

Appendix 9.7

Noise and Vibration Impact Assessment

Prepared by SLR Consulting



Centennial Coal



Angus Place Colliery Ventilation Facility Project

Noise and Vibration Impact Assessment

Site Angus Place Colliery

Date July 2012





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Angus Place Colliery Ventilation Facility Project Noise and Vibration Impact Assessment

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Centennial Angus Place Pty Ltd
Wolgan Road
Lidsdale NSW 2790

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Angus Place Colliery Ventilation Facility Project

Noise and Vibration Impact Assessment

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EXECUTIVE SUMMARY

PROPOSED ANGUS PLACE VENTILATION FACILITY PROJECT

Centennial Angus Place Pty Ltd (Angus Place) proposes to develop underground roadways and a ventilation facility from the existing Angus Place Colliery workings. The Angus Place Colliery Ventilation Facility Project (APCVFP) seeks to construct a ventilation/services installation and associated infrastructure on the Newnes State Forest. Underground roadways are also required from the LW910 install face to the base of the shaft site for ventilation purposes.

CONSTRUCTION NOISE IMPACT ASSESSMENT

Noise modelling has indicated that the noise emissions from the proposed construction of the proposed APCVFP are significantly below the relevant noise criteria at the nearest potentially affected receiver locations.

OPERATIONAL NOISE IMPACT ASSESSMENT

Noise modelling has indicated that the noise emissions from the proposed operation of the proposed APCVFP are significantly below the relevant noise criteria at the nearest potentially affected receiver locations. The operational noise criteria for the Newnes State Forest recreational area is predicted to be met at distances of approximately 550m to 700m from the proposed modification area.

CUMULATIVE NOISE IMPACT ASSESSMENT

The operation of the APCVFP is predicted to result in negligible increases in the cumulative mining and industrial noise levels at the nearest affected receivers.

VIBRATION IMPACT ASSESSMENT

Given the separation distance of approximately 7 km between the APCVFP and the nearest potentially affected residential locations, vibration levels from the APCVFP are predicted to be negligible and below levels of human perception at the nearest residential receivers.

ROAD TRAFFIC NOISE IMPACT ASSESSMENT

Traffic noise generated by the construction and operation of the proposed APCVFP is predicted to be within the NSW RNP criteria at all receiver locations.

NOISE MITIGATION AND MANAGEMENT RECOMMENDATIONS

While noise modelling has indicated that there will be negligible noise impacts associated with the APCVFP, the following noise management measures have been recommended for consideration:

- Continued noise monitoring on site and within the community 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).
- Refinement of onsite noise mitigation measures and plant operating procedures where practical.
- Incorporate clear signage at the site including relevant contact numbers for community enquiries.
- Prompt response to any community issues of concern.
- Adoption of “quiet” work practices at the vent fan compound.

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1 INTRODUCTION

Angus Place Colliery is situated in the New South Wales western coal field and is managed by Centennial Angus Place Pty Ltd under a joint venture arrangement between Centennial Springvale Pty Ltd and Springvale SK Kores Pty Ltd. Centennial Angus Place Pty Ltd is 100% owned by Centennial Coal Company Ltd. Centennial Coal Company Ltd is a wholly owned subsidiary of Banpu Public Company Ltd, listed on the Thailand Stock Exchange.

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 using longwall mining techniques. The main components of the development are an underground longwall mine and development panels, supporting surface infrastructure (within the Angus Place pit top area and on the Newnes State Forest), a coal stockpile area (Kerosene Vale) and dedicated haul roads to Delta Electricity's Wallerawang and Mount Piper power stations.

Angus Place is seeking a modification to the existing Angus Place Project Approval (PA06_0021) to construct a ventilation/services installation and associated infrastructure on the Newnes State Forest off Sunnyside Ridge Road. Underground roadways are also required from the LW910 install face to the shaft site. This modification is known as the Angus Place Colliery Ventilation Facility Project (APCVFP).

Broadly, the objective of this assessment was to identify the potential impacts of noise associated with APCVFP, the cumulative impacts of the APCVFP with the approved mine and the cumulative impacts of the modified Angus Place with other activities/operations in the proximity of Angus Place.

The noise assessment has been prepared with reference to Australian Standard AS 1055:1997 *Description and Measurement of Environmental Noise* Parts 1, 2 and 3 and in accordance with the Office of Environment and Heritage (OEH) *NSW Industrial Noise Policy (INP)* (and associated Application Notes), *Interim Construction Noise Guideline (ICNG)*, *NSW Road Noise Policy (RNP)*, *Environmental Noise Management – Assessing Vibration : A Technical Guide* and the Australia and New Zealand Environment and Conservation Council (ANZECC) *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration*. Where issues relating to noise are not addressed in the INP, such as sleep disturbance, reference has been made to the *NSW Environmental Noise Control Manual (ENCM)*. Reference has also been made to the Blue Mountains Conservation Society and Colong Foundation for Wilderness “*Places to Visit on the Newnes Plateau*” (June 2009) with respect to sensitive receiver locations.

The scope of the noise assessment was also designed to address the Director-Generals Requirements (DGRs) for the Project with regard to noise. A synopsis of these requirements is provided in **Table 1**.

Table 1 Director-General's Requirements

Director-General's Requirement	Section Addressed
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 the 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.	Section 3
Consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments.	Sections 5, 9 and 10
Risk assessment of the potential environmental impacts of the modification, identifying the key issues for further assessment;	Section 2
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 proposals for adaptive management and/or contingency plans to manage any significant risks to the environment; and	Sections 7 and 11 Sections 9, 10 and 11 Section 12
Consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EA.	N/A (Included in EA)
Noise and Vibration	
Noise and Vibration – including a quantitative assessment of potential:	
- Construction and operational noise impacts	Sections 9 and 10
- Reasonable and feasible mitigation measures, including evidence that there are no such measures available other than those proposed; and	Section 12
- Monitoring and management measures	Section 12
Attachment 1 Technical & Policy Guidelines	
Noise and Vibration	
- NSW Industrial Noise Policy (DECC)	Section 3, 8 and 10
- Environmental Noise Management – Assessing Vibration : a technical guide (DEC)	Sections 9
- NSW Road Noise Policy (DECCW)	Section 9 and 10
- Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZECC)	Not Applicable

2 PROJECT DESCRIPTION

2.1 Site Location

Angus Place Colliery is an underground mining operation located 5 km north of the village of Lidsdale, 8 km northeast of the township of Wallerawang and approximately 15 km northwest of the city of Lithgow. Angus Place Colliery is situated in the Lithgow local government area (LGA). The mine's regional location is shown in **Figure 1**. Mount Piper Power Station is located 6 km to the west and Wallerawang Power Station is located 5.5 km south-southwest. It is bordered by Springvale Colliery to the south, Ivanhoe Colliery to the northwest and the Wolgan Valley and Newnes Plateau to the north and east respectively.

A number of residential communities surround the Angus Place Colliery including Lidsdale approximately 5 km to the south and Blackmans Flat approximately 3.5 km to the west. A small number of rural residential properties are also located along Wolgan Road and in the Upper Wolgan Valley in the vicinity of the colliery. The nearest affected residential receivers to the APCVFP are detailed in **Section 4**.

The proposed APCVFP is located in the Newnes State Forest, approximately 7 km east of the existing Angus Place pit top. The locations of the Environmental Study Areas (ESAs) associated with the proposed APCVFP are presented in **Appendix A** along with the location of the nearest surrounding residential receivers. The Project Application Area is shown in **Figure 2**.

Angus Place is located within a region of significant topographical variation as shown in **Figure 3**. The boundary of the colliery lies along the western edge of the Great Dividing Range and is situated at an altitude of between approximately 900 m to 1100 m AHD. It is bordered by the Wolgan Valley to the north and the Newnes Plateau to the east.

Figure 1 Location of Angus Place Colliery

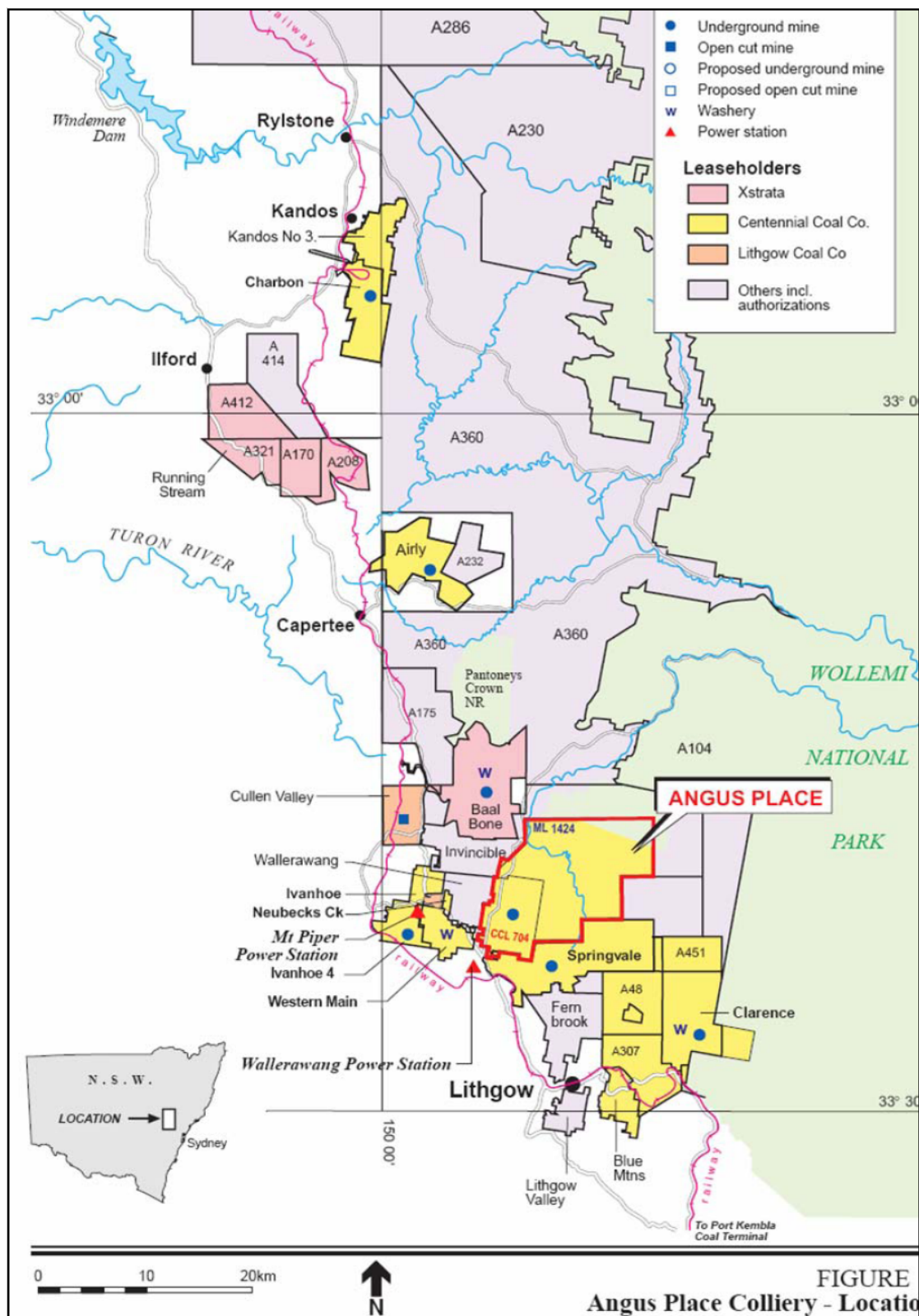
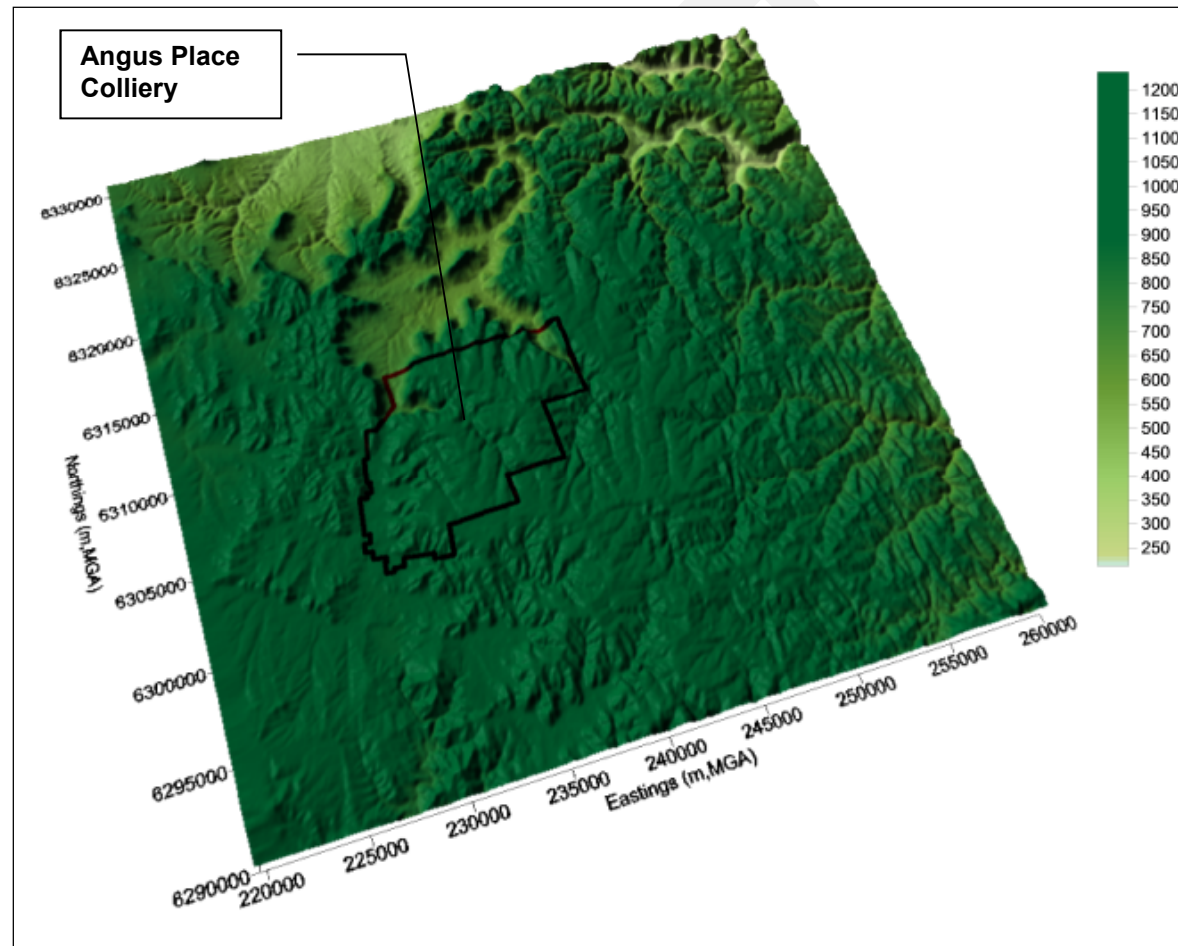


Figure 2 Project Application Area



Figure 3 Illustration of Regional Scale Topography Surrounding Angus Place Colliery



Note: Vertical exaggeration of two applied.

2.2 Current Operations

Coal extraction is currently undertaken within Mining Lease (ML) 1424 and Consolidated Coal Lease (CCL) 704. Longwall mining currently occurs at Angus Place Colliery

Coal is then conveyed to the surface from a stackout/reclaim stockpile which is equipped with underground feeders enabling coal to be loaded onto the reclaim conveyor. Coal is then conveyed to the coal sizer where it is crushed and sized, then delivered to the truck loading hoppers by a conveyor. Loaded trucks then transport the coal to Mount Piper or Wallerawang power stations via private haul roads. Angus Place holds coal supply contracts with Delta Electricity for supply of coal to Mount Piper and Wallerawang power stations.

No coal washing occurs, therefore there is no production of washery tailings or reject material.

Angus Place currently operates 7 days a week, 24 hours per day. It is noted that Angus Place has approval to mine up to 4 Mtpa (refer **Section 2.3**)

2.3 Current Approval

Angus Place Colliery received Project Approval for the extraction of Longwalls 930 to 980 in 2006 under the provisions of Part 3A of the EP&A Act. From the initial Part 3A application, Project Approval PA06_0021 was granted by the NSW Department of Planning which enabled Angus Place to undertake the following activities:

- The extension and maintenance of mining operations within the existing mining leases (ML 1424 and CCL 704).
- An increase in the current annual mining rate from 2.3 million tonnes per annum (Mtpa) to 3.5 Mtpa; and
- The transportation of increased coal tonnage by truck.

Currently, Angus Place Colliery is extracting coal using the longwall method of mining from Longwall 970 which exists within the currently approved longwalls 930 – 980.

To sustain the supply of coal to established markets Angus Place lodged an application with the NSW Department of Planning to modify the existing Project Approval 06_0021 in November 2010. The approval pathway sought was Section 75W of Part 3A Major Projects. Accordingly, an environmental assessment was lodged to support the application.

This application requested the following activities:

- The development and extraction of longwalls 910 (options 1 and 2) and 900 west.
- Increase the annual production limit to 4 million tonnes.
- Modifications to the existing pit top dirty water management system.
- Increase the number of full time staff from 215 to 225 and provision for up to 75 temporary contractors to assist with development activities over a 15 month period.

This Section 75W was approved at a State level on 29 August 2011 and has additionally received Federal Approval. It is noted that the Government has repealed Part 3A of the Environmental Planning and Assessment Act. In the meantime, projects that have been determined by Part 3A can continue to be modified under Section 75W of the Act.

3 PROPOSED APCVFP OPERATIONS

3.1 Background

It is proposed to develop underground roadways and a ventilation facility from the existing Angus Place Colliery workings. The APCVFP modification seeks to construct a ventilation/services installation and associated infrastructure on the Newnes State Forest. Underground roadways are also required from the LW910 install face to the base of the shaft site for ventilation purposes.

The APCVFP includes:

- The continuation of development activities beyond the Longwall (LW) 910 installation face to the area below the proposed ventilation site.
- Proposed underground roadways for trial mining. Trial mining has been designed to explore from the western to the eastern extents of the Subsidence Assessment Area and will be accessed via the underground roadways developed from the eastern extent of longwall 910
- Construction and operation of an additional ventilation facility and installation of ancillary equipment on the Newnes State Forest to ensure safe underground working conditions.
- Switchyard at existing overhead powerline at junction of Blackfellows Hands Road and Sunnyside Ridge Road.
- 66kV/11kV substation (preferred site and alternative site).
- Two 11kV buried feeder cables are proposed to extend from the Sunnyside Ridge Road plantation substation to the proposed shaft site.
- Various materials/services boreholes within the Ventilation Facility compound including:
 - Concrete borehole (including bunded deposition area.
 - Ballast borehole.
 - Stonedust supply borehole.
 - Emulsion supply borehole.
 - Borehole to supply electrical power.
 - Communications borehole.
 - Compressed air borehole from the proposed surface compound to the underground mine.

Angus Place has identified a preferred location for the sub-station site (ESA7/8) and an alternative site (ESA10).

3.2 Acoustically Significant Plant and Equipment

3.2.1 Construction

Construction activities will involve site preparation and clearance, drilling of the ventilation shafts, construction of the foundations, installation of the fan structure and ducting, connection to the shaft and commissioning within the proposed site compound at ESA9.

Additional construction activities will involve the clearance and excavations for the proposed power supply along Sunnyside Ridge Road (ESA1 to ESA6) as well as the proposed substation. There will also be activities involved in the regrading of the track surface between Clarence and the substation site.

Construction is estimated to take approximately 32 months.

Sound power levels of the acoustically significant items of construction plant and equipment considered in this assessment are provided in **Section 9.2**.

3.2.2 Operations

Operation of the proposed APCVFP will involve the following acoustically significant plant and equipment:

- ESA 9 - main shaft site compound
 - Centrifugal surface ventilation fan.
 - Substation.
 - Diesel backup generator.
 - Air compressor station.
- ESA 7/8 – substation site
 - 66kV/11kV substation.

Sound power levels of the acoustically significant items of operational plant and equipment considered in this assessment are provided in **Section 10.2**.

4 SENSITIVE RECEIVERS

The locations of residences located in the vicinity of the Project Area are shown in **Appendix A**, with additional details provided in **Table 2**.

Table 2 Locations of Nearest Residential Receivers

Receptor	Easting	Northing	Zone	Elevation	Approximate Distance to Nearest Site Component
R1	229,408 m E	6,305,100 m S	56H	905 m	7.7 km
R2	229,351 mE	6,304,614 mS	56H	910 m	7.8 km
R3	229,036 mE	6,301,779 mS	56H	905 m	8.8 km
R4	229990 mE	6,307,652 mS	56H	930 m	7.4 km
R5	231,748 mE	6,311,673 mS	56H	780 m	8 km
R6	232,286 mE	6,311,814 mS	56H	760 m	8 km

In addition to the residential locations identified in **Table 2**, the proposed APCVFP modification is located within the Newnes State Forest and proposed State Conservation Area. This is an area of the Newnes State Forest that is used for recreational purposes such as walking and camping. The locations of the nearest sensitive areas have been identified with reference to the Blue Mountains Conservation Society and Colong Foundation for Wilderness *“Places to Visit on the Newnes Plateau”* (June 2009) and are provided in **Table 3**.

It should also be noted that any of the roads or tracks surrounding the proposed APCVFP modification area could potentially be utilised for recreational purposes.

Table 3 Approximate Location of Nearest Sensitive Receiver

Receptor	Easting	Northing	Zone	Elevation	Approximate Distance to Nearest Site Component
R7	239,483 mE	6,300,390 mS	56H	1165 m	1.6 km
R8	237015 m E	6298782 m S	56H	1030 m	2.5 km
R9	243358 m E	6295836 m S	56H	1100 m	7.8 km
R10	245299 m E	6297921 m S	56H	970 m	7.8 km
R11	242528 m E	6303041 m S	56H	1080 m	6.5 km
R12	242516 m E	6307266 m S	56H	925 m	5.2 km
R13	238709 m E	6308496 m S	56H	1110 m	4.5 km
R14	235079 m E	6309656 m S	56H	1030 m	4.5 km

6 EXISTING MINE APPROVAL CONDITIONS

Project Approval 06_0021 (PA 06_0021) was granted on 13 September 2006 for the Angus Place Colliery Extension Project under Part 3A of the *Environmental Planning and Assessment Act 1979* by the then Minister for Planning. The modification to this approval was approved on 29 August 2011 under Section 75W of Part 3A Major Projects.

From a noise perspective, Angus Place Colliery is also licensed under the *Protection of the Environment Operations Act 1997*: Environment Protection Licence (EPL) No. 467.

6.1 Project Approval (06_0021)

PA 06_0021 states the following with regard to noise emissions:

NOISE

Impact Assessment Criteria

17. From no later than 28 February 2007, the Proponent shall ensure that the noise generated by the project, including the Proponent's operation of the haul road to the Wallerawang power station, does not exceed the noise impact assessment criteria presented in Table 6 at any residence on privately owned land.

Table 6 Noise Impact Assessment Criteria dB(A) LAeq(15minute)

Land	Day	Evening	Night
Sharpe	42 dBA	38 dBA	36 dBA
Mason (West) and other Wolgan Road rural properties	41 dBA	37 dBA	35 dBA
Lidsdale village residents	44 dBA	40 dBA	35 dBA

- Notes:
- a) For more information on the references to land in this condition, see 'Property Details' figure of the EA.
 - b) The noise criteria do not apply where the Proponent and the affected landowner have reached a negotiated agreement in regard to noise, and a copy of the agreement has been forwarded to the Director-General and DEC.
 - c) Noise from the project is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary, to determine compliance with the LAeq(15 minute) noise limits in the above table. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
 - d) The noise emission limits identified in the above table apply under meteorological conditions of:
 - Wind speeds of up to 3 m/s at 10 metres above ground level; or
 - Temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.

Land Acquisition Criteria

18. If, after 31 August 2007, the noise generated by the project, including the operation of the haul road to the Wallerawang power station, exceeds the criteria in Table 7, the Proponent shall, upon receiving a written request for acquisition from the landowner (excluding the landowners listed in Table 1), acquire the land in accordance with the procedures in conditions 7-9 of schedule 4.

Table 7 Land Acquisition Criteria dB(A) LAeq(15minute)

Land	Day	Evening	Night
<i>Sharpe, Mason (West) and other Wolgan Road rural properties</i>	44 dBA	40 dBA	40 dBA
<i>Lidsdale village residents</i>	47 dBA	43 dBA	43 dBA

Note: The notes under Table 6 also apply under Table 7.

Operating Hours – Wallerawang Power Station Haul Road

19. The Proponent shall not use the Wallerawang power station haul road at night.

Note: Night is defined as the period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and public holidays.

No additional requirements with respect to noise were included within the modified project approval granted on 29 August 2011.

6.2 Environment Protection Licence (EPL No: 467)

Condition L6 of the EPL specifies the following limit conditions with respect to noise emissions.

L6.1 Noise from the premises must not exceed:

- a) 42 dBA Leq(15minute) during the day (7am to 6pm); and
- b) 38 dBA dBA Leq(15minute) during the evening (6pm to 10pm); and
- c) at all other times 36 dBA Leq(15minute) except as expressly provided by this licence
at the Sharpe residence;
- d) 41 dBA Leq(15minute) during the day (7am to 6pm); and
- e) 37 dBA dBA Leq(15minute) during the evening (6pm to 10pm); and
- f) at all other times 35 dBA Leq(15minute) except as expressly provided by this licence
at the Mason (west) residence and other Wolgan Road properties; and;
- g) 44 dBA Leq(15minute) during the day (7am to 6pm); and
- h) 40 dBA dBA Leq(15minute) during the evening (6pm to 10pm); and
- i) at all other times 36 dBA Leq(15minute) except as expressly provided by this licence
at Lidsdale Village residences;

Where LAeq means the equivalent continuous noise level - the level of noise equivalent to the energy-average of noise levels occurring over a measurement period.

Note: The above noise limits were established under project approval 06_0021 by the Department of Planning.

L6.2 Noise from the premises is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 m of a dwelling (rural situations) where the dwelling is more than 30 m from the boundary, to determine compliance with condition L6.1.

The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.

Where it can be demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).

- L6.3 The noise emission limits identified in this licence apply under meteorological conditions of:
- a) wind speeds of up to 3 m/s at 10 metres above ground level; or
 - b) temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.

The noise limits specified in EPL 467 are consistent with those outlined in the PA.

7 EXISTING METEOROLOGICAL ENVIRONMENT

7.1 Wind

Wind has the potential to increase noise at a receiver when it is light and stable and blows from the direction of the source of the noise. As the strength of the wind increases the noise produced by the wind will obscure noise from most industrial and transport sources.

Wind effects need to be considered when wind is a feature of the area under consideration (in accordance with the INP). Where wind blows from the source to the receiver at speeds up to 3 m/s for more than 30% of the time in any season, then wind is considered to be a feature of the area and noise level predictions must be made under these conditions.

7.1.1 Previously Assessed Meteorological Conditions

The Environmental Assessment for the Project Approval and the Project Approval Modification used the methods specified in the INP to predict noise levels from the development. The noise assessments predicted noise levels from prevailing winds as determined from previous studies. Section 3.2 (INP Assessment of Prevailing Weather Conditions) within the *Transportation Noise Impact Assessment* report by Heggies Pty Ltd in 2003 analysed meteorological data from Mount Piper Power Station and identified prevailing wind conditions for Angus Place Colliery. The results are presented in **Table 4**. The Mount Piper meteorological station is located approximately 5 km west of Angus Place Colliery and is representative of winds in the area.

Table 4 Prevailing Wind Conditions in accordance with NSW INP

Season	Winds $\pm 45^\circ \leq 3$ m/s with Frequency of Occurrence $\geq 30\%$		
	Daytime	Evening	Night
Annual	-	SW, WSW, W	SW, WSW, W
Summer	-	SW, WSW, W	SW, WSW, W
Autumn	-	SSW, SW, WSW, W	SSW, SW, WSW, W
Winter	-	SW, WSW, W	SW, WSW
Spring	-	SW, WSW, W	SW, WSW, W

Table 4 identifies predominant wind directions ranging from westerly to south-south-westerly for wind speeds less than 3 m/s (within the wind speed range set in the PA).

7.1.2 INP Assessment of Prevailing Weather Conditions

Synthetically generated meteorological data has been produced for the site using the CALMET meteorological model as part of the Angus Place Air Quality and Greenhouse Gas Assessment (refer SLR Consulting report 670.10168-R1 *Angus Place Colliery Ventilation Facility Project Air Quality and Greenhouse Gas Assessment* dated March 2012). The modelling process has provided a meteorological dataset for the 2008 calendar year, centred over the study area.

Wind speed and direction data produced by the CALMET run for the period January 2008 to December 2008 was analysed to determine the frequency of occurrence of winds up to speeds of 3 m/s for daytime, evening and night in each season. A summary of the most frequently occurring winds is contained within **Table 5**, **Table 6** and **Table 7**. The percentage occurrence figures provided in bold are those that exceed the 30% threshold.

Table 5 Seasonal Frequency of Occurrence of Wind Speed Intervals – Daytime

Period	Calm	Wind Direction	0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Summer	0.4%	NE±45	3.3%	6.9%	10.2%
Autumn	1.5%	NE±45	7.1%	7.6%	14.7%
Winter	0.3%	W±45	3.0%	8.1%	11.0%
Spring	0.8%	WNW±45	3.3%	7.3%	10.6%

Table 6 Seasonal Frequency of Occurrence of Wind Speed Intervals – Evening

Period	Calm	Wind Direction	0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Summer	2.0%	E±45	5.5%	20.0%	25.5%
Autumn	4.1%	ESE±45	14.0%	15.4%	29.4%
Winter	0.8%	SW±45	5.6%	16.1%	21.7%
Spring	3.0%	ENE±45	5.2%	14.6%	19.8%

Table 7 Seasonal Frequency of Occurrence of Wind Speed Intervals – Night

Period	Calm	Wind Direction	0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Summer	2.9%	E±45	13.8%	13.9%	27.6%
Autumn	5.6%	SSW±45	22.2%	12.5%	34.7%
Winter	2.1%	WSW±45	14.0%	10.6%	24.7%
Spring	2.2%	SW±45	10.9%	10.0%	21.0%

Seasonal wind records indicate that south south-westerly winds are a feature of the area during the night-time period as they exceed the 30% threshold. In depth analysis shows that south westerly winds also exceed the 30% threshold during the autumn night-time period. Therefore, south south-westerly and south westerly winds during the night-time have been considered as part of this assessment.

It is noted that the prevailing winds identified from the synthetically produced data for the Angus Place site are generally consistent with those previously assessed.

It is noted that westerly and south westerly winds are blowing from the receiver to the source and, as such, provides a noise attenuating meteorological scenario.

7.2 Temperature Inversion

Temperature inversions, when they occur, have the ability to increase noise levels by focusing sound waves. Temperature inversions occur predominantly at night during the winter months.

The INP Section 5.2, Temperature Inversions, states:

“Assessment of impacts is confined to the night noise assessment period (10.00 pm to 7.00 am), as this is the time likely to have the greatest impact - that is, when temperature inversions usually occur and disturbance to sleep is possible.”

“Where inversion conditions are predicted for at least 30% (or approximately two nights per week) of total night-time in winter, then inversion effects are considered to be significant and should be taken into account in the noise assessment”.

An assessment of atmospheric stability conditions has also been prepared from the meteorological data set described in **Section 7.1.2** above. The annualised evening and night-time frequency of occurrence of atmospheric stability classes are presented in **Table 8**, together with estimated Environmental Lapse Rates (ELR).

Table 8 Winter Night-time Atmospheric Stability Frequency of Occurrence

Stability Class	Occurrence Percentage Night-time	Estimated ELR ¹ °C/100 m	Qualitative Description
A	0.0%	<-1.9	Lapse
B	0.6%	-1.9 to -1.7	Lapse
C	5.1%	-1.7 to -1.5	Lapse
D	33.8%	-1.5 to -0.5	Neutral
E	19.4%	-0.5 to 1.5	Weak Inversion
F	41.1%	1.5 to 4.0	Moderate Inversion
G	0.0%	>4.0	Strong Inversion

Note 1: ELR (Environmental Lapse Rate).

In accordance with the INP the frequency of occurrence of moderate or F Class (ie 1.5 °C/100 m up to 4.0 °C/100 m) temperature inversions is greater than 30% during the winter night-time period and therefore this weather condition is included in the assessment.

8 NOISE MODELLING METHODOLOGY

A computer model was used to predict noise emissions from operation of the project. The operational noise modelling was undertaken using SoundPLAN v7.0 software, developed by Braunstein and Berndt GmbH in Germany. A three-dimensional digital terrain map giving all relevant topographic information was used in the modelling process. The model used this map, together with noise source data, ground cover, shielding by barriers and/or adjacent buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers.

Topographic contours and drawings of the proposed site were supplied by Centennial Coal for the purpose of modelling noise from the proposed APCVFP. Prediction of noise under calm and prevailing atmospheric conditions was conducted. Atmospheric parameters under which noise predictions were made are given in **Table 9**.

Table 9 Meteorological Parameters for Noise Predictions

	Temperature	Humidity	Wind Speed	Wind Direction (degrees from north)	Temperature Inversion
Calm (All periods)	20°C	65%	N/A	N/A	N/A
SSW/SW Winds (Evening and Night-time)	10°C	75%	3 m/s	202.5/225	N/A
Inversion (Night-time)	10°C	90%	N/A	N/A	F Class

9 CONSTRUCTION NOISE ASSESSMENT

9.1 Construction Activities

A summary of the construction noise modelling scenario is provided in **Table 10**. A tick (✓) indicates that the equipment is in operation during the relevant period. Where there is a number in brackets following a tick, this represents the number of pieces of the equipment that has been considered in the noise model during the relevant period.

Table 10 Construction Noise Modelling Scenario

Plant and Equipment	Day	Evening	Night
Proposed Site Compound (ESA9)			
Drill	✓	✓	✓
Dozer	✓	✓	✓
Excavator	✓	✓	✓
Crane	✓	✓	✓
Concrete truck	✓	✓	✓
Compressors	✓	✓	✓
Diesel Generator	✓	✓	✓
Proposed Switchyard (ESA6)			
Dozer	✓	✓	✓
Proposed Substation (ESA7, ESA8)			
Dozer	✓	✓	✓
Proposed Power Supply (ESA1, ESA2 and ESA3)			
Dozer	✓(3)	✓(3)	✓(3)
Proposed New Track (ESA5)			
Dozer	✓	✓	✓

Construction noise modelling has assumed that all the plant and equipment detailed in **Table 10** are operating concurrently. As such, this provides a conservative assessment approach; actual noise levels are likely to be lower than predicted for much of the time.

Construction noise modelling has been carried out under the meteorological parameters identified in **Table 9**.

9.2 Sound Power Levels

The SWLs of the proposed construction plant and equipment have been obtained from a SLR Consulting database of similar plant and equipment and are provided in **Table 11**.

Table 11 Construction Plant Sound Power Levels

Source Description	Octave Band Centre Frequency (Hz) - dBL re 1pW								dBL	dBA
	63	125	250	500	1000	2000	4000	8000		
Drill	96	89	101	95	100	103	77	75	107	105
Excavator (100 tonne)	105	116	108	111	107	105	100	93	119	113
Dozer	112	109	113	116	113	111	108	98	121	118
Crane (50 tonne)	112	106	102	102	101	97	97	77	114	106
Concrete truck	112	107	109	104	104	101	97	88	116	109
Compactor	104	109	112	107	105	102	96	90	116	110
Compressor	93	90	87	89	85	83	79	70	97	88
Diesel Generator	106	113	110	104	98	97	92	88	116	107

9.3 Construction Noise Assessment Criteria

The Interim Construction Noise Guideline (ICNG) (OEH, 2009) sets out noise management levels, in relation to construction type activities, for residential and other sensitive receivers and how they are to be applied. A summary of the noise management levels from the ICNG is contained in **Table 12** and **Table 13**.

Table 12 Interim Construction Noise Guideline (Residences)

Time of day	Management level LAeq(15minute)	How to apply
Recommended standard hours Monday to Friday 7am to 6pm Saturday 8am to 1pm No work Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. - Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. - The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. - Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: - times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences. - if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. - The proponent should apply all feasible and reasonable work practices to meet the noise affected level. - Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.

Table 13 Interim Construction Noise Guideline at Sensitive Land Uses (other than residences)

Land Use	Management Level, LAeq(15minute) (applies when properties are being used)
Classrooms at schools and other educational institutions	Internal noise level 45 dBA
Hospital wards and operating theatres	Internal noise level 45 dBA
Places of worship	Internal noise level 45 dBA
Active recreation areas ¹	External noise level 65 dBA
Passive recreation areas ²	External noise level 60 dBA
Community Centres	Depends on the intended use of the centre Refer to the recommended 'maximum' internal levels in AS2107 for specific uses.

1. Characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion.
2. Characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation.

9.4 Project Specific Construction Noise Goals

PA 06_0021 contains no noise goals with respect to construction activities at the Angus Place Colliery. Notwithstanding this, the PA 06_0021 operational noise criteria presented in **Section 6.1** have been determined in accordance with the INP based upon the background noise level plus 5 dBA. The existing operational noise criteria have been used to determine the project specific construction noise goals based on the guidance in **Section 9.3**.

The project specific construction noise goals, presented in **Table 14** are applicable for the proposed modification.

Table 14 Project Specific Construction Noise Goals

Location	Period	Construction Noise Goal LAeq(15minute)	
		Noise Affected	Highly Noise Affected
R1	Day	47	75
	Evening	38	N/A
	Night	36	N/A
R2	Day	46	75
	Evening	37	N/A
	Night	35	N/A
R3	Day	49	75
	Evening	40	N/A
	Night	35	N/A
R4	Day	40	75
	Evening	35	N/A
	Night	35	N/A
R5	Day	40	75
	Evening	35	N/A
	Night	35	N/A
R6	Day	40	75
	Evening	35	N/A
	Night	35	N/A
R7 to R14	When in use	60	N/A

9.5 Construction Noise Assessment

The predicted intrusive LAeq(15 minute) construction noise levels at the nearest potentially affected receivers are presented in **Table 15** together with the construction noise goals.

Table 15 Predicted Construction Noise Levels

Location	Period	Predicted Noise Level LAeq(15minute) (dBA)			Construction Noise Goal LAeq(15minute)	
		Calm	Prevailing Wind	Temperature Inversion	Noise Affected	Highly Noise Affected
R1	Day	<20	N/A	N/A	47	75
	Evening	<20	<20	N/A	38	N/A
	Night	<20	<20	<20	36	N/A
R2	Day	<20	N/A	N/A	46	75
	Evening	<20	<20	N/A	37	N/A
	Night	<20	<20	<20	35	N/A
R3	Day	<20	N/A	N/A	49	75
	Evening	<20	<20	N/A	40	N/A
	Night	<20	<20	<20	35	N/A
R4	Day	<20	N/A	N/A	40	75
	Evening	<20	<20	N/A	35	N/A
	Night	<20	<20	<20	35	N/A
R5	Day	<20	N/A	N/A	40	75
	Evening	<20	<20	N/A	35	N/A
	Night	<20	<20	<20	35	N/A
R6	Day	<20	N/A	N/A	40	75
	Evening	<20	<20	N/A	35	N/A
	Night	<20	<20	<20	35	N/A
R7	Day	29	N/A	N/A	60	N/A
	Evening	29	29	N/A	60	N/A
	Night	29	29	34	60	N/A
R8	Day	<20	N/A	N/A	60	N/A
	Evening	<20	<20	N/A	60	N/A
	Night	<20	<20	<20	60	N/A
R9	Day	<20	N/A	N/A	60	N/A
	Evening	<20	<20	N/A	60	N/A
	Night	<20	<20	<20	60	N/A
R10	Day	<20	N/A	N/A	60	N/A
	Evening	<20	<20	N/A	60	N/A
	Night	<20	<20	<20	60	N/A
R11	Day	22	N/A	N/A	60	N/A
	Evening	22	29	N/A	60	N/A
	Night	22	29	29	60	N/A
R12	Day	<20	N/A	N/A	60	N/A
	Evening	<20	<20	N/A	60	N/A
	Night	<20	<20	<20	60	N/A
R13	Day	<20	N/A	N/A	60	N/A
	Evening	<20	<20	N/A	60	N/A
	Night	<20	<20	<20	60	N/A

Location	Period	Predicted Noise Level LAeq(15minute) (dBA)			Construction Noise Goal LAeq(15minute)	
		Calm	Prevailing Wind	Temperature Inversion	Noise Affected	Highly Noise Affected
R14	Day	21	N/A	N/A	60	N/A
	Evening	21	26	N/A	60	N/A
	Night	21	26	28	60	N/A

As indicated in **Table 15** the predicted construction noise levels are well below the respective construction noise goals at the nearest potentially affected receivers and any potential construction noise impacts are negligible.

9.6 Construction Road Traffic Noise Assessment

9.6.1 Transport and Personnel Movements

Access to the Project Sites during the construction of the proposed APCVFP will be along existing NSF roads and tracks, and specifically via State Mine Gully Road for light vehicles, and via Old Bells Line of Road for trucks; both roads then lead to Glowworm Tunnel Road which provides access to Blackfellows Hand Trail, Sunnyside Ridge Road and the access track to the proposed shaft site.

There will be an increase in traffic (along public roads and Forest NSW tracks) and personnel during the 32 months (approximately) of construction. The peak construction traffic generation will occur approximately 13 to 14 months into the construction period and will consist of approximately 42 daily trips, being 20 truck trips and 22 light vehicle trips (refer *Angus Place Colliery Ventilation Facility Project Traffic Impact Assessment* by ARC Traffic and Transport dated March 2012).

This level of peak generation is estimated to occur for approximately 1 month; prior to and following this peak generation period, the APCVFP construction traffic generation averages less than 20 daily vehicle trips.

Shifts are proposed from 6:00am – 6:00pm, and from 6:00pm to 6:00am; in general, light vehicle trips (staff) are likely to generally be concentrated in short (approximately 30 minute) periods around the shift change time, while heavy vehicle trips would be more dispersed across the day.

9.6.2 Road Traffic Noise Criteria

The NSW Road Noise Policy (RNP) presents guidelines for road traffic noise assessment. The policy document provides road traffic noise criteria for proposed road, residential and industrial developments, as well as criteria for other sensitive land uses.

Table 16 presents the most relevant RNP criteria for the proposed construction activities that have the potential to increase road traffic noise levels.

Table 16 Road Traffic Noise Assessment Criteria for Residential Land Uses

Road Category	Type of Project/Land Use	Assessment Criteria (dBA)	
		Day (7am to 10pm)	Night (10pm to 7am)
Local Roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	LAeq(1hour) 55 dBA (external)	LAeq(1hour) 50 dBA(external)

9.6.3 Road Traffic Noise Assessment

Old Bells Line of Road

Based upon the expected road traffic movements presented in **Section 9.6.1** it has been assumed that 11 light vehicle movements and five (5) heavy vehicle movements may occur on the Old Bells Line of Road during a “worst case” hourly period.

The LAeq(1hour) noise level at the nearest receiver (approximately 100m from the Old Bells Line of Road) is 40 dBA. This is significantly below the numerical criteria detailed in the NSW RNP.

State Mine Gully Road

Based upon the expected road traffic movements presented in **Section 9.6.1** it has been assumed that 11 light vehicle movements may occur on the State Mine Gully Road and associated local roads in Lithgow during a “worst case” hourly period.

The LAeq(1hour) noise level at the nearest roadside receivers (assumed to be approximately 5m from the edge of the road) is 45 dBA. This is significantly below the numerical criteria detailed in the NSW RNP.

Therefore, there will not be any additional road traffic noise impacts associated with the construction of the project.

9.7 Vibration Assessment

The main vibration generating activities will occur during the construction phase of the project including the operation of mobile equipment such as the dozer and trucks. Given the minimum separation distance of approximately 7 km between construction operations and the nearest potentially affected residential locations vibration levels from these activities is predicted to be negligible and below levels of human perception at the nearest residential receivers.

10 OPERATIONAL NOISE ASSESSMENT

10.1 Operational Noise Modelling Scenario

The scenario modelled during each period is summarised in **Table 17**. A tick (✓) indicates that the equipment is in operation during the relevant period. Where there is a number in brackets following a tick, this represents the number of pieces of the equipment that has been considered in the noise model during the relevant period.

Table 17 Operational Noise Modelling Scenario

Plant and Equipment	Day	Evening	Night
ESA9			
Proposed ventilation fan	✓	✓	✓
Proposed Substation	✓	✓	✓
Diesel Generator	✓	✓	✓
Compressors	✓	✓	✓
ESA7, ESA8			
Proposed Substation	✓	✓	✓

Operational noise modelling has been carried out under the meteorological parameters identified in **Table 9**.

10.2 Sound Power Levels

Sound power levels of the proposed plant and equipment have been sourced from an SLR Consulting database of similar plant and equipment. In order to provide a conservative assessment of the potential impacts of noise from the upgrade, likely maximum SWLs of similar plant and equipment have been adopted in all cases.

The SWLs of the proposed plant and equipment are provided in **Table 18**.

Table 18 Proposed Operational Sound Power Levels

Source Description	Octave Band Centre Frequency (Hz) - dBL re 1pW								dBL	dBA
	63	125	250	500	1000	2000	4000	8000		
Ventilation fans	121	123	124	118	111	110	105	99	129	120
Diesel Generator	106	113	110	104	98	97	92	88	116	107
Compressor	93	90	87	89	85	83	79	70	97	88
Substations	80	96	92	79	71	66	63	56	97	85

10.3 Project Specific Noise Criteria

In accordance with PA 06_0021 and the EPL, the adopted Project Specific Noise Criteria are presented in **Table 19**.

It is noted that the potentially affected receivers R4, R5, R6 and R7 have not been identified in either PA 06_0021 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 in accordance with the INP.

Table 19 Project Specific Noise Levels

Location	Period	Project Specific Noise Criteria ($L_{Aeq,15min}$)
R1	Day	42
	Evening	38
	Night	36
R2	Day	41
	Evening	37
	Night	35
R3	Day	44
	Evening	40
	Night	35
R4	Day	35
	Evening	35
	Night	35
R5	Day	35
	Evening	35
	Night	35
R6	Day	35
	Evening	35
	Night	35
R7 to R14	When in use	50

10.4 Operational Noise Modelling Results & Discussion

Noise level predictions to the nearest potentially affected residential receiver as well as relevant project noise criteria are displayed in **Table 20** for the proposed modification. Calm and worst-case (night-time temperature inversion) operational noise contours are provided in **Appendices B1** and **B2** respectively.

Table 20 Predicted Operational Noise Levels

Location	Period	Predicted Noise Level LAeq(15minute) (dBA)			Project Specific Noise Criteria (LAeq,15min)
		Calm	Prevailing Wind	Temperature Inversion	
R1	Day	<20	N/A	N/A	42
	Evening	<20	<20	N/A	38
	Night	<20	<20	<20	36
R2	Day	<20	N/A	N/A	41
	Evening	<20	<20	N/A	37
	Night	<20	<20	<20	35
R3	Day	<20	N/A	N/A	44
	Evening	<20	<20	N/A	40
	Night	<20	<20	<20	35
R4	Day	<20	N/A	N/A	35
	Evening	<20	<20	N/A	35
	Night	<20	<20	<20	35
R5	Day	<20	N/A	N/A	35
	Evening	<20	<20	N/A	35
	Night	<20	<20	<20	35
R6	Day	<20	N/A	N/A	35
	Evening	<20	<20	N/A	35
	Night	<20	<20	<20	35
R7	Day	<20	N/A	N/A	50
	Evening	<20	<20	N/A	50
	Night	<20	<20	20	50
R8 to R13	Day	<20	N/A	N/A	50
	Evening	<20	<20	N/A	50
	Night	<20	<20	<20	50
R14	Day	<20	N/A	N/A	50
	Evening	<20	24	N/A	50
	Night	<20	24	25	50

As indicated in **Table 20**, noise emissions associated with the equipment associated with the proposed modification are predicted to be significantly below the Project Specific Noise Criteria at the nearest potentially affected receivers under calm and prevailing meteorological conditions.

As indicated in **Appendices B1** and **B2**, the acceptable amenity criterion of 50 dBA for a passive recreational area will be met at distances of approximately 550m and 700m from the proposed modification area under calm and prevailing meteorological conditions respectively. As indicated in **Appendix B2**, this means that there is a small area of Sunnyside Ridge Road to the east of the project modification area which is predicted to experience small exceedences of the project specific noise criteria for a passive recreational area. It is noted, however, that Sunnyside Ridge Road is promoted for use as a 4wd track and noise impacts on potential users are considered insignificant.

Notwithstanding the above, noise mitigation and management strategies are recommended in **Section 12** to further minimise potential noise impacts on Sunnyside Ridge Road.

10.5 Operational Road Traffic Noise Assessment

During the operation phase of the APCVFP, an average of less than 10 vehicles per week would be generated to/from the site compound, with an expected peak of 4 vehicle trips on any single day. These trips would primarily be light vehicle trips, but a small number of truck trips would likely be generated each week.

Therefore, there will not be any additional road traffic noise impacts associated with the operation of the project.

11 CUMULATIVE NOISE IMPACT ASSESSMENT

11.1 Existing Angus Place Colliery Noise Emissions

11.1.1 Background and Overview

In accordance with Schedule 3, Condition 22 of the Angus Place Colliery Project Approval (PA 06_0021) a Noise Monitoring Program (dated May 2007) was prepared by the Angus Place Colliery. In accordance with this document, Atkins Acoustics conducted quarterly noise monitoring between September 2007 and February 2008.

In May 2008 SLR Consulting conducted a review of the noise monitoring program (refer SLR Consulting Report 30-1942-R1 *Angus Place Noise Monitoring Peer Review*). Based on this review, SLR Consulting subsequently prepared a revised operational Noise Monitoring Program for the site (refer SLR Consulting Report 30-1942-R2 *Angus Place Colliery Noise Monitoring Program* dated December 2008).

11.1.2 Noise Monitoring Results

In accordance with the Angus Place Noise Monitoring Program (NMP) SLR Consulting has conducted quarterly noise monitoring at the Angus Place Colliery from May 2008 to present (refer SLR Consulting Reports 30-1942 QR01 2008 May Qtr 20080627 dated July 2008 to 30-1942 QR013 2011 JulyQtr 20110905 dated September 2011).

The quarterly noise monitoring reports have provided the noise levels from Angus Place Colliery operations from attended noise measurements at the nearest affected receivers, namely the Sharpe, Mason and Neubeck residences. Reported noise levels include the contributions of both the Wallerawang haul road and the Angus Place Colliery Pit Top.

A summary of the results of the quarterly noise monitoring conducted by SLR Consulting since May 2008 are provided in **Table 21**, **Table 22** and **Table 23**.

Table 21 Daytime Quarterly Noise Monitoring Results

Location	Angus Place Colliery Contributed Noise Level LAeq (15 minute) dBA ¹													
	Noise Criteria	July 2011	Apr 2011	Dec 2010	Sept 2010	July 2010	Apr 2010	Dec 2009	Sept 2009	July 2009	Apr 2009	Jan 2009	Sept 2008	May 2008
R1	42	39	37	37	41	39	<30	38	37	39	40	39	36	43
R2	41	37	36	41	37	40	<30	40	39	39	39	40	39	41
R3	44	40	41	43	40	39	41	39	42	36	39	39	34	38

Table 22 Evening Quarterly Noise Monitoring Results

Location	Angus Place Colliery Contributed Noise Level LAeq (15 minute) dBA ¹													
	Noise Criteria	July 2011	Apr 2011	Dec 2010	Sept 2010	July 2010	Apr 2010	Dec 2009	Sept 2009	July 2009	Apr 2009	Jan 2009	Sept 2008	May 2008
R1	38	40	33	32	42	36	<30	33	37	39	40	41	40	38
R2	37	37	32	37	41	35	<30	32	37	39	37	41	36	39
R3	40	39	<30	40	42	36	30	35	39	36	39	37	36	39

Table 23 Night-time Quarterly Noise Monitoring Results

Location	Angus Place Colliery Contributed Noise Level LAeq (15 minute) dBA ¹													
	Noise Criteria	July 2011	Apr 2011	Dec 2010	Sept 2010	July 2010	Apr 2010	Dec 2009	Sept 2009	July 2009	Apr 2009	Jan 2009	Sept 2008	May 2008
R1	36	32	32	33	<30	<30	<30	30	<30	33	35	37	38	38
R2	35	30	30	34	<30	<30	<30	<30	<30	<30	<30	33	35	37
R3	35	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<35	<35	<35

Results of the quarterly noise monitoring since May 2008 indicate occasional minor exceedances of the noise impact assessment criteria during the evening period.

As stated in **Section 2.3** noise levels associated with the Angus Place Colliery Expansion Project Section 75W were approved at a State level on 29 August 2011. Noise levels from the expansion project were predicted to comply with the noise criteria provided in **Table 21**, **Table 22** and **Table 23**.

11.1.3 Angus Place Cumulative Impact Assessment

Given the predicted noise levels of less than 20 dBA due to the proposed APCVFP at the nearest affected receivers any increase to cumulative Angus Place Colliery noise levels is predicted to be negligible (less than 0.5 dBA).

11.2 Other Nearby Mining and Industrial Operations

Given the locations of the nearest sensitive receivers, it should be noted that only the receivers in Lidsdale (R3) are impacted by other industries in the subject area.

Potential sources of noise in the subject area have been identified as the Wallerawang and Mount Piper power stations, and the Kerosene Vale Ash Repository, the Pine Dale, Lamberts Gully and Springvale Coal Mines. Furthermore, it is understood that limited truck movements utilise the Wallerawang haul road for trucks transporting ash material from the Wallerawang power station to the Kerosene Vale Ash Repository.

SLR Consulting have conducted significant noise monitoring at R3 within the township of Lidsdale as in accordance with the Angus Place Colliery Noise Monitoring Program since May 2008. From this noise monitoring noise levels from other industries have been estimated as follows:

Wallerawang power station – 42 dBA.

Kerosene Vale Ash Repository – 35 dBA.

Ash trucks – 36 dBA.

Based on these noise levels and the predicted noise levels from existing Angus Place Colliery operations, cumulative industrial noise levels in Lidsdale are predicted to be approximately 46 dBA during the daytime, 45 dBA during the evening and 44 dBA during the night-time.

Given the predicted noise levels of less than 20 dBA due to the proposed APCVFP operations at the nearest affected receivers any increase to cumulative industrial noise levels due to the proposed APCVFP operations is predicted to be negligible (less than 0.1 dBA). Additionally, it is noted that there are a number of other existing and proposed mine ventilation fans in the vicinity of the Angus Place Colliery including the Invincible Colliery vent fan and the proposed Springvale vent fan. Again, given the predicted noise levels of less than 20 dBA the potential cumulative impact of the APCVFP with other fans is predicted to be negligible at the nearest residential receivers.

11.3 Other Proposed Projects in the Area

It is understood that there are a number of additional projects proposed in the vicinity of the APCVFP including the following:

- Pine Dale Colliery Expansion.
- Lidsdale Siding Upgrade Project.
- Coal Services Washery Upgrade and Coal Distribution Project.

As stated in **Section 11.2** given the predicted noise levels of less than 20 dBA due to the proposed APCVFP operations at the nearest affected receivers any increase to cumulative industrial noise levels due to the proposed APCVFP operations would be negligible (less than 0.1 dBA).

12 NOISE MITIGATION AND MANAGEMENT RECOMMENDATIONS

Noise predictions indicate that noise levels associated with the construction and operation of the APCVFP will be significantly below the project specific noise levels at the nearest potentially affected residential receivers and will result in negligible noise increases from the existing Angus Place Colliery and existing mining and industrial operations in the area.

Notwithstanding this, the following noise mitigation and management measures should be considered:

- Continued noise monitoring on site and within the community 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).
- Refinement of onsite noise mitigation measures and plant operating procedures where practical.
- Incorporate clear signage at the site including relevant contact numbers for community enquiries.
- Prompt response to any community issues of concern.

In addition to the above mitigation and management measures, the following “quiet” work practices are recommended at the vent fan compound to minimise any potential noise impacts to recreational users of Sunnyside Ridge Road:

- Regularly train workers (ie toolbox talks) to use equipment in ways to minimise noise.
- Operate mobile plant in a quiet, efficient manner.
- Switching off vehicles and plant when not in use.
- Keep plant and equipment well maintained including:
 - Regular inspection and maintenance of equipment to ensure it is good working order;
 - Equipment not to be operated until it is maintained or repaired;

- For equipment with enclosures (ie compressor rooms) ensure door and seals are well maintained and kept closed when not in use.

13 CONCLUSIONS

SLR Consulting has prepared a NIA for the proposed APCVFP associated with the Angus Place Colliery. The objectives of the NIA were to identify the potential impacts of noise and vibration due to the proposed construction and operation of the proposed APCVFP expansion on the nearest surrounding noise sensitive receivers including consideration of cumulative impacts with existing Angus Place operations and other mining and industrial noise sources in the area.

Noise modelling has indicated that the noise emissions from the proposed construction and operation of the proposed APCVFP are significantly below the relevant noise criteria at the nearest potentially affected receiver locations. Furthermore, the operation of the APCVFP is predicted to result in negligible increases in the cumulative industrial noise levels at the nearest affected receivers.

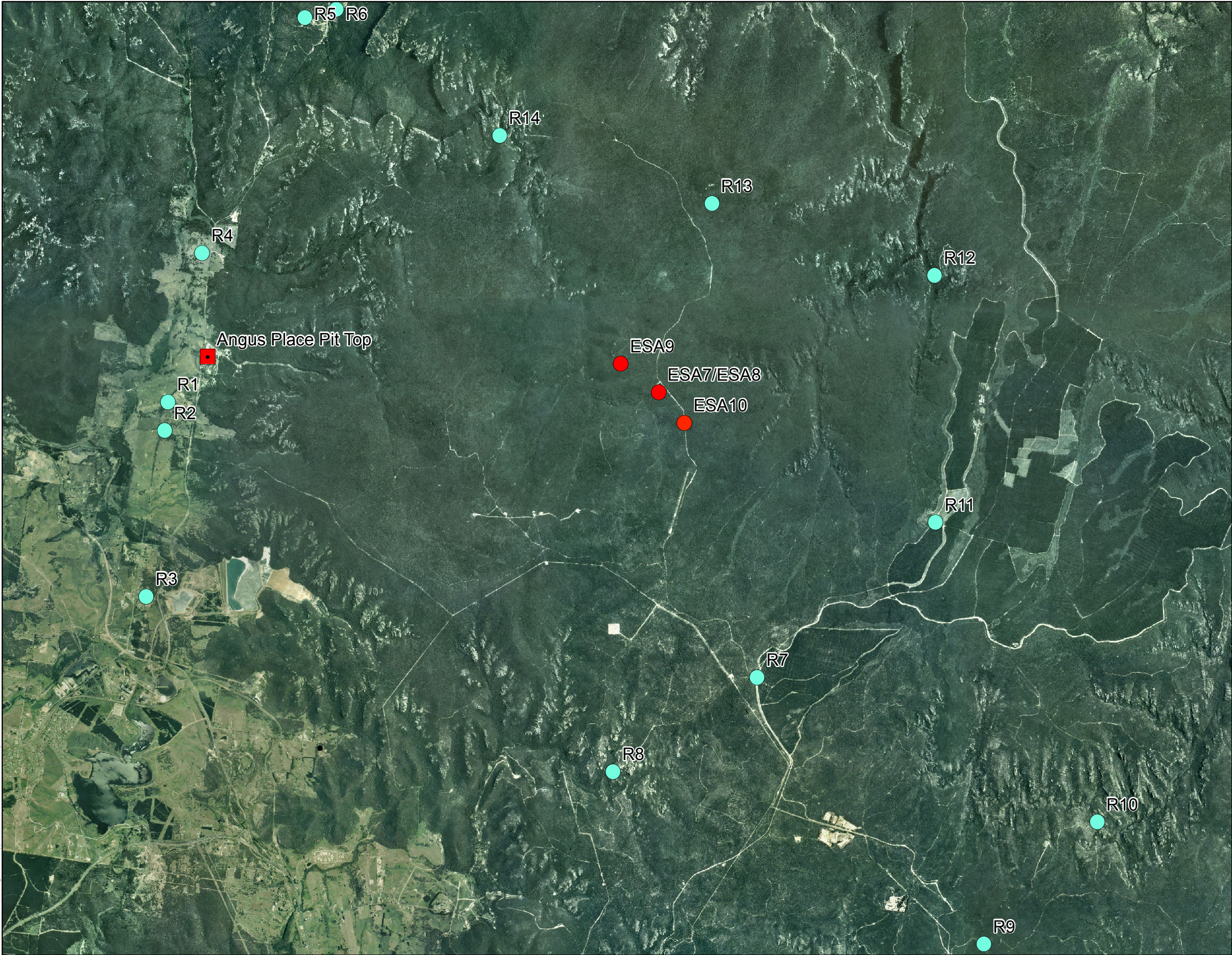
The operational noise criteria for the Newnes State Forest recreational area is predicted to be met at distances of approximately 550m to 700m from the proposed modification area.

Traffic noise generated by the construction and operation of the proposed APCVFP is predicted to be within the NSW RNP criteria at all receiver locations.

Given the separation distance between construction operations and the nearest potentially affected residential locations vibration levels from the APCVFP are predicted to be negligible and below levels of human perception at the nearest residential receivers.

While noise modelling has indicated that there will be negligible noise impacts associated with the APCVFP, the following noise management measures have been recommended for consideration:

- Continued noise monitoring on site and within the community 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).
- Refinement of onsite noise mitigation measures and plant operating procedures where practical.
- Incorporate clear signage at the site including relevant contact numbers site for community enquiries.
- Prompt response to any community issues of concern.
- Adoption of “quiet” work practices at the vent fan compound.



LEGEND

- Angus Place Pit Top
- ESA10
- ESA7/ESA8
- ESA9
- Noise Sensitive Receivers

NOTES

NOTES:
1. Aerial imagery courtesy of Centennial Coal
2. All features are approximate only and subject to detailed survey

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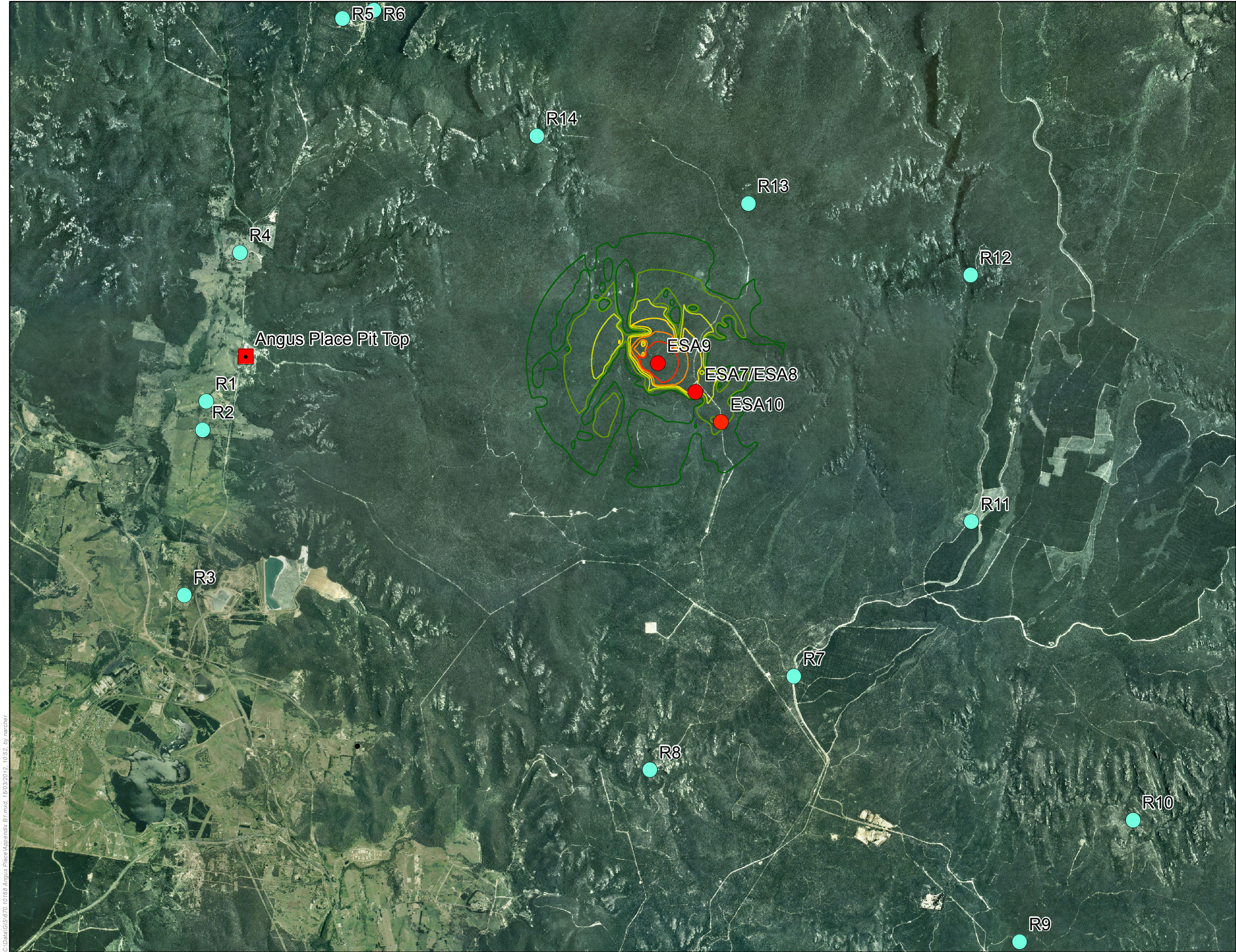
Project Name:
**Angus Place Colliery
Ventilation Facility Project**

Prepared for:
Centennial Angus Place

Project No: **670.10168**

Scale 1:60,000 @ A3 Date 16/03/2012

Drafted Nathan Archer Approved John Cotterill



LEGEND

■

 Angus Place Pit Top

●

 ESA10

●

 ESA7/ESA8

●

 ESA9

●

 Noise Sensitive Receivers

Leq(15 minute)

—

 30 dBA

—

 35 dBA

—

 40 dBA

—

 45 dBA

—

 50 dBA

—

 55 dBA

0 250 500 1,000 1,500 2,000

Metres

N

NOTES

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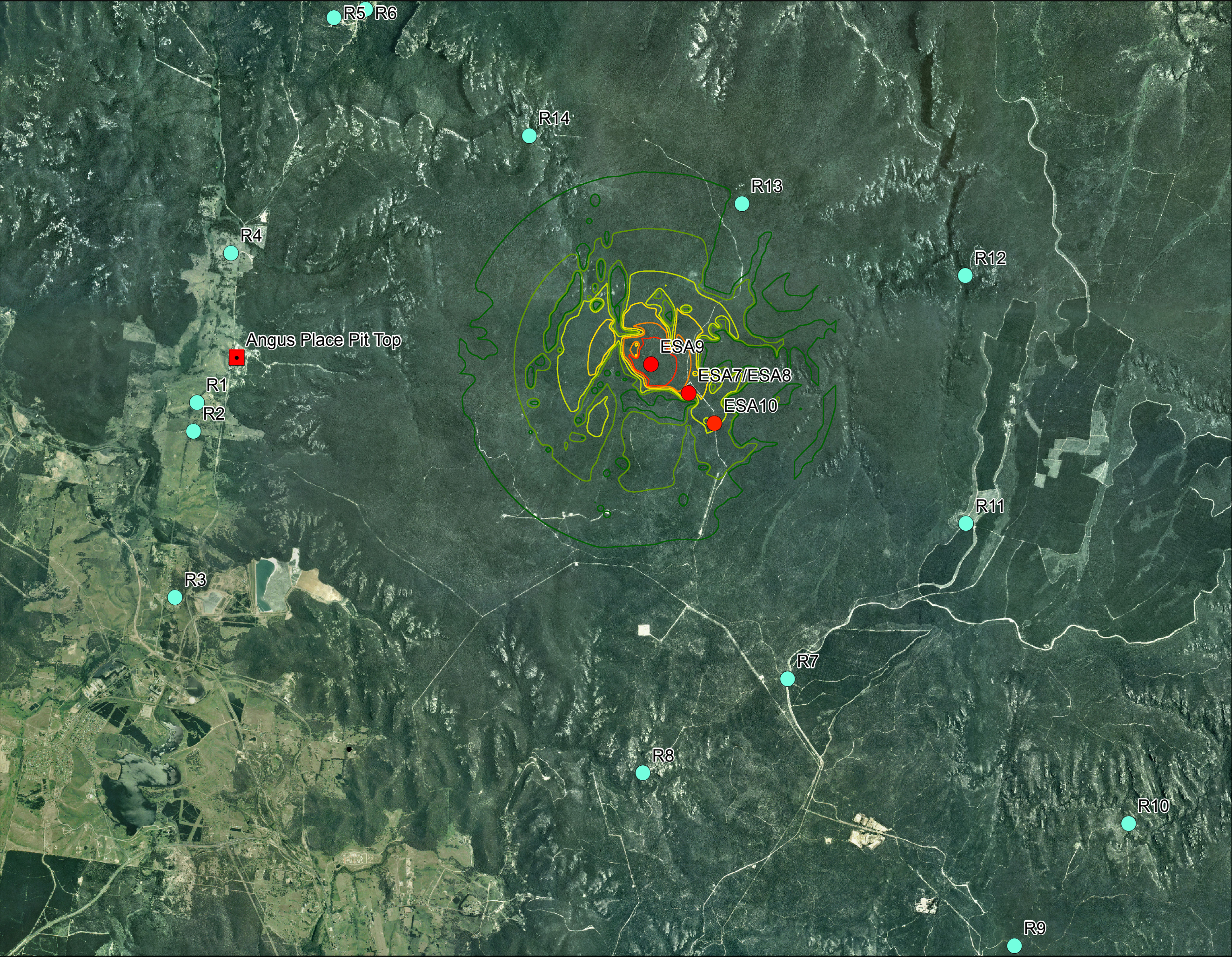
16/03/2012

Drafted

Nathan Archer

Approved

John Cotterill



LEGEND

- Angus Place Pit Top
- ESA10
- ESA7/ESA8
- ESA9
- Noise Sensitive Receivers

Leq(15minute)

- 30 dBA
- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA

0 250 500 1,000 1,500 2,000
Metres

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