

4.2.6.4 Road Traffic Noise

All roads to be used by Project-related traffic currently carry very low volumes of traffic (less than 1 500 vehicles per day and a maximum hourly traffic volume of up to 115), with proportion of heavy vehicles around 10% (TUP, 2010). Spectrum (2010b) note that these levels of traffic indicate existing traffic noise levels are well below the traffic noise criteria identified in Section 4.2.3.5 at any residence more than 15m from the road edge.

Spectrum (2010b) have calculated, using the methodology in Section 4.2.4.2, that the contribution of 10 heavy vehicle movements (the maximum hourly increase in traffic likely to be generated by the Project (TUP, 2010), travelling at 80km/hr, would provide for a traffic noise contribution of 50dB(A), $L_{eq}(1 \text{ hour})^4$. This is 5dB below the night time traffic noise criterion and 10dB below the daytime criterion. As a result, the Project would not result in the traffic noise levels received at residences along the transport route exceeding the nominated criteria.

4.2.6.5 Blasting Assessment

Based on the formulae presented in Section 4.2.4.3 and a minimum distance from the box cut to the closest non-Project-related residence (Residence R31) of 750m, an instantaneous charge of 105kg would result air blast overpressure emissions of approximately 115dB(L) or equal to the blasting criterion (Spectrum, 2010b). The calculated peak ground vibration level for an instantaneous charge of 105kg at Residence R31 is 0.5mm/s. The Proponent notes that this is one-tenth of the 5mm/s exceedance criterion for ground vibration.

Once construction of the box cut is complete, blasting would be required within the decline and Dargues Reef mine. As this blasting would be underground, airblast overpressure impacts would not be generated. As a result, ground vibration-related impacts would be the only blasting-related impact. As the instantaneous charge that would be used during underground mining operations would be less than 105kg and the above assessment concluded that an instantaneous charge of 105kg would result in ground vibration levels that would be one-tenth of the relevant criteria, the Proponent contends that underground blasting impacts would be significantly less than the relevant criteria.

Finally, as blast monitoring information is collected, a blasting “site law” for the Project would be developed allowing for more precise predictions of blasting impacts. This may allow for blasts with maximum instantaneous charges of more than 105kg.

4.2.7 Monitoring

The Proponent would implement a *Noise and Vibration Monitoring Program* prior to commencement of site establishment operations. Results of the monitoring program would be presented in the *Annual Environmental Management Report* that would be prepared for the Project to ensure that noise and vibration impacts associated with the Project are managed appropriately. The monitoring program, which would be developed in consultation with the Department of Planning, Department of Environment, Climate Change and Water and the local community, would include the following elements.

- Noise compliance monitoring would be undertaken during both the daytime and night time periods during the site establishment phase.

⁴ At a nominal distance of 20m from the road edge.



- Routine noise compliance monitoring would be conducted on a quarterly basis during the first two years of the operational stage of the Project. The frequency of ongoing monitoring would be determined based.
- Suitable monitoring locations may include R107, R31, R30, R27 and R34 which are the closest locations surrounding the Project Site and compliance at these locations would imply compliance at more distance receivers.

4.3 ECOLOGY

4.3.1 Introduction

The DGRs issued by the Department of Planning require that the *Environmental Assessment* include an assessment of “**Ecology** – including:

- *accurate estimates of any vegetation disturbance associated with the project;*
- *impacts on threatened species, populations or ecological communities; critical habitats; and native vegetation generally;*
- *a detailed description of the measures that would be implemented to maintain or improve the regional biodiversity values in the medium to long term.”*

Based on the risk assessment undertaken for the Project (see Section 3.3), specific ecology-related impacts that may result as a consequence of the Project (without the implementation of the safeguards, controls and mitigation measures presented in this section) include the following.

- Loss of, or alteration to, existing habitats.
- Direct adverse impact on threatened species, populations or endangered ecological communities.
- Local or regional reduction in distribution of threatened species, populations or endangered ecological communities.
- Possible local extinction of threatened species, populations or endangered ecological communities.
- Local or regional reduction in distribution of threatened species, populations or endangered ecological communities.
- Possible local extinction of threatened species, populations or endangered ecological communities.

The Ecology Assessment was undertaken by Gaia Research Pty Ltd (Gaia). This section of the *Environmental Assessment* provides a summary of the assessment report which is presented in full as Part 2 (Volume 1) of the *Specialist Consultant Studies Compendium* and referred to hereafter as "Gaia (2010)".

The Ecology Assessment was managed by Mr Garry Daly (BSc, GradDipEd) of Gaia. Mr Daly holds the following licences.

- Scientific Investigation Licence No. S10470. Animal Research Authority Issued by the Director General of NSW Agriculture No. 05/2371 to conduct fauna surveys utilising a variety of techniques.



Mr Daly was assisted by the following individuals.

- Mr Greg Stone (BAppSc, AdvDipLandMgt, AssDipLandMgt) – flora specialist.
- Ms Alison Rowell (BSc) – grassland specialist.
- Mr Barry Virtue (BA) – bird specialist.
- Mr Brian James (BEd) – bird specialist.

Curriculum vitae for each of the above individuals are presented in Appendix 5 of Gaia (2010).

4.3.2 Regional Flora and Fauna

Gaia (2010) undertook a search of an area within 5km of the Project Site using the following databases to identify listed species and ecological communities that may occur within the vicinity of the Project Site.

- NPWS Wildlife Atlas, accessed 30 April 2010.
- NPWS Flora Atlas, accessed 30 April 2010.
- DEWHA Protected Matters Search Tool, accessed 21 June 2010.
- PlantNet/Flora Online, accessed 14 June 2010.

In addition, DECCW provided a list of species required to be assessed during the Ecology Assessment and Mr Daly included further species based on his experience. As a result, **Table 4.11** presents those listed species and ecological communities identified as having the potential to occur within and surrounding the Project Site.

Table 4.11
Listed Species and Ecological Communities

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Threatened Species / Ecological Community	Scientific Name	TSC Act Schedule ¹	EPBC Act ^{1,2}	DECCW DGRs	Gaia Research
Fauna Species					
Koala	<i>Phascolarctos cinereus</i>	2		x	
Squirrel Glider	<i>Petaurus norfolcensis</i>	2		x	
Yellow-bellied Glider	<i>Petaurus australis</i>	2		x	
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	2		x	
White-footed Dunnart	<i>Sminthopsis leucopus</i>	2		x	
Eastern Pygmy Possum	<i>Cercartetus nanus</i>	2		x	
Grey-headed Flying Fox	<i>Pteropus poliocephalus</i>	2	V		
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	2		x	
Eastern Bentwing Bat	<i>Miniopterus schreibersii oceanensis</i>	2		x	
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	2		x	
Golden-tipped Bat	<i>Kerivoula papuensis</i>	2		x	
Large-footed Myotis	<i>Myotis macropus</i>	2		x	
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	2		x	
Smoky Mouse	<i>Pseudomys fumeus</i>	1	E		
Australian Painted Snipe	<i>Rostratula australis</i>	1	V		
Little Eagle	<i>Hieraetus morphnoides</i>	2		x	
Square-tailed Kite	<i>Lophoictina isura</i>	2		x	
Brown Treecreeper	<i>Climacteris picumnus victoriae</i>	2		x	
Regent Honeyeater	<i>Xanthomyza phrygia</i>	1	E		



Table 4.11 (Cont)
Listed Species and Ecological Communities

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Threatened Species / Ecological Community	Scientific Name	TSC Act Schedule ¹	EPBC Act ^{1,2}	DECCW DGRs	Gaia Research
Fauna Species					
Diamond Firetail	<i>Stagonopleura guttata</i>	2		x	
Hooded Robin	<i>Melanodryas cucullata cucullata</i>	2		x	
Scarlet Robin	<i>Petroica boodang</i>	2		x	
Flame Robin	<i>Petroica phoenicea</i>	2		x	
Pink Robin	<i>Petroica rodinogaster</i>	2		x	
Barking Owl	<i>Ninox connivens</i>	2		x	
Powerful Owl	<i>Ninox strenua</i>	2		x	
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	2		x	x
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	2		x	x
Swift Parrot	<i>Lathanus discolor</i>	1	E		
Striped Legless Lizard	<i>Delma impar</i>	2	V	x	
Broad-headed Snake	<i>Hoplocephalus bungaroides</i>	1	V		
Giant Burrowing Frog	<i>Heleioporus australiacus</i>	2	V	x	
Littlejohn's Tree Frog	<i>Litoria littlejohni</i>	2	V	x	
Southern Bell Frog	<i>Litoria raniformis</i>	1	V	x	
Macquarie Perch	<i>Macquaria australasica</i>		E		
Australian Graying	<i>Prototroctes maraena</i>		V		
Flora Species					
Small-leaved Gum	<i>Eucalyptus parvula</i>	1		x	
Araluen Gum	<i>Eucalyptus kartzoffiana</i>	1	V	x	
Mauve Burr Daisy	<i>Calotis glandulosa</i>	2			
Michelago Parrot-Pea	<i>Dillwynia glaucula</i>	1		x	
Monaro Golden Daisy	<i>Rutidosis leiolepis</i>	2		x	
Austral Toadflax	<i>Thesium australe</i>		V	x	
Araluen Zieria	<i>Zieria adenophora</i>	1A		x	
Dense Cord-rush	<i>Baloskion longipes</i>	2		x	
Hoary Sunray	<i>Leucochrysum albicans</i> var. <i>tricolor</i>		E		
Tangled Bedstraw	<i>Gallium australe</i>	1		x	
Thick-lipped Spider-orchid	<i>Caladenia tessellata</i>		V		
Endangered Ecological Communities					
Majors Creek Leek Orchid	<i>Prasophyllum</i> sp. <i>Majors Creek</i>	1A		x	
Pale Golden Moths	<i>Diuris ochroma</i>	1			
Small Snake Orchid	<i>Diuris pedunculata</i>	1			
Natural Temperate Grasslands of the Southern Tablelands (NSW and ACT) (EPBC community)			E		
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland			CE		
Note 1: TSC Act = Threatened Species Conservation Act 1995, EPBC Act = Environment Protection & Biodiversity Conservation Act 1999 Note 2: V = Vulnerable, E = Endangered, CE = Critically Endangered. Source: Gaia (2010) – Table 2					



4.3.3 Survey Methodology

4.3.3.1 Introduction and Survey Area

The survey methodology used during the Ecology Assessment complies with the requirements of:

- *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Working draft)*, prepared by the Department of Environment and Conservation (2004); and
- *Draft Guidelines for Threatened Species Assessment* prepared by the (then) Department of Environment and Conservation and Department of Primary Industries (2005).

The survey area for the Ecology Assessment included the entire Project Site. As a result, the survey area and Project Site are coincident with the Project Site and are referred to hereafter as the Project Site.

4.3.3.2 Flora Survey Methodology

The flora surveys were undertaken on:

- 14 October 2009;
- 25 January 2010;
- 3 May 2010;
- 4 June 2010; and
- 9 June 2010.

A preliminary survey was initially undertaken to determine the major vegetation types present within the Project Site and the distribution of each. Sites representative of these vegetation types were selected for further surveying using 100m transects and 20 x 20m quadrats. **Figure 4.14** presents the location of the transects and quadrats. In addition, searches for plant species of conservation significance were then carried out in potential habitat using the random meander technique.

Finally, it is noted that it was agreed with the DECCW during an onsite meeting on 7 May 2010 that pastures/grasslands within the Project Site would be classified either as:

- Native Grassland;
- Native-dominated Pasture; or
- Exotic-dominated Pasture.

Section 3.2.3 of Gaia (2010) provides a detailed description of classification of each of those classes of vegetation.



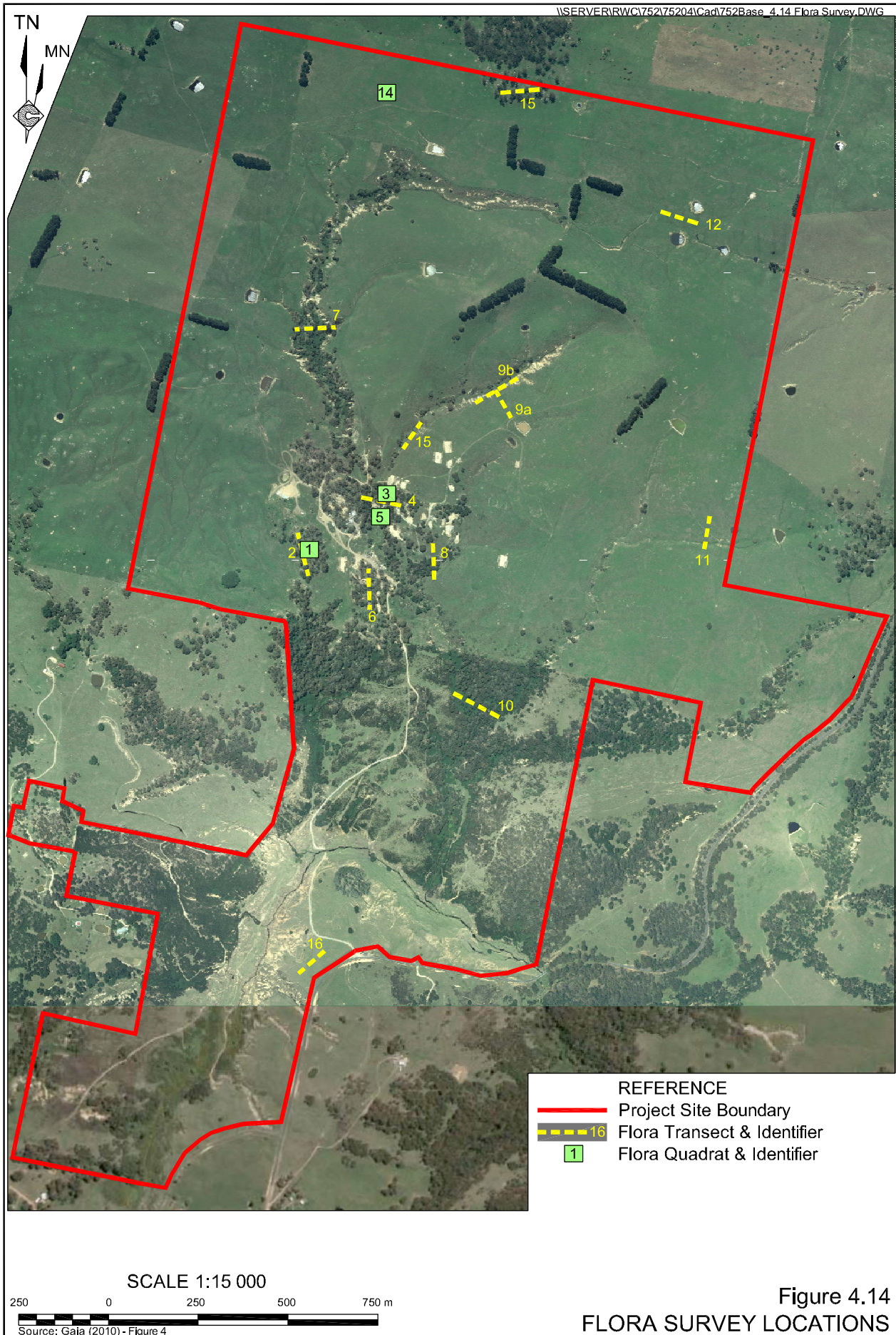


Figure 4.14
FLORA SURVEY LOCATIONS

4.3.3.3 Fauna Survey Methodology

The fauna surveys were undertaken:

- on 19 November 2007;
- from 12 to 15 October 2009; and
- from 1 to 4 February 2010.

An initial preliminary survey was undertaken to identify habitat types. Following this, the following surveys were undertaken. It is noted that a detailed description of the fauna survey methodology is presented in Section 3.3 of Gaia (2010). **Figure 4.15** presents each of the survey locations.

- Elliot and cage trapping - two 100m x 200m transects were established within an area of Ribbon Gum – Snow Gum Open Forest (Ribbon Gum Forest) (see Section 4.3.4.3) adjacent to Spring Creek. These sites were surveyed in October 2009 and in February 2010. Each transect consisted of 10 Elliot Traps (type A) and two 20cm x 20cm x 55cm cage traps.
- Harp trapping – six harp trapping locations were established in sections of the Project Site likely to be utilised by bats.
- Diurnal bird census – diurnal bird censuses were undertaken for 20 minutes along each Elliot and cage trapping transect. In addition, smaller surveys were undertaken at a further three locations within the Project Site. Birds were identified by their species-specific calls and by direct observation with the aid of binoculars. Birds detected outside the surveyed transects were also recorded.
- Foot-based spotlighting - Spotlighting was conducted for arboreal mammals for 40 minutes within the Ribbon Gum Forest. Spotlighting was conducted with the aid of 50 watt/12 volt lights and involved the identification of animals by direct observation and the recognition of species-specific calls.
- Nocturnal playback – The calls of a standard suite of species were broadcast from the start of one of the Elliott and cage trap transects through a car stereo system from 7:43pm to 8:00pm on 1 February 2010. This location was selected as it was on a ridge and within remnant mature forest. No spotlights were operated during the playback but the immediate area was spotlit after the cessation of the playback.
- Diurnal herpetofauna census - The herpetofauna census involved two 60 minute searches by two people along Elliot trapping lines on 14 October 2009 between 8:55am and 9:25am and repeated on 3 February 2010 between 12:27pm and 12:57pm.
- Nocturnal streamside search - Amphibian searches were conducted beside Majors Creek for 30 minutes duration with the aid of a 50 watt/12 volt spotlight from 8:55pm to 9:25pm on the 2 February 2010.

