

APPENDIX G

Ecological Assessment

Joy Hafey Environmental Consultant

*PO Box 5 Tahmoor 2573
Tel 02 46819106
Fax 02 46819094
Mobile 0427841112
Email: joy@joyhafey.com.au*



*Trading as
Wirrimbirra Environmental
Consultants Pty Ltd
ABN(91 105 535 484)*

***Fauna & Flora Assessment
Assessments of Significance
Lot 100 and 101 DP Drualla Road
and Downes Place, Jamberoo***



November 2015

CERTIFICATION

**Fauna & Flora Assessment: Assessments of Significance, Lot 100
and Lot 101 DP 1157883 Drualla Road and Downes Place,
Jamberoo**

Prepared by :-

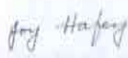
Name : Joy Hafey

**Qualifications : B.Sc. ecology & molecular biology
Bushfire Consultant**

**I hereby certify that I have prepared the contents of this
assessment**

**And to the best of my knowledge, it is true in all material
particulars**

**And does not, by its presentation or omission of information,
materially mislead**


Signature.....

Name...Joy Hafey.....

Date 14th November 2015.....

Copyright Joy Hafey 2015

Summary

Joy Hafey was engaged to provide a Fauna and Fauna Assessment on Lot 101 and a small north eastern corner of Lot 100 in DP 1157883 Drualla Road and Downes Place, Jamberoo. The assessment forms a part of a planning proposal seeking Kiama Municipal Council support to make an amendment to KLEP 2011 to rezone the subject site from RU2 Rural Landscape to R2 Low Density Residential, enabling the land to be subdivided and developed for residential purposes.

The proposed development site is located approximately 1km from centre of the small village of Jamberoo in the Kiama Municipal Council LGA. The ecological field study was undertaken over four days, in November 2015. As a result of past disturbance, the vegetation on the land is significantly modified in species structure and composition. The survey found that the subject site is ecologically degraded and considerably modified to the original ecological community. The subject site is part of a large dairy farm and is predominantly cleared and "pasture improved". There is no understorey and the dense groundcover species are exotic pasture grasses and weeds. Grazing is a regular feature on the site. A total of 56 flora species (14 native) and 31 fauna species were noted on the subject site. Limited fauna was noted on the site with avifauna the most abundant. A small section of the site has been mapped as biodiversity land under Kiama Local Environment Plan 2011

A literature search found the Commonwealth Protected Matters Search Tool and NSW NPWS Wildlife Atlas, listed 40 threatened fauna, 22 threatened flora, and three endangered ecological communities (EEC), as occurring within 10km of the subject site.

No threatened species were noted on the subject site and the site is unlikely to provide suitable habitat for any threatened species. It was concluded that the proposed development would not have a significant impact on any endangered ecological community or threatened species and no further ecological assessments are recommended.

Table of Contents

1.	Introduction	5
2.	Site Description	6
	2.1 Location	
	2.2 Landform	
	2.3 Geology & Soil	
	2.4 Climate	
3.	Methodology of Survey	9
	3.1 Flora Methodology	
	3.2 Fauna Methodology	
4.	Results	12
	4.1 Flora	
	4.2 Fauna	
5	Habitat & Wildlife Corridor Potential	16
6	Statutory Requirements	18
7	Assessments of Significance	21
8.	Impact of the Proposed Development, Ameliorate Measures	23
9	Discussion and Conclusion	25

Appendix 1 Threatened Fauna & Flora of the Region

Appendix 2 Flora Noted on the Survey Site

Appendix 3 Avifauna Noted

Appendix 4 Habitat Value

Appendix 5 References

Figure 1 Aerial Overview 7

Figure 2 Proposed Subdivision Layout 8

Figure 3 Vegetation Communities Map 11

Figure 4 Aerial View of the Region 18

Plates 1-5 Views of the Study Site

Front Cover View of the Existing Residence and Surrounds

1.0 Introduction

This flora and fauna report, has been prepared to accompany a Planning Proposal to Kiama Municipal Council by Beth Downes for an amendment to KLEP 2011 to rezone the area comprising - Lot 101 and a small north eastern corner of Lot 100 in DP 1157883 Drualla Road and Downes Place, Jamberoo (see Figure 1). For the purpose of this report, this area is referred to as the subject site. This rezoning would be from RU2 Rural Landscape to R2 Low Density Residential, to enable the land to be subdivided and developed for residential purposes. Under the 'Kiama Urban Strategy' (KMC, 2011) the subject site has been identified as being suitable for urban expansion, contingent upon a more detailed environment assessment documenting any environmental constraints upon the site. After rezoning the subject site, it is proposed to subdivide it into 16 allotments, ranging in size from 800m² to 1290m² (see Figure 2.). The boundaries and layout of this future subdivision were determined through consultation with Kiama Municipal Council. The proposed plan of the subdivision has a 12.5 meter perimeter road, which provides a cleared area between the subdivision and the rural interface.

The aim of the flora and fauna study is to;

- 1 Identify the flora and fauna on the study site, with special emphasis placed on the identification of threatened species. By definition of the Threatened Species Conservation Act 1995, threatened species includes endangered species, vulnerable species, species presumed extinct and also endangered ecological communities Appendix 1 lists threatened species, noted as occurring within 10km of the study site.
- 2 Identify habitat potential of the site and identify areas of high conservation significance that could be managed for biodiversity conservation.
- 3 Identify the wildlife corridor potential of the site
- 4 Identify mitigating measures to ameliorate any impacts likely to occur as a result of the proposed development.
- 5 Identify issues relating to: Threatened Species Conservation Act 1995 (TSC Act 1995), Environmental Planning & Assessment Act (EP&A Act), Fisheries Management Act 1994, Environment Protection and Biodiversity Conservation Act 1999 (EPCB Act), Kiama LEP 2011 and State Environment Planning Policy 44 (SEPP44) Potential Koala Habitat.

2. Description of the Subject Site

The site covers an area of approximately 1.6ha and is predominantly cleared (Figures 1). There are a small number of scattered trees surrounding the dwelling and one native tree located on the north western boundary. Existing development includes a residence and outbuildings with landscaped gardens and a swimming pool. An access track to the homestead of “Roo View” crosses the site.

The subject site is currently zoned RU2 under Kiama Local Environment Plan 2011, see Figure 3. Vegetation on the unformed western section of Drualla Road is mapped as “biodiversity land” and is zoned E3, Environmental Management. One tree on the subject site links into the canopy of this remnant vegetation.

Land use on the subject site is grazing of domestic stock.

2.1 Location

The subject site is situated approximately 1 km north west of the Jamberoo Post Office in the Kiama Municipal Council L G A. It is bounded by Drualla Road to the north and Downes Place to the east with rural land to the north, west and south.

2.2 Landform

The subject site forms part of a ridgeline on the foothills of the escarpment. The site slopes from the ridge, to the west and east. Maximum elevation is 45m Above Sea Level on the ridge with minimum elevation approximate 25m in the western gully. Water from the site is drained to an upper tributary of the Minnimurra River.

2.3. Geology & Soils

The soil landscape grouping is identified on the Kiama Soil Landscape Sheet 9028 as the Foutaindale Soil Landscape. Soils are moderate to deep podzolic soils found on the low rolling hills with long sideslopes on Budgong Sandstone in the Jamberoo valley. (DECCW, 2010)

2.4 Climate

The climate of the area is temperate, with warm summers at Kiama Station 068242 (mean max. Jan 24.9 C) and mild winters (mean minimum July 17.9°C) (Bureau of Meteorology). The mean annual rainfall for the area (years 1963-2015) is 1490 mm per annum at Jamberoo Station 068209 (Bureau of Meteorology 2015).

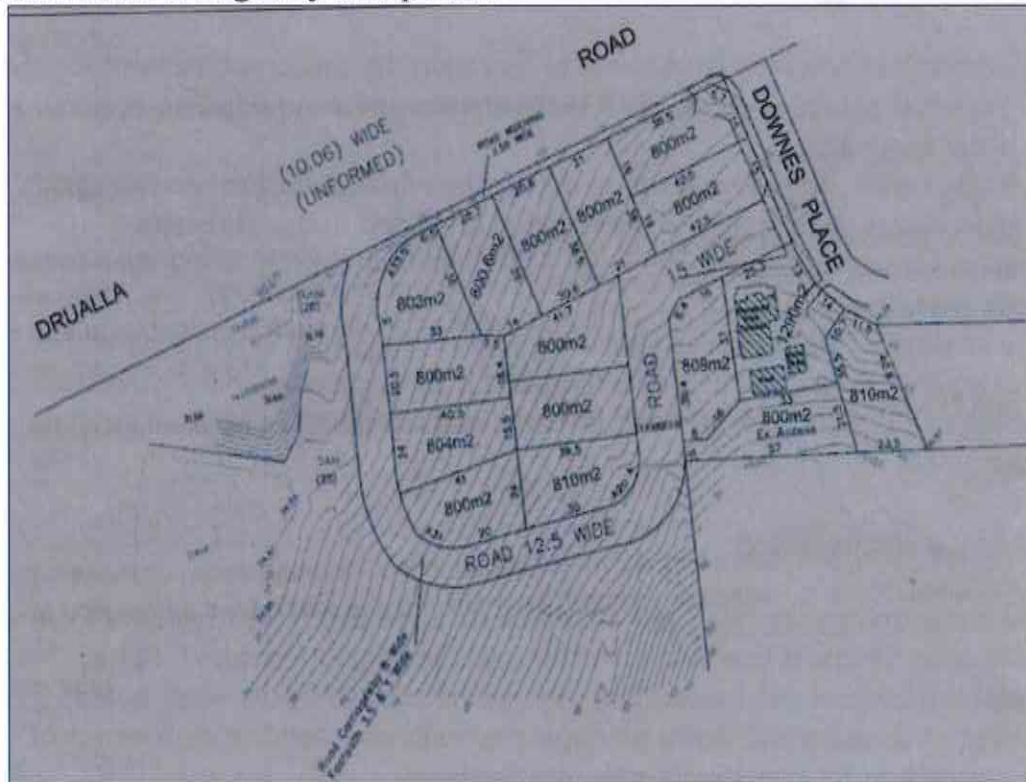
Lots 100 and Lot 101 DP 1157883, Drualla Road and Downes Place, Jamberoo

▼ **Figure 1 Aerial view of the Proposed Development Site:** Lot 101 and Lot 102 DP 1157883 Drualla Road and Downes Place, Jamberoo. The subject site comprises only the north eastern portion of Lot 100 and Lot 101, see detail below.

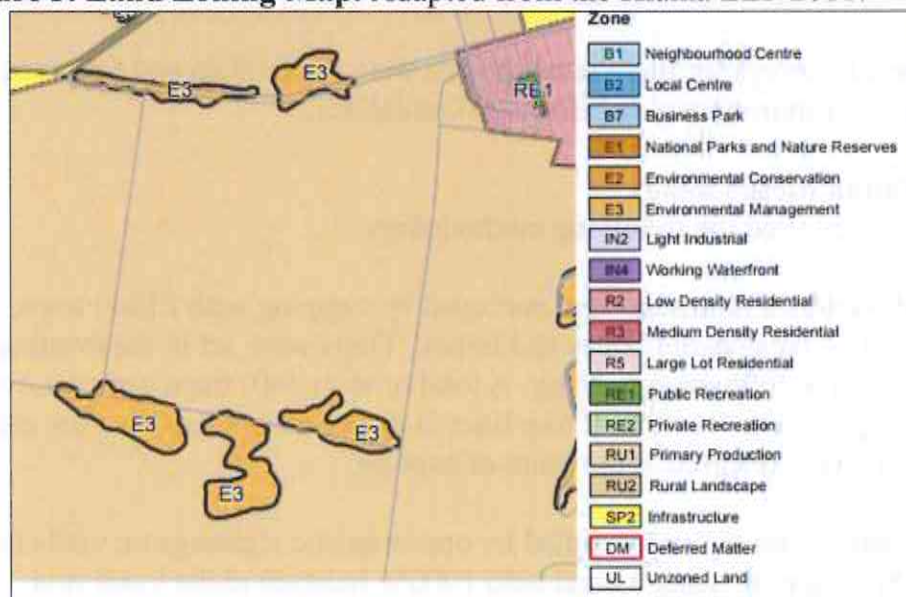


Lots 100 and Lot 101 DP 1157883, Drualla Road and Downes Place, Jamberoo

▼ **Figure 2 The Proposed Subdivision Layout:** the proposed 16 Lot subdivision is ringed by a loop road.



▼ **Figure 3. Land Zoning Map.** Adapted from the Kiama LEP 2011.



3.0 Methodology

A literature review was carried out to ascertain the conservation significance of plant and animal species, plant communities and animal habitats in and near the study area.

The assessment was carried out to determine whether further investigation was necessary with regard to species that are listed in the Threatened Species Conservation Act 1995 and which may potentially be present on the study site.

The ecological field survey was conducted during mild to stormy weather over a period four days in November, 2015. The degree of disturbance to habitat and threats such as weed invasion and the presence of feral animals were noted.

3.1 Flora Methodology

The methodology for this study involved detailed field investigation of the study area. Transect lines were walked and the vegetation noted. Subjective visual inspections and assessment of vegetative biodiversity were noted. Topographic maps and aerial photographs were used to identify features of the vegetation for investigation during fieldwork.

Each vegetative community is described in terms of dominant plant species and vegetation height and density. Plant taxonomy follows Harden (2002)

Targeted surveys for threatened species were undertaken and followed NSW Office of Environment and Heritage Guidelines.

3.2 Fauna Methodology

The survey used the following methodology

Small Ground Animals were surveyed by trapping with Elliott traps, baited with rolled oats/peanut butter and honey. Traps were set in the evening and retrieved the following morning. A total of sixty (60) traps were set over three nights. The location of trap lines is indicated in Figure 1. Any captured animals were released at the point of capture.

Aboreal Animals were sampled by opportunistic sightings on visits to the site. Spotlighting using a hand held 1000W halogen globe torch was undertaken. The technique involved walking amongst woodland trees and

conducting searches of trees. Observations of scats, scratchings, diggings etc, indicating the present of these animals, were noted and recorded.

Amphibians were noted by listening for calls during each visit and by searching in habitat areas, e.g. under timber and rocks. Playback tapes of threatened frog species were utilized to illicit a response from threatened frog species which may be in the area.

Reptiles were sampled by turning over debris during each visit to the site and opportunistic sightings.

Avifauna were sampled by opportunistic sightings and listening for calls during each visit to the site. Playback tapes of threatened owl species were utilized to illicit a response from threatened owl species which may be in the area.

Bats were sampled by opportunistic sightings during dusk and night visits to the site.

Large ground animals were sampled by opportunistic sightings on all visits to the site. Observations of scats, scratchings, diggings etc. indicating the presence of these animals, were noted and recorded.

Molluscs were sampled by searches amongst litter at the base of trees and amongst clumps of grasses.

4.0 Flora and Fauna Results.

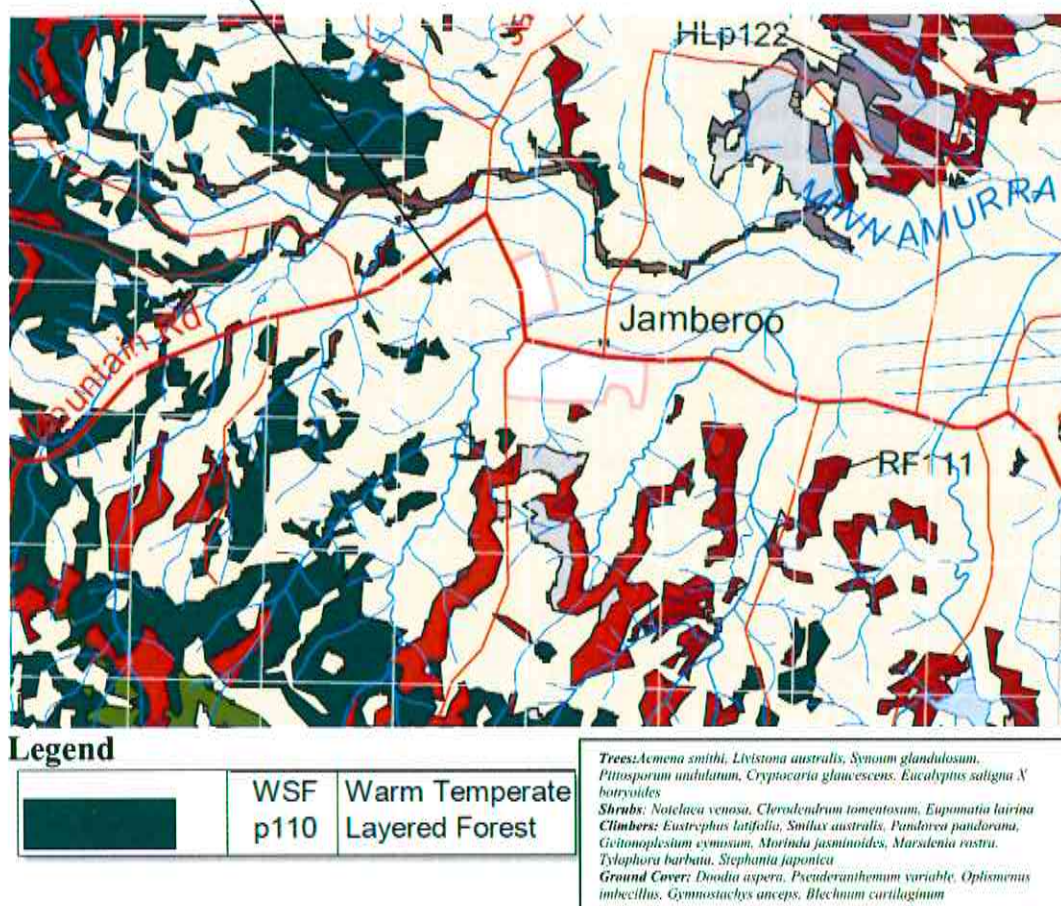
The literature review, conducted to assess the potential diversity and abundance of flora and fauna species in area, included the following:

- 1 Department of Environment and Heritage Wildlife Atlas Report (Bionet) 2015 Jamberoo 10km radius
- 2 Australian Museum Records
- 3 Kiama Municipal Council LEP 2011
- 4 Rare or Threatened Australian Plants (ROTAP)
- 5 Commonwealth EPBC Act Protected Matters Report 2015 Jamberoo 10km radius
- 6 Fairley A. 2004 Seldom Seen Rare Plants of Greater Sydney

The review found that

- Vegetation community maps indicate the presence of an urbanised landscape predominantly comprised of exotic species, see Figure 4.
- There are twenty two (22) threatened flora species and forty (40) threatened terrestrial fauna species occurring within a 10km radius of the subject sites (NSW NPWS Wildlife Atlas 2014 and Commonwealth Protected Matters Search Tool Kiama area 2014. Appendix 1 lists threatened species noted as occurring in close proximity (within 10km) and the likelihood of occurrence on the subject sites.

▼ **Figure 4 Vegetation Communities Map:** The vegetation indicated on the subject site (white) is urbanised or bare areas largely devoid of native vegetation and comprised predominantly of exotic vegetation. The field survey confirms these conditions. Vegetation proximal to the subject site was mapped as Warm Temperate Layered Forest. Reference DECCW 2009



The field survey found that

- the site provides habitat for 56 flora species (14 native) and 31 fauna species. Appendix 2 and 3 list species noted.
- Weed invasion is moderate and a number of environmental and noxious weeds were noted eg *Senecio madagascariensis* (Fireweed), *Rubus fruticosus* (Blackberry), *Cirsium vulgare* (Scotch Thistle).

4.1 Flora Survey Results

As a result of past land practices the vegetation of the area is considerably modified to the original vegetation, both in species diversity and structural diversity. The site has been utilised as a dairy farm for several generations and has been extensively pasture improved and grazed over a long period of time. The vegetation is discussed below and described in terms of its structural and floristic characteristics. It is classified using the terminology of Specht (1991) and the name of the dominant tree species.

There are two general vegetation communities on the subject site. They are

1. Exotic pastureland community.
2. Highly modified landscaped community.

1) Exotic Pastureland community

This community occurs to the east, west and south of the existing dwelling on the corner of Downes Place and Drualla Road. The area is viewed in Plates 1, 2 and 3. The community is depauperate in species diversity and structural diversity. It consists predominantly of a dense cover of exotic grasses eg *Lolium perenne* (Perennial Rye Grass), *Paspalum Paspaloides* (Paspalum), *Pennisetum clandestinum* (Kikuyu) and weeds eg *Senecio madagascariensis* (Fireweed). The grassland varies in height, from 0.5m to 0.75m.

One native tree, *Eucalyptus botryoides* (Southern Mahogany) occurs on the northern boundary in close association with other mature trees on the unformed roadway of Drualla Road, see Plate 2.

2) The landscapes community

This community occurs around the perimeter of the existing dwelling.

The canopy stratum is comprised of native and exotic trees to 16m in height. Plate 4 presents a canopy outline adjacent to the existing dwelling.

Lots 100 and Lot 101 DP 1157883, Drualla Road and Downes Place, Jamberoo

Canopy species noted included, *Cupressus torulosa*, *Grevillea robusta* (Silky Oak), *Eucalyptus botryoides* (Southern Mahogany), *Jacaranda mimosaeifolia* (Jacaranda) and *Cinnamomum camphora* (Camphor Laurel).

The shrub stratum and small tree stratum consists of several planted native species eg *Westringia fruticosa* (Coastal Westringia) *Podocarpus elatus* (Plum Pine) and *Hymenosporum flavum* (Native Frangipanni). The trees and shrubs on site provide habitat for native birds.

The ground stratum consists of a dense cover of *Pennesetum clandestinum* which is regularly mown.



▲ Plate 1 View to the South over the Grassland Community: The grassland community consisting of a dense cover of exotic pasture grasses eg *Lolium perenne* (Perennial Rye Grass), *Paspalum paspaloides* (Paspalum), *Pennesetum clandestinum* (Kikuyu), *Dactylis glomerata* (Cocksfoot) and *Trifolium repens* (White Clover)



▲ Plate 2: View of the Northern Boundary: The fence line marks the northern boundary with the unformed section of Drualla Rd. The unformed roadway contains abundant noxious and environmental weeds as well as species characteristic of Warm Temperate Layered Forest eg *Morinda* sp.



▲ Plate 3 Western Boundary of the Subject Site: The white line marks the western boundary. A small adjacent dam provides habitat for several species eg ducks, swamp hens and frogs. A set back of 10m from the dam applies.



▲ Plate 4 Outline of the Canopy Species in Landscaped Gardens: The canopy species surrounding the existing dwelling include exotic and native species. These trees provide the only nesting, roosting and a food source within an otherwise cleared subject site.

4.2 Fauna Results

The habitat potential for native fauna within this area has already been limited with the past clearing of a substantial area of native vegetation. In total there were 9 faunal and 22 avifaunal species noted on the subject site

No small animals were trapped or noted

Other larger animals were in evidence. .

- Rabbits (*Oryctolagus cuniculus*) were noted.
- Fox (*Vulpes vulpes*) scats were noted
- Dogs (*Canus familiaris*) were observed.
- Cattle (*Bos taurus*) were observed.

No bats were noted.

Amphibian *Crinia signifera* (Eastern Froglet), *Littoria dentata* (Bleating Tree Frog) and *Lymnodynastes peronii* (Striped Marsh Frog) were heard in the dam to the west of the subject site, see Plate 3.

Small reptiles, *Lampropholis delicata* (Grass Skink) were observed.

Avifauna: A total of 22 bird species were recorded, by observations or identification of calls on site visits. Birds noted included granivorous, nectivorous, frugivores, insectivorous species and wetland species.

(Appendix 3)

Molluscs: Snails noted on site were identified as *Helix aspera*, the common introduced species.

Note: No threatened fauna species were noted on the proposed development site.

4.3 Discussion of Flora and Fauna Results and Survey Constraints

Ground truthing provides an evaluation of vegetation conditions on the subject site. Quadrat analysis of 400m² plots of the vegetation showed that the site is depauperate in native species. It is considered that no native ecological community occurs on the subject site. The planting of native species around the existing residence and on the road reserve of Downes Place has provided a small area of habitat for native birds.

A brief evaluation of the vegetation occurring on the unformed road reserve of Drualla Road, found that species characteristic of Warm Temperate Layered Forest (WTLF) occurs adjacent to the northern boundary of the subject site.

However the road reserve contains an abundant and diverse range of noxious and environmental weeds which are being spread into the surrounding landscape.

The constraints on the flora and fauna survey related to the fact that the survey was carried out over a short period of time in spring 2015 and sampling did not cover seasonal variations or varying climatic conditions. The study does however provide a comprehensive assessment of the biodiversity on the study site.

5.0 Habitat Potential & Wildlife Corridor Potential

In general, the habitat potential of the proposed development site has been reduced through ecosystem simplification and the addition of introduced flora and fauna. These have depleted natural resources such as food and shelter for native animals.

The following observations were noted

- There is a low diversity of species and low structural diversity on the subject site to provide a greater diversity and abundance of micro habitats.
- There are few mature trees with hollows etc. for roosting, breeding or nesting sites.
- Introduced species have replaced native species thereby reducing food resources and shelter sites.
- There is no fallen trees and litter debris to provide habitat for fauna eg reptiles and invertebrates
- There are no rocks, caves, overhangs or crevices to provide habitat.
- There are no ephemeral creek areas to provide habitat.
- There is no juvenile recruitment of trees or shrubs occurring.

Cleared agricultural lands have the lowest habitat potential for a range of species. In general the habitat potential of the subject site for specialist native species is poor. Appendix 4 classifies potential habitat.

The potential for the site to be part of a wildlife corridor was assessed. Aerial photographs (Figures 1 and 5) were used in conjunction with cadastral maps at a 1: 25 000 scale to give an indication of the overall extent of native vegetation on the site and its continuity with other areas of native vegetation in the area

The subject site has no connectivity to the small areas of remnant vegetation in the area. It is surrounded by urban development to the east and by farmland to the north, south and west. It therefore, is not considered to form part of a wildlife corridor. The trees on site are important as they provide roosting habitat for avifauna and flying and gliding mammals as they move through the area.

With the regeneration of the unformed Drualla Road, there is the potential to provide an important corridor through the rural landscape. The ecological value of this vegetation has been recognised in its partial E3 zoning in the Kiama LEP, see Figure 3.

Landscaping the proposed development site with a perimeter of mesic native vegetation could extend the corridor potential of the Drualla Road corridor.



▲ **Figure 5 Aerial Overview of the Region:** The subject site is surrounded by residential development to the east and land associated with agriculture to the south, north and west

6.0 Statutory Assessments

The fauna and flora assessment must comply with all Commonwealth legislation regarding threatened species and communities. Attention must also be paid to any government policies which may be applicable to the study site.

*a) **The Threatened Species Conservation Act (1995)** is a state legislative requirement that must be addressed in the assessment of fauna and flora matters. It requires consideration of the potential impacts on threatened species, populations and ecological communities. There are 22 flora and 40 fauna species, listed under the TSC Act and the EPBC Act, occurring within the local area that need to be considered. There are 3 endangered ecological communities within 10km.*

The likelihood of occurrence of these species is addressed in Appendix 1

b) Section 5A of the Environmental Planning & Assessment Act (1979)
lists factors to be taken into account in deciding whether there is a significant effect on threatened species as a result of the development. These factors are based on the "Seven Part Test".

The subject site does not provide habitat for any threatened plant species and is unlikely to provide acceptable habitat for threatened fauna.

c) The Fisheries Management Act (1994) *provides a list of threatened aquatic species, which require consideration when addressing the potential impacts of developments.*

There is an absence of suitable habitat for any threatened aquatic fauna on the study site, therefore this legislation does not need to be addressed.

d) The Environment Protection and Biodiversity Conservation Act 1999
is a national statutory requirement that requires that Commonwealth approval be sought for certain developments that may impact upon matters of national environmental significance. Matters of national environmental significance to be considered under the EPBC Act 1999 are as follows:

- *World Heritage properties*
- *National Heritage places*
- *Wetlands protected by the Ramsar Convention.*
- *Nationally listed threatened species and ecological communities.*
- *Nationally listed migratory species.*
- *Nuclear actions, including uranium mining.*
- *Great Barrier Reef Marine Park*
- *Protection of water resources from coal seam gas development and large coal mining development*
- *The Commonwealth marine environment*

The site does not contain any threatened flora or fauna species listed under the EPBC Act, Ramsar wetlands, nor is the site involved with nuclear development. The site is not located within the Great Barrier Reef Marine Park, does not pose any potential impacts to the Commonwealth marine

environment and is not associated with any coal seam gas development or large coal mining development.

e) State Environment Planning Policy no. 44 (SEPP44)-Koala (Phascolarctos cinereus) Habitat Protection.

SEPP 44 operates under the framework of the EPA Act.

The aims of this legislation is “to encourage the conservation and management 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 the koala population decline” . A development application affecting one hectare or more, in an identified local government area, must be assessed under SEPP 44.

An assessment under this legislation is based upon whether the land constitutes potential Koala habitat.

Potential Koala habitat is defined as the “ number of eucalypt species present in Schedule 2 (table 1) of SEPP 44, constitute 15% or more in the upper and lower stratum of the tree component present on site”.

Table 1 SEPP 44 Schedule 2 Tree Species (Koala feed trees)

<i>Scientific Name</i>	<i>Common Name</i>
<i>Eucalyptus albens</i>	White Box
<i>Eucalyptus camaldulensis</i>	River Red Gum
<i>Eucalyptus haemastoma</i>	Broad-leaved Scibbly Gum
<i>Eucalyptus microcorys</i>	Tallowwood
<i>Eucalyptus populnea</i>	Poplar Box
<i>Eucalyptus punctata</i>	Grey Gum
<i>Eucalyptus robusta</i>	Swamp Mahogany
<i>Eucalyptus signata</i>	Scibbly Gum
<i>Eucalyptus tereticornis</i>	Forest Red Gum
<i>Eucalyptus viminalis</i>	Ribbon Gum

If potential Koala habitat is present the area must be further assessed to determine if the site constitutes core Koala habitat.

Core Koala habitat is defined as “an area of land with a resident population of Koalas as evidenced by attributes such as breeding females (ie females with young) and recent sightings of and historic records of a population”.

Note: With regard to SEPP 44, this legislation provides an inadequate basis to adequately assess land as potential Koala habitat. The list in Schedule 2 is incomplete with regard to what constitutes koala food trees. A more relevant list is included in the Draft Recovery Plan for Koalas, NSW Dept. Environment and Conservation (DEC).

On the basis of SEPP 44 the site does not constitute Potential Koala Habitat as there are no Koala food trees on the subject site. and no Koalas were observed.

7.0 Assessments of Significance TSC Act & EPBC Act

An assessment of significance allows decision makers to assess whether a proposed development is likely to impact significantly, on a threatened species, its populations, habitats or on a threatened ecological community. The stages of a threatened species assessment are

- preliminary assessment
- assessment of the nature of the development
- evaluation of significance
- administrative and legislative outcomes of the “seven part test”

Note: Endangered (E) species are defined as “taxa in serious risk of disappearing from the wild state within one or two decades if present land use and other factors continue to operate”.

Vulnerable (V) species are defined as taxa not presently endangered but at risk of disappearing from the wild over a longer period (20-25 years) through continued depletion, or which largely occur on sites that are likely to experience changes in land use that would threaten the survival of the species in the wild” (Briggs and Leigh 1995)

While the proposed development is of a limited nature, the following points need to be considered with regard to threatened species in the area

“7 part test”

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

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

C) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

1) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction or

11) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

D) In relation to the habitat of a threatened species, population or ecological community:

1) the extent to which habitat is likely to be removed or modified as a result of the action proposed and

11) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action and

111) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

E) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

The survey site does not involve critical habitat.

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

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

The occurrence of the 22 threatened flora and 40 threatened fauna species is considered in Appendix 1. It was concluded that as the subject site was a

small ecologically degraded area, the occurrence of threatened species is unlikely.

8.0 Impact of the Development and Ameliorating Measures

Impact of the proposed development may be regarded as, direct, indirect and accumulative. However the proposed development is unlikely to contribute further to the existing threats already existing on the site.

The most significant direct impact will be the removal of vegetation for future construction. The proposal will result in the clearance of an area of the subject site that is ecologically degraded predominantly with exotic grasses.

The major threat to plant communities in the Sydney bioregion is clearing, closely followed by weed infestation. It is therefore important that noxious and environmental weed control be continued on site as these species can spread into native communities. Unfortunately the unformed Drualla Road contains many noxious and environmental weeds which are encroaching into the subject site.

A major impact of the proposed development is soil disturbance as a feature of the cut and fill required to construct the subdivision.

Mitigating measures to minimize the impact of earth works are as follows:

- No machinery is to impinge upon the riparian area to the west of the western boundary. The western boundary of the subject site is to mark the extent of any earthworks with the exception of the western spillway.
- At the commencement of earthworks, the topsoil is to be stripped and stored in low heaps <1m in height. Soil containment barriers are to be placed on the downside of soil heaps.
- Following the construction, the topsoil is to be spread over the fill so that there is no inversion of the soil layers.
- The spread of the soil is to be graded so that the depth of the soil under the canopy of the trees is <100mm and there is no accumulation of soil around the base of the trees.
- The topsoil is not to be compacted beneath the tree canopies.

- Erosion and sediment transportation can be mitigated by adhering to construction controls such as the erection of sediment fencing.
- Bushland areas (Drualla Rd) in the vicinity are to be protected by using appropriate fencing to stop access to sensitive areas.

There is the potential for the development to impact on water quality and the potential to increase weed growth in the riparian area downstream of the development. The ephemeral creek to the immediate west, is a second order tributary of Hyams Creek. To mitigate any impacts, the NSW Office of Water guidelines have stipulated a set back of 10m to the dam and a 20m set back, to the watercourse downstream.

As a part of the development, the spillway on the eastern side of the adjacent dam, is to be realigned to the western side. Earthworks within this area, have the potential to disrupt the small ecosystem associated with this dam. Plate 5 is a view of the area. Mitigating measure would be to restrict the construction to as small an area as necessary, to construct the spillway and to revegetate the area with native riparian plant species.



▲ Plate 5 View of the Dam to the West of the Development Site: As a part of the development the spillway on the eastern side is to be relocated to the west. The dam provides a significant body of water with fringing, emergent and floating plant species to provide habitat for native fauna.

A major impact of the proposed development is the removal of a small number of trees as consequence of their condition or their location conflicting with the footprint of the proposed development . Mitigating measures to minimize this action are as follows: The provision of 6 nest boxes of varying type and size are to be placed in retained trees on the site. Bat (2) and bird (4) boxes are recommended. The canopy species, most of which are located adjacent to the existing dwelling, are important habitat on the site, therefore retention of trees is important. To “off set” the removal of trees for development, the planting of WTLF and mesic trees eg Lilly Pilly, around the perimeter of the site is recommended.

Damage to trees may occur during the construction phase. Adherence to the Australian Standard 4970 (Protection of Trees on Construction Sites 2009) is to be followed to prevent damage to retained trees in the existing dwelling area and in the unformed road of Drualla Rd..

Change in light emissions and noise levels are considered to be minimal with regard to the proposed development. As the development abuts existing development it is considered that there already exists a significant noise and light pollution in the area.

An increase in water and nutrient pollution is unlikely to occur. An appropriate sewerage system has been designed and the build up of cattle manure will cease to occur with the cessation of farming on site.

9.0 Discussion and Conclusion

The survey conducted, indicated the following:-

- The proposed development ensures that any disturbance or modification to the environment will occur in an area significantly ecologically degraded. The proposed development site is cleared pasture improved land.

In conclusion it is considered that there would be no constraints to the proposed development under the EP&A Act, EPBC Act or the TSC Act. No further investigation is required, ie a Species Impact Statement is not required, nor is referral to the commonwealth minister.