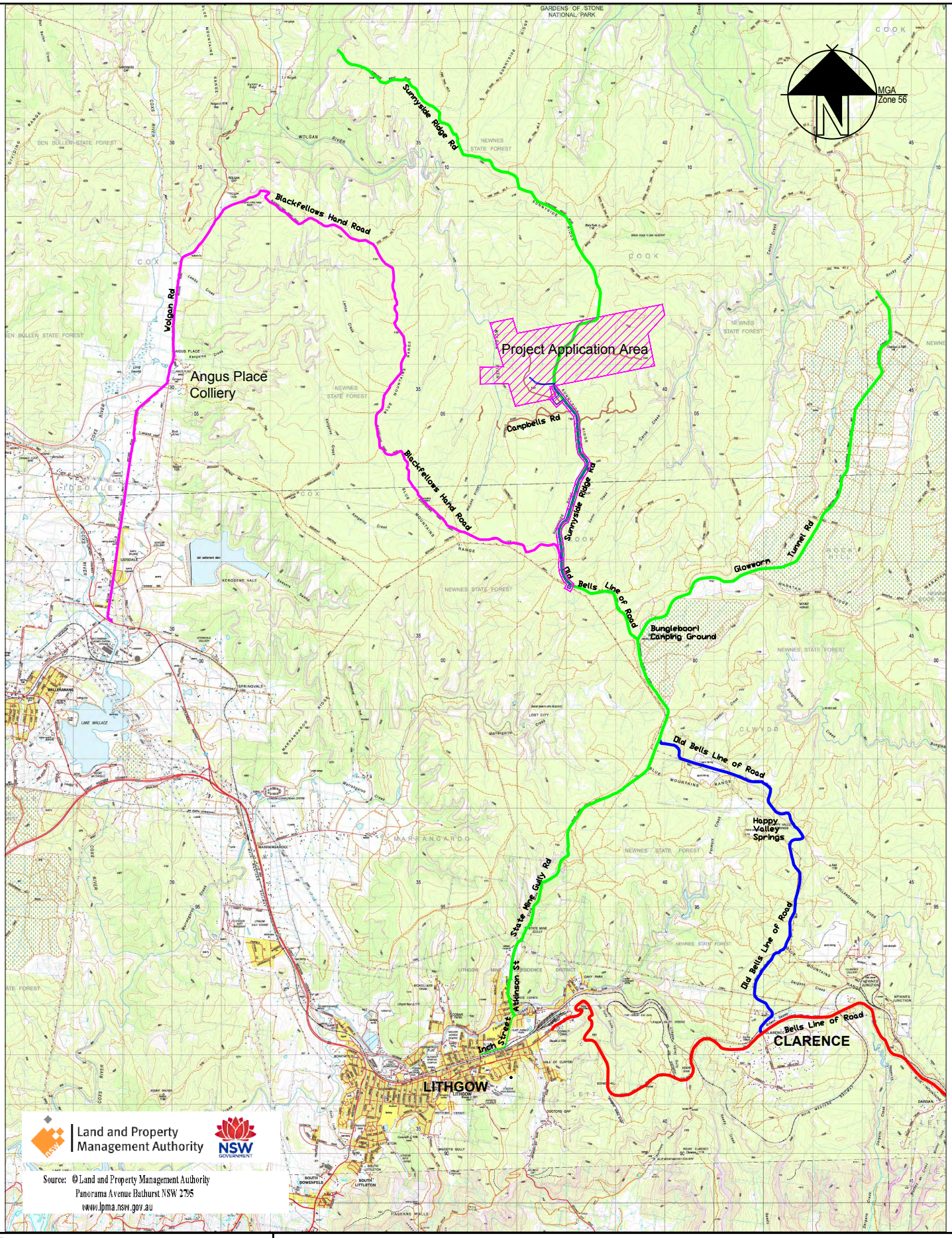
Residential and Recreational Receptors

Figure 9.2

Project: Angus Place Colliery Ventilation Facility Project

Source: Base topographic data © Commonwealth of Australia (Geoscience Australia) 2006.
Mine workings and project application features © Centennial Coal 2012.
Recievers, SLR 2012.
Background topographic map © Land and Property Management Authority(LPMA), Panorama Avenue Bathurst NSW 2795, www.lpma.nsw.gov.au

Tracking ID: 11-3671-036b Compiled: 25 Jul 2012



Client:	Centennial Coal		
Compiled by:	TW	Date:	25/06/2012
Approved by:	JAK	Date:	25/06/2012

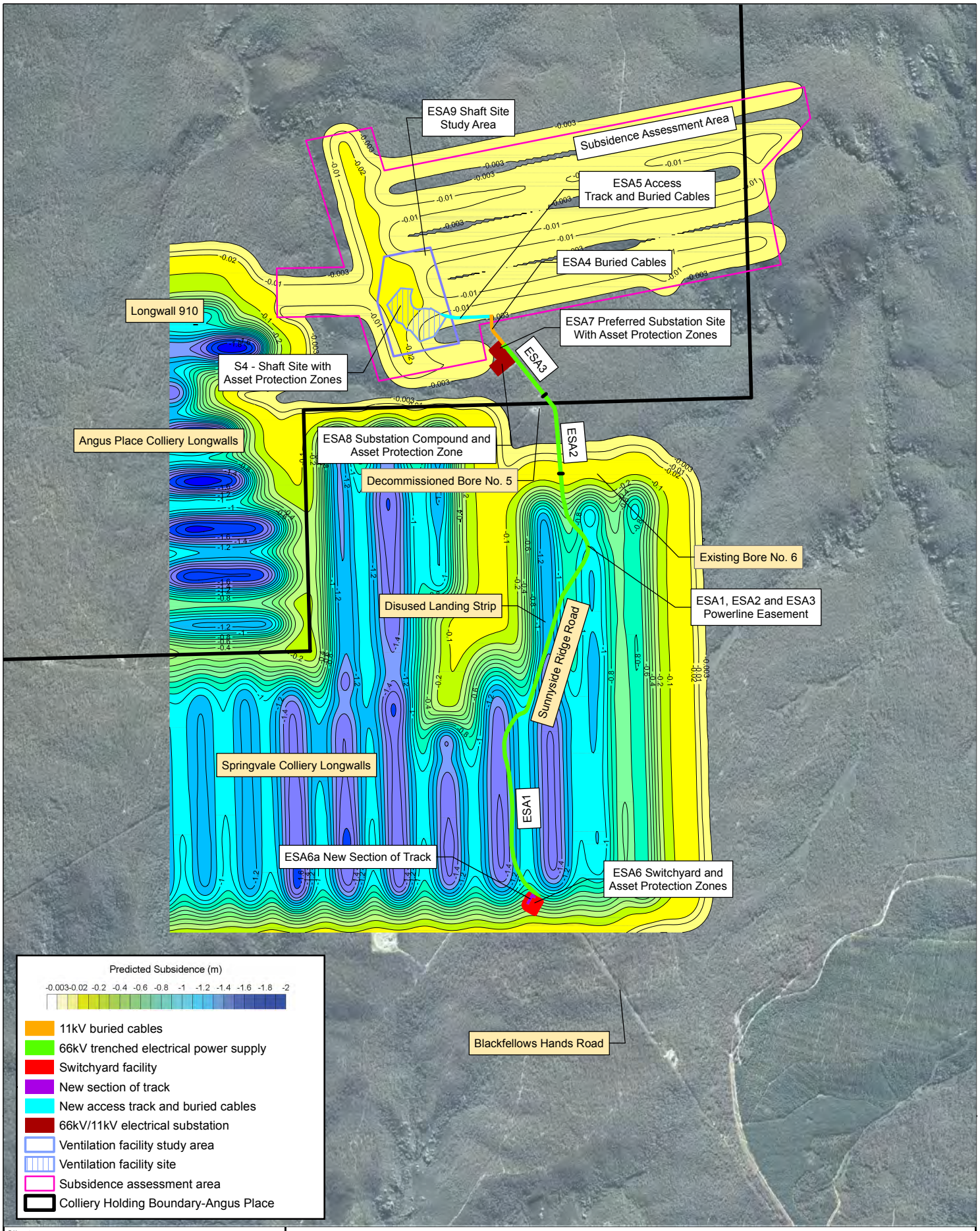
Access Roads

Figure 9.3

Project: Angus Place Colliery Ventilation Facility Project

Source: Centennial Coal 2012.

RPS



Client:	Centennial Coal		
Compiled by:	TW	Date:	25/06/2012
Approved by:	JAK	Date:	25/06/2012

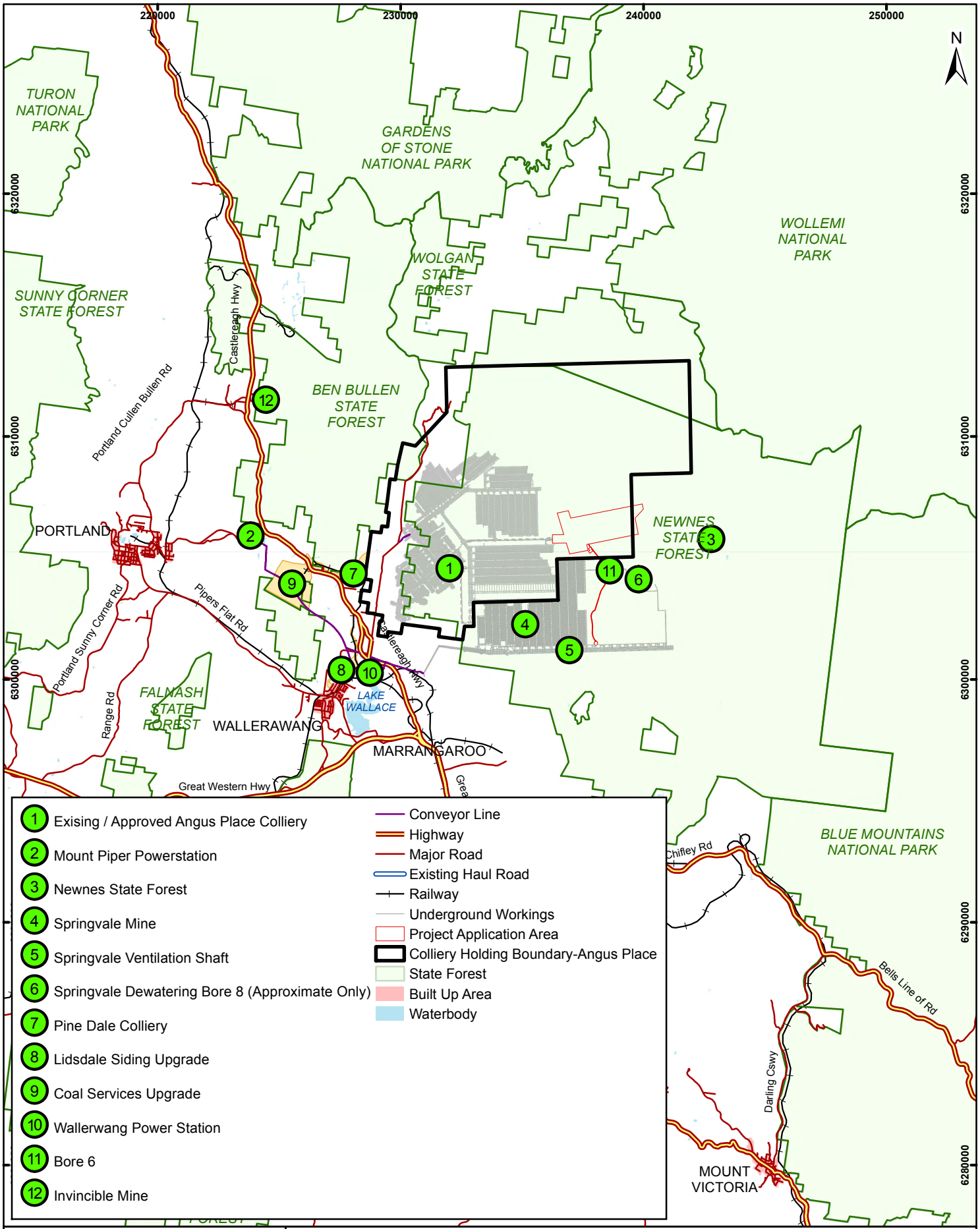
Subsidence Assessment Area & Modelled Subsidence Areas

Figure 9.4

Project: Angus Place Colliery Ventilation Facility Project

Source: DGS 2012.

RPS DgS



Client:	Centennial Coal		
Compiled by:	TW	Date:	25/07/2012
Approved by:	JAK	Date:	25/07/2012

Approximate Locations of Other Projects and Activities for Cumulative Effects Assessment

Figure 9.5

Project: Angus Place Colliery Ventilation Facility Project

0 0.5 1 2 3 km

Datum: GDA94 / MGA Zone 56

RPS

10.0 Statement of Commitments

The following Statement of Commitments is based upon the mitigation and management measures identified in Section 9 Environmental Assessment.

FLORA AND FAUNA

1. A *Persoonia hindii* Management Plan will be developed. This plan will:
    a. Include the direct management actions and mitigation measures identified in Section 9.3.4 of this EA.
    b. Include consultation with relevant stakeholders, including OEH, Forests NSW and the NSW Botanic Gardens.
2. The existing Flora and Fauna Management Plan will be updated to include the management actions identified in Section 9.3.4 of this EA.

SURFACE WATER

3. The existing Site Water Management Plan will be updated to include the management actions identified in Section 9.4.4 of this EA.
4. A Construction Environmental Management Plan will be developed and implemented. This plan will include measures to minimise impacts to surface water systems, including sediment and erosion controls.

GROUNDWATER

5. The existing Groundwater Management Plan will be updated to include the management actions identified in Section 9.5.4 of this EA.

REHABILITATION

6. Rehabilitation will be implemented in accordance with the existing Rehabilitation Strategy.

SOILS AND LAND RESOURCES

7. The Construction Environmental Management Plan will include sediment and erosion controls.
8. The existing Site Water Management Plan will be updated to include the management actions in Section 9.7.4 of this EA.
9. The Rehabilitation Strategy will be updated to include the management actions in Section 9.6 and 9.7.4 of this EA.

GREENHOUSE GASES

10. The existing Energy Savings Action Plan and Energy Efficiency Opportunities strategies will continue to be implemented.
11. Centennial Angus Place Pty Ltd will participate, where required, in strategies to reduce greenhouse gas emissions identified by Centennial Angus Place Pty Ltd.

AIR QUALITY

12. The Construction Environmental Management Plan will include measures such as dust suppression and limits to plant use.
13. Dust monitoring will continue under the existing Environmental Monitoring Program.
14. Air quality management measures will be further investigated to decrease air quality impacts from the project in conjunction with other site practices.
15. The diesel generator will be maintained in accordance with the manufacturer's maintenance requirements to ensure that emissions from it are mitigated on the occasions when it is needed.
16. The vegetative buffer provided by the existing forest will be maintained to mitigate odour from the Ventilation Facility during its operation.

NOISE

17. The existing Noise Monitoring Program will be updated to include management actions identified in Section 9.10 of this EA.
18. The Construction Environmental Management Plan will include noise management and mitigation measures.

BUSHFIRE

19. The existing Bushfire Management Procedure and Management of Bushfire Assets Procedure will be updated to include the management actions identified in Section 9.11.1 of this EA.

VISUAL

20. The Construction Environmental Management Plan will include measures to minimise the visual impacts of the construction phase of the project.

RECREATION

21. The Construction Environmental Management Plan will include measures to minimise impacts to recreational users of the Newnes State Forest during construction. This will include installation of appropriate signage.

TRAFFIC

22. A Construction Traffic Management Plan will be prepared and implemented in consultation with Forests NSW and Lithgow City Council that includes the management actions identified in Section 9.14.4 of this EA.

SUBSIDENCE

23. A Wolgan River Monitoring Program will be developed and implemented. It will include:
    a. Pre and post mining inspections of the Wolgan River.
    b. Photographic monitoring of the Wolgan River prior to mining.
    c. Annual inspections and reporting of the condition of the Wolgan River for a period of 5 years post mining.

24. Appropriate impact management and mitigation plans will be developed for infrastructure within the Project Application Area.

25. Existing management plans will be updated to take into consideration potential subsidence impacts from the project.

HERITAGE

26. The existing Cultural Heritage Management Plan will be updated to include the management actions identified in Section 9.17.4 of the EA.

AGRICULTURE

27. An agreement will be entered into with Forests NSW for the temporary use of the land required for the project.

28. An Occupation Permit and/or Mining Lease will be established for the Project Application Area prior to the operational phase of the project.

OTHER HAZARDS

29. Where required, all management plans will be updated to include the management actions identified in Section 9.20.3 of this EA.

30. The Construction Environmental Management Plan will take into consideration public safety, hazardous materials management and waste management activities.

OTHER APPROVALS

31. Centennial Angus Place Pty Ltd will obtain all necessary approvals to carry out and complete the project.

32. Centennial Angus Place will ensure a section 91 licence is obtained under the *Threatened Species Conservation Act 1995* for the implementation of the *Persoonia hindii* Management Plan.

11.0 Justification and Conclusion

11.1 Justification

This EA has been prepared in support of an application under section 75W of the EP&A Act to modify Project Approval 06_0021 for the project comprising the following key elements:

- Development of underground access headings from the eastern extent of longwall 910 to a proposed Ventilation Facility;
- Development of underground roadways eastwards of the Ventilation Facility to undertake trial mining;
- Construction and operation of a Ventilation Facility, access track and associated infrastructure (electrical substation, power supply and switchyard); and
- Rehabilitation activities following the construction of the Ventilation Facility.

An Environmental Constraints Study was undertaken prior to the project description being finalised to determine locations for the substation and provide guidance on the precise siting of the Ventilation Facility. This and the consideration of a number of layout and siting alternatives has resulted in the avoidance and minimisation of some environmental impacts and residual impacts are to be mitigated.

In addition to the matters prescribed in the DGRs, a risk based and consultative approach has been used in preparing this EA. The Environmental Risk Assessment was undertaken at an early stage and identified potential environmental impacts associated with the project. This resulted in the undertaking of a range of technical assessments, some of which exceeded the requirements of the subsequent DGRs. It also identified aspects of the project where further information or investigation was needed to address any existing knowledge gaps and any need to improve existing mitigation and management measures to ensure the residual risk for the project is acceptably low. Any unacceptable risks or knowledge/information gaps were used to inform the scope of the specialist investigations.

The area comprises native vegetation and swamps and the design of the project has evolved during the EA process to minimise impacts on threatened flora, in particular, *Persoonia hindii* and also on swamps identified as EECs and two significant ecological areas identified as having affinities with swamp environs and with an EEC near the proposed Ventilation Facility. Mitigation includes a number of measures for *Persoonia hindii* such as seed collection, translocation and management of residual populations. However, there would remain a residual impact associated with the loss of *Persoonia hindii*, an endangered flora species under the TSC Act. The swamp and the two significant ecological areas within proximity to the Ventilation Facility will be protected by buffers of at least 50m and water management measures.

For surface water, a range of detailed mitigation measures are identified, some of which are specifically to protect the swamp near the Ventilation Facility. There would be a minor increase in discharge at LDP001 and this is within the limits set by the EPL. Drilling would intersect aquifers and drilling methods would mitigate flows into and out of the boreholes.

Greenhouse gas would be generated by the project. The maximisation of energy efficiency has been considered for specific components of the project such as the design of the Ventilation Facility. Angus Place Colliery is currently implementing a number of measures to minimise greenhouse gas emissions to the greatest practicable extent and this will be ongoing.

Impacts on air quality and those associated with odour on sensitive receptors are negligible.

There would be an exceedance of the project specific noise criteria around the Ventilation Facility during operation. This includes a short section of Sunnyside Ridge Road which is promoted as a 4WD route.

Whilst those in vehicles using this section of Sunnyside Ridge Road are unlikely to be significantly affected, this noise would be noticeable to other recreational users in the vicinity of the Ventilation Facility.

Night lighting during construction would be temporary and largely screened by vegetation. Parts of the project would be visible during construction and operation from the immediate area and potentially from three recreational places to the south, south east and east. The Project Application Area is within a bushfire prone area and Asset Protection Zones have been incorporated into the project. A range of other mitigation measures to protect against bushfire and other hazards are identified in this EA.

The Project Application Area is located to the east of the existing mine and within the Newnes State Forest. It is further away from residential receptors to the west and north west although is within an area used for recreation and consequently effects on those using the Newnes State Forest for recreation have been addressed. There would be residual impacts on recreational amenity in the vicinity of the Project Application Area during construction. During operation, there would be residual recreational amenity effects in the immediate area of the Ventilation Facility comprising a combination of noise, odour and changes to views. This would be for the duration of the operation of the project and, following this, the Project Application Area would be rehabilitated and returned to forest.

Subsidence from the project is predicted to be negligible. Subsidence from the Springvale Colliery longwalls has potential to affect parts of the proposed infrastructure for the project and mitigation measures, such as those for the design of the proposed infrastructure and monitoring, are identified.

There are no Aboriginal heritage sites or registered non Aboriginal registered heritage items within or in the vicinity of the Project Application Area.

There are forestry resources within the Project Application Area and Centennial Angus Place Pty Ltd is liaising with Forests NSW about harvesting this forestry and establishing a rental agreement and Security Deposit.

Waste would be generated during construction and operation and measures to minimise and manage wastes are identified.

Cumulative impacts with other projects are mainly associated with other projects close to the Project Application Area. They include the loss of *Persoonia hindii* and impacts on recreational amenity. In a regional context there are potential greenhouse gas emissions from a number of projects and a general intensification of mining in the local area.

Revisions to the design of the scheme during the EA process have resulted in some impacts being avoided and minimised. The majority of the potential adverse impacts associated with the project can be mitigated through the implementation of the mitigation measures identified in this EA. The main residual impacts are the loss of *Persoonia hindii*, changes to recreational amenity (combined noise, odour and changes in views) in the immediate vicinity of the Project Application Area and greenhouse gas emissions.

The project is considered justified in the context of the objects of the EP&A Act. Table 11.1 identifies the objects of the EP&A Act and how the project addresses these.

Table 11.1 Objects of the EP&A Act and Relevance to Project

Object	Relevance to Project
(a)(i) To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.	The project would provide the necessary infrastructure to allow access to investigate coal resources and provide adequate ventilation. Impacts on the natural environment have been avoided or minimised through design iterations and would be further mitigated by the measures identified in this EA.
(a)(ii) To encourage the promotion and co-ordination of the orderly and economic use and development of land.	The project would allow access to investigate potential future coal resources at Angus Place Colliery.
(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services.	The project would not affect any existing communication or utility services.
(a) (iv) the provision of land for public purposes.	The project is within State Forest and there would be amenity impacts on those using the area for recreation within proximity of the Project Application Area.
(a)(v) To encourage the provision and co-ordination of community services and facilities.	Centennial Angus Place Pty Ltd contributes to community services and facilities within Lidsdale through the CCC and actively participates in community events.
(a)(vi) To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.	The project has been designed to minimise impacts on native flora and fauna including threatened species, populations and ecological communities. This included providing buffer zones between the project and areas of hanging swamp EEC and providing a trenched power supply route to minimise clearing requirements.
(vii) To encourage ecologically sustainable development.	The principles of ecologically sustainable development are discussed below.
(a)(viii) To encourage the provision and maintenance of affordable housing.	This objective is not applicable.
(b) To promote the sharing of the responsibility for environmental planning between the different levels of government in the State.	Centennial Angus Place Pty Ltd has consulted various Federal, State and local government agencies throughout the EA process and would continue to liaise with these stakeholders and the local community during the detailed design, construction and operation of the project.
(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	Project specific community consultation has been undertaken. Consultation via the CCC will be ongoing.

11.1.1 Principles of Ecologically Sustainable Development

Ecologically Sustainable Development (ESD) is a primary objective of environmental protection in NSW. ESD is an objective of the EP&A Act under Section 5(a)(vii) and is defined under Section 4 of the EP&A Act as having the same meaning as Section 6(2) of the *Protection of the Environment Administration Act 1991* being:

> *'6(2) for the purposes of subsection (1)(a), ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making*

processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

(a) the precautionary principle—namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation...

(b) inter-generational equity—namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

(c) conservation of biological diversity and ecological integrity—namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,

(d) improved valuation, pricing and incentive mechanisms—namely, that environmental factors should be included in the valuation of assets and services….'

The overall objectives of ESD are to use, conserve and enhance natural resources. This ensures that ecological processes are maintained facilitating improved quality of life, now and into the future.

Centennial Angus Place Pty Ltd has shown a commitment to the principles of ESD and understands that social, economic and environmental objectives are interdependent. Centennial Angus Place Pty Ltd acknowledges that a well designed and effectively managed operation will avoid significant and/or costly environmental impact or degradation. The risk averse mine plan and the suite of existing environmental management plans have been developed to appropriately identify, mitigate and manage environmental risk. These demonstrate environmental due diligence and provide procedures for on-going management and monitoring of the operation in line with the objectives of ESD.

The Precautionary Principle

The Precautionary Principle, in summary, holds that where there are threats of serious or irreversible environmental damage, the lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

There has been careful evaluation undertaken in order to avoid, where possible, serious or irreversible damage to the environment. A detailed understanding of the issues and potential impacts associated with the project has been obtained via consultation and assessment to a level of detail commensurate with the scale of the scheme, industry standards and the legislative framework under which the scheme would be permitted. Technical assessments, including the use of engineering and scientific modelling, have been undertaken for the design of the project and for impacts relating to groundwater, surface water, Aboriginal heritage, traffic, subsidence, European heritage, noise, air quality (including greenhouse gas) flora and fauna, visual and recreation. Assessment has also been undertaken for other issues, including hazards, agriculture and economic considerations. The Environmental Risk Assessment was undertaken at an early stage in the EA process and identified a potential need for a range of assessments, some of which were additional to those identified in the subsequent DGRs and were undertaken as part of the precautionary approach.

During the EA process the design of the scheme has been amended in response to assessment findings and to avoid or minimise environmental impacts where possible.

Social Equity, Inter-Generational Equity

Intergenerational Equity is centred on the concept that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future

generations. There is a moral obligation to ensure that today's economic progress, which will benefit both current and future generations, is not offset by environmental deterioration.

The primary objective of the project is to develop underground roadways and ventilation shafts from the existing Angus Place Colliery workings to enable trial mining to the east of the Wolgan River. The various consultation activities that have been undertaken and the engagement of suitably qualified and experienced consultants have ensured that the planning, design and EA phases of the project have been transparent. The contents of this EA report (including appendices), combined with the consultation activities, has enabled Angus Place Colliery to understand the potential implications of the project. Therefore it has been possible to identify revisions to the scheme during the EA process.

The management strategies, mitigation measures and monitoring programs have been identified to minimise adverse impact. Emphasis has been placed on anticipation and prevention of potential impacts, as opposed to undertaking later remedial action. These actions and initiatives will assist in ensuring that current and future generations can enjoy equal and equitable access to social, environmental and economic resources through the maintenance of the health, diversity and production of the environment.

Conservation of Biological Diversity and Ecological Integrity

The principle of Conservation of Biological Diversity and Ecological Integrity holds that the conservation of biological diversity and ecological integrity should be a fundamental consideration for a development project.

The potential environmental impacts of the project, including upon ecological communities and habitat values, and measures to ameliorate these potential impacts are detailed within this EA. Centennial Angus Place Pty Ltd has sought to avoid and minimise potential impacts on ecological values through a risk based approach that eliminates or minimises impacts on the surrounding ecology. A specialist flora and fauna assessment was undertaken for the project. This includes the identification and assessment of impacts on EECs and mitigation for an endangered flora species under the TSC Act, *Persoonia hindii*.

A referral was submitted to the SEWPaC under the EPBC Act in June 2012 to determine whether the project constituted a controlled action. On 2 July 2012 SEWPaC provided notification of the decision that the project does not constitute a controlled action under the EPBC Act. Therefore, the project does not require further assessment or approval under the EPBC Act.

Improved Valuation and Pricing of Environmental Resources

The principle of Improved Valuation, Pricing and Incentive Mechanisms deems that environmental factors should be included in the valuation of assets and services. The cost associated with using or impacting upon an environmental resource is seen as a cost incurred to protect that resource.

Whilst clear and widely accepted standards have not yet been established for the application of this principle (to date there are few widely accepted methods by which monetary values are attributed to environmental factors), Centennial Angus Place Pty Ltd acknowledges and accepts the financial costs associated with all the measures required for the mine to avoid, minimise, mitigate and manage potential environmental and social (in this case recreational) impacts for the project.

11.2 Conclusion

This EA was prepared in accordance with the EP&A Act as a transitional Part 3A project. It addresses the requirements of the Director General of the DP&I and key risk areas identified by Centennial Angus Place Pty Ltd and the project team. The design of the project has been amended to avoid or minimise environmental impacts during the EA process. However, there would be residual impacts on *Persoonia hindii*, recreational amenity in the vicinity of the Project Application Area and greenhouse gas emissions. The

EA has considered the positive and negative environment, social (in this case recreational) and economic impacts of the project, including potential cumulative impacts with the existing mine and surrounding activities in the area. The EA and technical assessments indicate that the project has strong justification for proceeding provided that the specific mitigation measures identified in this EA are implemented.

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13.0 Abbreviations

Abbreviation	Meaning
AIS	Agricultural Impact Statement
AHIMS	Aboriginal Heritage Information Management System
CCL	Consolidated Coal Lease
CHMHS	*Coal Mine Health and Safety Act 2002*
CO_2	Carbon dioxide
CCC	Community Consultative Community
CEMP	Construction Environmental Management Plan
DECCW	(Former) Department of Environment, Climate Change and Water (NSW) (now known as Office of Environment and Heritage (OEH))
DGRs	Director General's Requirements
DP&I	Department of Planning and Infrastructure (NSW)
DRE	Division of Resources and Energy (within DTIRIS)
DTIRIS	Department of Trade & Investment, Regional Infrastructure and Services (NSW)
EA	Environmental Assessment
EEC	Endangered Ecological Community
EP&A Act	*Environmental Planning and Assessment Act 1979 (NSW)*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
EPL	Environment Protection Licence
GDE	Groundwater Dependent Ecosystem
GNTCG	Gundungurra Native Title Claim Group
LDP	Licensed Discharge Point
LEP	Local Environmental Plan
LGA	Local Government Area
ML	Megalitres
MLA	Mining Lease Application
MNES	Matter of National Environmental Significance
Mt	Million tonnes
Mtpa	Million tonnes per annum
NGER Act	*National Greenhouse and Energy Reporting Act 2007*
OEH	Office of Environment and Heritage (NSW)
Pa	Pascal – a unit of pressure
POEO Act	*Protection of the Environment Operations Act 1997*
SAL	Strategic Agricultural Land
SEPP	State Environmental Planning Policy
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities (Commonwealth)
SWMP	Site Water Management Plan
TSC Act	*Threatened Species Conservation Act 1995*
WMA	*Water Management Act 2000*

14.0 Glossary

Term	Meaning
20 mm subsidence	The 20 mm subsidence contour is an industry defined limit and represents the practical measurable limit of subsidence. (See also Angle of Draw below).
Air compressor station	Surface building which houses several compressor units which take in air at atmospheric pressure and deliver it at a higher pressure underground as 'compressed air'. This compressed air is used for an array of underground services such as water pumping infrastructure.
Angle of draw	The angle to the vertical from the sides or ends of an extracted longwall block and the line drawn from the limits of extraction at seam level to the 20 mm subsidence contour at the surface. The 20 mm subsidence contour is an industry defined limit and represents the practical measurable limit of subsidence.
Aquifer	Underground water storage within either disturbed or undisturbed strata.
Aquitard / Aquiclude	Less permeable strata, not permeable enough to yield economic quantities of water.
Blind Bore Tailings	Broken strata (rock) that is generated at the surface by the bore drilling process using the blind boring method.
Blind boring	The process to produce a circular section excavation from the surface to a desired depth by boring (drilling) from the surface. On completion of boring, the shaft is lined.
Bore	A borehole that is drilled from the surface to a source of underground water that enables the underground water to be transferred to the surface either naturally or through artificial means.
Chain pillar	The pillar of solid coal left between adjacent longwall panels. This forms a barrier that allows the goaf to be sealed off and facilitates tailgate roof stability.
Clean water	Waters on the premises that have not come into physical contact with disturbed areas (sedimentation), coal or mined carbonaceous material.
Cliff line	Refers to sub-vertical rock slopes with heights > 20 m in the context of the CAPC Mining Lease. They are also usually longer than their height.
Coal Handling Plant	A facility where coal is screened and prepared for transport off-site.
Continuous miner	The electric powered cutting machine used to form underground roadways by removing coal from the working face.
Community Enhancement Fund	Established by Centennial Angus Place Pty Ltd under the existing Project Approval. It provides a structured approach to supporting community activities and involves guidelines for funding and a panel made up of local representatives to assess funding applications.
Design Angle of Draw	The 'practical' angle of draw used to define minimum or allowable distances from the sides and ends of an extracted longwall block to sensitive surface features. It is considered to be an effective impact management tool in which to minimise impact from differential subsidence parameters such as tilt, curvature and strain, which may cause cracking or instability. Subsidence by itself (i.e. with very low tilt and strain) does not cause damage outside longwall extraction limits. A Design angle of draw of 26.5o has been used with negligible impact to surface features at Angus Place Colliery (and Springvale Colliery) to date.
Dewatering	Transfer of water from underground workings to the surface.
Development activities	The extraction of coal to produce underground roadways and headings, enabling access to future longwall extraction areas. Mains development extraction is undertaken using continuous miner units, which simultaneously bolt and dust the face (two major components of servicing) whilst cutting coal.
Development access headings	Underground roadways formed using continuous miners (development activities) to generate access roads from the mains headings to the longwall installation face. Such access headings can be configured as air intakes or air returns (exhaust). Cut throughs occur at regular intervals to allow access between the development access headings.
Dirty water	Water on the premises that has come into physical contact with coal, mined carbonaceous

	materials or otherwise contains an elevated sediment load.
Downdip	A direction that is downwards and parallel to the dip direction of the strata.
Environmental Study Area	Part of the Project Application Area, Environmental Study Areas (ESAs) are the areas within which the proposed infrastructure would be located.
Extraction (longwalls)	This refers to the extraction of coal following the mining of underground roadways (an example is longwall mining).
Hanging Swamp (Newnes Plateau) part of the Temperate Highland Peat Swamps on Sandstone classification	This vegetation community occurs in gully heads and ridge-top sites where groundwater seepage travelling through permeable rock layers is directed laterally by impermeable layers. These form wet peaty soils in which a range of swamp heath flora species grow.
Inbye	An underground coal mining term pertaining to the direction towards the coal face. Specifically it is used to describe the relative position of some feature or location in the mine that is closer to the coal face than the reference location.
Licensed Discharge Point	A location where Angus Place Colliery discharges water in accordance with conditions stipulated within the site EPL issued under the NSW *Protection of the Environment Operations Act 1997*.
Long term stable	Ensuring that the trial mining area is built to sufficient geotechnical and engineering standards which results in negligible subsidence or impacts.
Longwall	Longwall mining is a form of underground coal mining where a block of coal is mined using a longwall shearer. The longwall mining method is supported by roadway development, mined using a continuous miner.
Maingate	Refers to the tunnels or roadways down the side of a longwall block which provide coal clearance (conveyor belt), access for mine operations personnel, power, materials supply and ventilation airflow for the longwall face. Coal clearance is usually located on the side of the longwall panel adjacent to the unmined solid coal.
Process Pond	An open pond where the tailings generated by the blind bore process are managed and stored temporarily.
Project Application Area	The site area for the project. This Project Application Area comprises a number of Environmental Study Areas (ESAs) for the proposed infrastructure and a Subsidence Assessment Area for the proposed underground roadways.
Rock formations	Individual rock features > 5 m and < 20 m high which are not cliff lines. They include sandstone pagodas or micro-buttes and these are usually higher than their width.
Run of Mine coal	Raw coal production (unprocessed).
Sedimentation Pond	An open pond designed to treat surface runoff water which contains solids attributable to sedimentation. The water is held within the pond and most of the solids drop out of suspension.
Springvale Delta Water Transfer Scheme	This scheme was originally established between Centennial Springvale and Delta Electricity to improve the management of water at Springvale Colliery and to reduce the consumption of water by Delta Electricity from the Coxs River which forms part of the Sydney drinking water supply catchment. It has been extended to include transfers from dewatering bores at Angus Place Colliery. A proportion of underground water from Angus Place Colliery is transferred to the scheme via infrastructure that links both Springvale and Angus Place Colliery to Wallerawang Power Station for consumption at the cooling towers. The scheme operates under two scenarios, normal and abnormal. Under normal circumstances all water is transferred to Wallerawang Power Station. Under abnormal circumstances, Angus Place Colliery mine water is discharged through LDP006.
Study Area	Area used by specialist assessors for assessment purposes. This area varies from topic to topic.
Subsidence	The difference between the pre-mining surface level and the post-mining surface level at a point, after it settles above an underground mining area.
Subsidence Assessment Area	Part of the Project Application Area, the area defined as having potential subsidence from the proposed underground roadways.
Tailgate	Refers to the tunnel(s) or roadway(s) down the side of a longwall block which provide ventilation airflow for (usually away from) the longwall face.

Underground roadways	Headings, roadways and cut-throughs mined using continuous miners (development activities) which are designed to be long term stable from a subsidence perspective. The surface subsidence from forming underground roadways is typically undetectable.
Updip	A direction that is upwards and parallel to the dip direction of the strata.
Ventilation shaft	A cylindrical vertical passageway from the mine workings to the surface which conveys fresh airflow into the mine or expels used air from the mine. The ventilation system is driven by a ventilation fan which is situated at the Ventilation Facility.