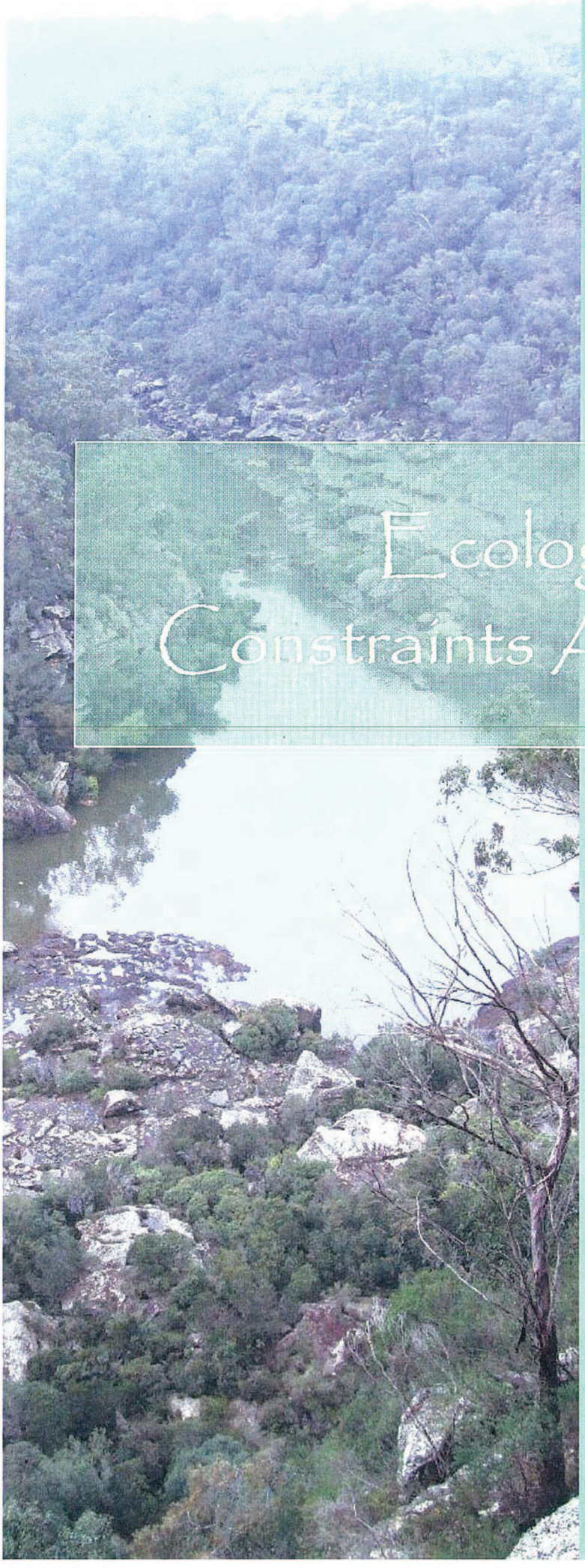
Appendix D

Ecological Constraints Assessment by Travers Bushfire & Ecology



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Ecological Constraints Assessment

Lot A & B DP 369710 and
Lots 85 & 86 DP 751270
RIVER ROAD
TAHMOOR

FEBRUARY 2011
(REF: A10074F)

Travers
bushfire & ecology

ECOLOGICAL CONSTRAINTS ASSESSMENT

LOT A & B DP 369710 and LOTS 85 & 86 DP 751270

RIVER ROAD, TAHMOOR

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File: A10074F

Disclaimer:

This report has been prepared to provide advice to the client on matters pertaining to a specific development proposal as provide by the client and / or their authorised representatives. The outcomes of this report are based on available information and recorded survey data at the time of completion as stated in the report. Due to the nature of ecological survey, further significant species may be present on site or may affect the proposal, subject to the timing of survey, survey effort and changes in legislation or listed species. This report can be used by the client only for its intended purpose and for that purpose only. Should the report be withheld for submission for more than 12 months, we advise the report may require updating to remain valid. Should any other use of the advice be made by any person including the client then this firm advises that the advice should not be relied upon. The report and its attachments should be read as a whole as individual parts of the report do not convey the full meaning or intent of the report.

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EXECUTIVE SUMMARY

This Ecological Constraints Assessment report has been prepared by *Travers bushfire & ecology* to identify the vegetation, riparian and bushfire constraints on potential future development at Lot A & B DP 369710 and Lots 85 & 86 DP 751270, River Road, Tahmoor.

From this review large portions of the site are ecologically unconstrained and are suitable for development due to the presence of large cleared areas of low habitat value. Subject to the completion of fauna survey and detailed assessment under the Native Vegetation Act, the constraints in this report have been appropriately reflected in the attached concept plan (Insert 1).

Recorded Threatened Species and Endangered Ecological Communities

The following ecological constraints are based on flora survey, database searches and fauna habitat assessment in the absence of fauna survey. Opportunistic observations of fauna were noted during vegetation surveys and assisted in the assessment of potential fauna habitat onsite.

EPA Act 1979 & TSC Act 1995

In respect of matters required to be considered under the *Environmental Planning & Assessment Act* (1979) and relating to the species / provisions of the *Threatened Species Conservation Act* (1995);

- One threatened flora species was recorded within the subject site - *Persoonia bargoensis*;
- One (1) endangered ecological community *Shale Sandstone Transition Forest* was recorded within the subject site; and
- One (1) threatened fauna species Glossy Black-Cockatoo was recorded foraging during the botanical survey; and
- No endangered populations were recorded on site or considered likely to occur.

Note: A desktop study has been done on threatened fauna. Incidental recordings of threatened fauna species may have been picked up during the botanical survey.

EPBC Act 1999

In respect of matters required to be considered under the *Environment Protection and Biodiversity Conservation Act* (1999):

- One threatened flora species was recorded within the subject - *Persoonia bargoensis*;
- One (1) migratory fauna species listed under the EPBC Act (1999) - Cattle Egret (*Ardea ibis*) was recorded within the subject site;
- One (1) endangered ecological community *Shale Sandstone Transition Forest* were recorded within the subject site; and
- No endangered populations were recorded on site or considered likely to occur.

FM Act 1994

One (1) state listed threatened fish species the Macquarie Perch has potential to utilise the Nepean River and Bargo River along the lower eastern limits of the subject site. One (1) additionally protected species listed under this Act - Australian Greyling also has suitable habitat present.

Ecological & Riparian Constraints

It is concluded that any proposed development for the subject site landscape would be constrained by the presence of the following ecological features:

- **One (1) large dam** providing variable quality aquatic habitat for a diversity of bird species including waterfowl, waders and migratory species of national significance. These habitats also have potential to be utilised seasonally by listed threatened species. As the dams have connectivity to existing watercourses, they will need to be protected by a minimum natural habitat buffer of 10m for the restoration of fringing vegetation, roosting and foraging habitat.

- **One (1) endangered ecological community** – *Shale Sandstone Transition Forest* was recorded. A *maintain or improve* outcome needs to be achieved for the EEC such that the loss of any medium or high quality vegetation is offset within the site or elsewhere by agreement with Council or potentially DECCW.

  Shale Sandstone Transition Forest is listed as a matter of national environmental significance under the EPBC Act 1979. Impacts on these vegetation types trigger a submission to DEWHA.

  The current area of *Shale Sandstone Transition Forest* on site is 4.87ha. The vegetation is in moderate to very good condition. Vegetation in 'low condition' can generally be removed however any loss of medium or good quality vegetation must be offset through protection and / or restoration measures. Vegetation of a good condition generally needs to be retained insitu. Even though as stated above, vegetation is in moderate through to very good condition, vegetation can be classed as 'low condition' under a Biometric assessment if that remnant is under 0.25ha in size or lacks sufficient cover or native species. There are three (3) small remnants all less than 0.25ha therefore all remnants would be classed as low condition and thus could be removed if required. It is recommended however that hollow-bearing trees identified in these remnants be retained where possible for the protection of roosting habitat for threatened microbat species and common fauna.

  Asset protection zones are to be preferably outside of the EEC to minimise potential offsets and loss of resilient native vegetation.

- **Riparian Buffers** are required for the existing watercourses onsite. These are shown on Figure 1.

  The Nepean and Bargo River occur to the east of the subject site and would attract a minimum 50m buffer. Myrtle Creek to the north would also attract a minimum 30m buffer. Remaining watercourses arising from these are unnamed and will be afforded a minimum 10m buffer.

  It is standard DECCW - NSW Office of Water policy that asset protection zones must be outside of any riparian buffer.

- **Threatened fauna species habitat and connectivity** – Comprehensive or preliminary fauna survey has not been undertaken within the subject site. It is expected that potential exists for hollow-dependent threatened species to reside within quality hollows located along the fringes of the 'Pasture with Scattered Trees' vegetation community where neighbouring native open forest areas exist. Fauna survey should attempt to identify most suitable hollows present for each of the hollow-dependent threatened species recorded.

  The eastern native open forest areas contain quality habitats and provide a valued corridor for local fauna along the western slopes of the Bargo and Nepean Rivers which likely includes threatened species. This is emphasised in the Wollondilly LEP, 2009 which shows that the vegetation to the east is of the most valued quality. The retention of these areas will combine well with the proposed riparian corridors for fauna movements to all aspects without compromising current options.

  Existing water bodies such as the large dam on the western boundary are potential habitat areas for threatened microbat and migratory species. Appropriate ecological survey and assessment will need to be undertaken at the detail design/DA stage to determine the ecological value of these areas.

The total area of the subject site is approximately 110 ha. Based on ecological investigations to date, the open pasture area is mostly unconstrained except for the provision of riparian buffers and fringing native vegetation areas some of which contains the EEC - *Shale Sandstone Transition Forest*. The Open pasture area occupies approximately 90 ha. Subject to fauna survey and assessment under the Native Vegetation Act, it is estimated that approximately 85 ha would be suitable for future development. This would preferably be inclusive of perimeter asset protection zones that minimise impacts on any existing Shale Sandstone Transition Forest.

Recommendations

The following recommendations are made to provide a greater degree of security as to the nature of the sites ecological constraints and to optimise the vegetative cover and hence habitat values of the landscape post potential subdivision of the site. The recommendations are also based on the concept subdivision layout (Attachment 1).

- Undertake comprehensive fauna survey within the subject site for any subsequent development application. Where development is proposed to impact on natural open forest areas fauna survey will include fauna trapping as a minimum along with target survey for threatened species and general diurnal observations and night survey. Further recommendations pertinent to the protection of significant fauna habitat are likely to result from such survey.

- Ecological site management would need to include restoration of native vegetation within the proposed riparian corridors. Restoration works will be needed to restore *Shale Sandstone Transition Forest* vegetation onsite if any is removed or modified by an asset protection zone or other proposed works. It is highly likely that the vegetation could be replaced onsite to create more contiguous and consolidated native vegetation areas such as adjoining Myrtle Creek in the north-eastern portions of the site. It is possible that offset areas may be found at another location off the site as assessed under a Biobanking Statement or in consultation with Council.

- To adopt a vegetation management plan that conserves as much of the existing vegetation as possible, offsets the loss of significant vegetation in the form of wildlife corridors, riparian corridors, retained vegetation and dams for waterbirds.

- Stormwater management of the site will need to achieve a 'maintain or improve' outcome in the management of water quality onsite. A general improvement in water quality would need to be achieved prior to the delivery of water into the Nepean and Bargo Rivers (and Myrtle Creek).

- Given the potential migratory bird and threatened fauna habitat value of the main dam near the western site boundary, fauna survey will need to be undertaken to identify the significance of habitat for threatened and migratory bird species.

- Consider realignment of the proposed lot boundaries to allow conservation or restoration of Shale Sandstone Transition Forest within the north western portion of the site as a 3:1 restoration offset for removal of the same EEC within the eastern portions of the site.

The subdivision layout plans as mapped would require the removal of Shale Sandstone Transition Forest which occurs near the eastern site perimeter. Given this vegetation is a listed Endangered Ecological Community (TSC Act and EPBC Act) any loss of this community would need to be offset. As the site is not exempt from the Native Vegetation Act 2003, the removal of EEC vegetation will require CMA approval which may require 3:1 or greater offset ratio.

Travers bushfire & ecology has undertaken a similar assessment within the same LGA and containing some similar vegetation whereby the offset ratio required was 3:1. Thus, in order to remove, as an example, 1.5ha of EEC not classified as low condition under the Biometric Assessment Methodology, would need 4.5ha to be provided as a restoration offset.

It recommended that if some of the eastern areas of EEC are to be removed for asset protection zones, the most appropriate restoration offset area would be within the north-western portions of the site which abuts a larger patch of fringing Shale Sandstone Transition Forest.

Alternatively, as described in the dot points above, Biobanking methodology or negotiations with Council may be undertaken to come up with a different offset strategy to be located elsewhere.

Ecological Assessments Required

The project may attract significant assessment at the DA stage given the presence of *Shale Sandstone Transition Forest* that is also a matter a national environmental significance. Conservation strategies and measures will be required at the development application stage to ensure the minimum loss of EEC is afforded, as too the protection of all recognised watercourses (and associated water bodies), habitat connectivity and threatened species habitat.

The following documentation will be required including:

- Flora and Fauna Assessment report including 7 part test;
- A referral to DEWHA for assessment under the EPBC Act if any loss of good quality Shale Sandstone Transition Forest is expected;
- Vegetation Management Plan in support of any future development application;
- Tree Condition Assessment (SULE – Safe Use Life Expectancy); and
- Controlled Activity Approval from NSW DWE.

The preparation of these reports will need to be integrated with other consultancy reports such as a Bushfire Protection Assessment.

Conclusion

From this review large portions of the site are ecologically unconstrained and suitable for development due to the lack of native vegetation and / or watercourses. The constraints in this report have been appropriately reflected in the attached concept plan (insert 1). Fauna constraints and vegetation management matters relevant to the Native Vegetation Act 2003 will need to be examined at the detailed design/DA stage.

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List of abbreviations

APZ	asset protection zone
BPA	bushfire protection assessment
CLUMP	conservation land use management plan
DCP	Development Control Plan
DEC	NSW Department of Environment and Conservation (superseded by DECC from 4/07)
DECC	NSW Department of Environment and Climate Change (superseded by DECCW from 10/09)
DECCW	NSW Department of Environment, Climate Change and Water
DEWHA	Federal Department of the Environment, Water, Heritage and the Arts
EEC	endangered ecological community
EPA	Environmental Protection Agency
EPA Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESMP	ecological site management plan
FF	flora and fauna assessment
FM Act	*Fisheries Management Act 1994*
FMP	fuel management plan
HTA	habitat tree assessment
IPA	inner protection area
LEP	local environment plan
LGA	local government area
NES	national environmental significance
NPWS	NSW National Parks and Wildlife Service
NSW DPI	NSW Department of Industry and Investment
OPA	outer protection area
PBP	*Planning for Bush Fire Protection 2006: A Guide for Councils, Planners, Fire Authorities and Developers*
POM	plan of management
RF Act	*Rural Fires Act*
RFS	NSW Rural Fire Service

ROTAP	rare or threatened Australian plants
SEPP 44	*State Environmental Protection Policy No 44 – Koala Habitat Protection*
SIS	species impact statement
SULE	safe useful life expectancy
TPO	tree preservation order
TPZ	tree preservation zone
TRRP	tree retention and removal plan
TSC Act	*Threatened Species Conservation Act 1995*
VMP	vegetation management plan

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TABLES

Travers bushfire & ecology have been engaged by *EG Property Group* to carry out an Ecological Constraints Assessment within Lot A & B DP 369710 and Lots 85 & 86 DP 751270, River Road, Tahmoor. This may be referred to as the subject site within the report.

Specifically, the report shall provide;

- an analysis of the existing vegetation including hollow-bearing trees
- a desktop assessment of locally recorded threatened fauna species
- analysis of riparian constraints
- bushfire constraints.

Figure 1 provides the flora survey effort and results.
Figure 2 provides the fauna survey effort, result and habitat Trees.
Figure 3 provides a summary of the ecological and riparian constraints.

1.1 Aims of the assessment

The aims of the ecological constraints assessment are to:

- Carry out a botanical survey to describe the vegetation communities and their condition in accordance with the guidelines adopted by Wollondilly Council;

- Undertaken a desktop study of potential threatened fauna species that have been recorded locally and provide an indication on their likelihood and describe if their potential habitat is present or absent;

- Complete target surveys for threatened flora species (if applicable), populations and ecological communities;

- Assess the conservation value of the site;

- Identify potential flora and fauna constraints in accordance with the requirements of the *Environment Protection and Biodiversity Conservation Act 1999,* the *Threatened Species Conservation Act 1995,* the *Fisheries Management Act 1994* and guidelines issued by the National Parks and Wildlife Service;

- Identify watercourses and describe their level or class in accordance with the Controlled Activity Guidelines supplied through the NSW Office of Water;

- Advise on appropriate buffers / setbacks from watercourses; and

- Provide advice on where asset protection zones are applicable, the level of construction required and the way in which these zones should be managed.

1.2 Information collation

A review of the relevant information pertinent to the subject site was undertaken prior to the initiation of field surveys as background to the study. Information sources reviewed include the following documents.

Standard Technical Resources

- *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (working draft) *(Department of Environment and Conservation (2004))*
- Aerial photographs (scale 1:25,000) and Topographical maps (scale 1:25,000)
- *Atlas of NSW Wildlife* (DECCW, 2010) 1:100,000 scale map sheet
- The schedules of the *Threatened Species Conservation Act, 1995*
- The schedules of the *Fisheries Management Act, 1994*
- Lists of threatened species and communities in the *Environmental Protection and Biodiversity Act 1999*
- Rare or Threatened Australian Plants (ROTAP)
- Vegetation mapping of the Cumberland Plain (2003)

1.3 Statutory requirements

1.3.1 Threatened Species Conservation Act (1995)

The specific requirements of the *Threatened Species Conservation (TSC) Act* (1995) must be addressed in the assessment of flora and fauna matters. This requires the consideration of potential impacts on threatened species, populations and ecological communities.

The factors to be taken into account in deciding whether there is a significant effect are set out in Section 5A of the *Environmental Planning & Assessment (EP&A) Act* (1979) and are based on a *7 part test of significance.*

Where a proposed activity is located in an area identified as critical habitat, or such that it is likely to significantly affect threatened species, populations, ecological communities, or their habitats, a Species Impact Statement (SIS) is required to be prepared.

1.3.2 Fisheries Management Act (1994)

The Fisheries Management Act (1994) provides a list of threatened aquatic species, which require consideration when addressing the potential impacts of a proposed development. Where a proposed activity is located in an area identified as critical habitat, or such that it is likely to significantly affect threatened species, populations, ecological communities, or their habitats, a Species Impact Statement (SIS) is required to be prepared.

1.3.3 Environment Protection and Biodiversity Conservation (EPBC) Act (1999)

The *Environmental Planning and Biodiversity Conservation Act* requires that Commonwealth approval be obtained for certain actions. The Act provides an assessment and approvals system for actions that have a significant impact on matters of national environmental significance (NES). These may include:

- World Heritage Properties and National Heritage Places
- Wetlands of International Importance protected by international treaty
- Nationally listed threatened species and ecological communities
- Nationally listed migratory species

- Commonwealth marine environment

Actions are projects, developments, undertakings, activities, and series of activities or alteration of any of these. An action that needs Commonwealth approval is known as a controlled action. A controlled action needs approval where the Commonwealth decides the action would have a significant effect on a NES matter.

Where a proposed activity is located in an area identified to be of NES, or such that it is likely to significantly affect threatened species, ecological communities, migratory species or their habitats then the matter needs to be referred to *Department of the Environment, Water, Heritage & the Arts* for assessment. In the case where no listed federal species are located on site then no referral is required. The onus is on the proponent to make the application and not the Council to make any referral.

A significant impact is regarded as being:

> *'Important, notable, or of consequence, having regard to its context or intensity' and depends upon the sensitivity, value, and quality of the environment which is impacted and upon the duration, magnitude, and geographical extent of the impacts. A significant impact is likely when it is a real or not a remote chance or possibility.*
>
> *Source EPBC Policy Statement '.*

Guidelines on the correct interpretation of the actions and assessment of significance are located on the department's web site *http://WWW.envionment.gov.au/epbc/publications.*

1.4 Development concept

A development concept plan has been developed which includes 92 rural residential lots, a range of recreational facilities associated with these dwellings as well as a conference/function centre, restaurant, bar and tourist accommodation - refer Insert 1.

The main access to the site is via River Road which provides direct access to the township of Tahmoor approximately 1 km to the north west of the site.

Insert 1: Concept Development Plan

1.5 Site description

The planning and cadastral details of the subject site are provided in Table 1.1 while Table 1.2 summarises the geographical characteristics of the site. Past and present site disturbances are summarised in Table 1.3.

Table 1.1 - Site details

Location	Lot A & B DP 369710 and Lots 85 & 86 DP 751270, 165 – 185 River Road, Tahmoor.
Description of Location	The four lots occur off the end of River Road at Tahmoor. Myrtle Creek occurs near the northern boundary and Nepean River near the eastern boundary. Rural holdings and rural-residential properties surround the subject site. The township of Picton occurs approximately 5.5-6km to the north and Bargo occurs 7.5-8km to the south.
Area	Approximately 115ha
Topographic Map	Picton 1:25,000
Grid Reference	280300E and 6210400N
Local Government Area	Wollondilly
Existing Land Use	Pastoral lands and rural residences

Table 1.2 - Site characteristics

Elevation	Approximately 80-240m AHD
Topography	The majority of the site is on undulating land with a slope 0-5 degrees. Gully vegetation along Myrtle Creek may reach slopes of 15-35 degrees. Gully vegetation to the Nepean River is 15-35 degrees on the upper slopes then nears vertical (cliff like) down to the river base.
Aspect	Generally east
Geology and Soils	Blacktown soil landscape occurs in the northern portion of the subject site which is on Wianamatta Group shale. Soils are usually moderately deep. Lucas Heights soil landscape occurs in the southern portion of the subject site which is on the Mittagong Formation. Soils are moderately deep. Hawkesbury soils landscape occurs in the valley / gully areas of the subject site, occurring on Hawkesbury Sandstone. There is usually a lot of rock outcropping and soils are typically shallow (under 50cm deep).
Catchment	Nepean River
Drainage	There is a drainage line which bisects the property running west to east across the centre of the site. There are a number of small ephemeral unnamed tributaries entering the edges of the site also off Myrtle Creek (north), Nepean River (east) and Bargo River (south and south-east)
Vegetation	Cleared paddocks with scattered trees – mostly *E. fibrosa* and *E. punctata*; remnant patches of Shale Sandstone Transition Forest on the flat plateau area which changes to sandstone gully vegetation on the slopes.

The subject site has been affected by the following impacts:

Table 1.3 – Site disturbance

Clearing	Approximately 78% of the subject site is cleared vegetation for paddocks or has been under-scrubbed and managed
Agriculture / Pastoral	Some paddocks are currently grazed by cattle
Earthworks	There has been cut and fill works for dams and tracks, and possibly some of the residences.
Introduced Weeds	The paddocks have a moderate to high proportion of exotic grasses. The edges of remnant vegetation may have a moderate influence of exotic grasses or annuals in the understorey and the gullies may be impacted by various annuals and a low incidence of African Olive shrubs.
Evidence of Feral, Introduced or Domestic fauna	Native fauna species present are likely to be impacted upon by exotic species such as Dogs, Cattle, Rabbits, Horses, Common Mynas, Common Starlings and Spotted Turtle-doves.

2.1 Background

Field Survey

It is important to note that field survey data collected during the survey period is representative of species occurring within the subject site for that occasion. Due to effects of fire, breeding cycles, migratory patterns, camouflage, weather conditions, time of day, visibility, predatory and / or feeding patterns, increased species frequency or richness may be observed within the subject site outside the nominated survey period.

Habitat assessments based on the identification of micro-habitat features for various species of interest, including regionally significant and threatened species, has been used to overcome this survey limitation.

Survey has been undertaken in accordance with guidelines issued by the DEC 2004 and ecological assessment has been undertaken in accordance with guidelines issued by DECC 2007.

Licences

Individual staff members are licensed under Clause 20 of the *National Parks and Wildlife (Land Management) Regulation 1995* and Section 120 & 131 of the *National Parks and Wildlife Act, 1974* to conduct flora and fauna surveys within service and non-service areas. NPWS Scientific Licence Numbers: S10359.

The staff of *Travers bushfire & ecology* are licensed under an Animal Research Authority issued by the Department of Agriculture. This authority allows *Travers bushfire & ecology* staff to conduct various fauna surveys of native and introduced fauna for the purposes of environmental consulting throughout New South Wales.

2.2 Survey techniques

To determine the likely and actual occurrence of flora species, fauna species and plant communities on the subject site a variety of assessments were undertaken to supplement previous surveys of the area and literature reviews. The methods utilised included:

- ***Literature Review*** - A review of readily available literature for the area was undertaken to obtain reference material and background information for this survey.

- ***Data Search*** - A search of the Atlas of NSW Wildlife (DECCW, 2010) was undertaken to identify records of threatened flora & fauna species located within a 10km radius of the site. This enabled the preparation of a list of threatened flora and fauna species that could potentially occur within the habitats found on the site (Tables 4.1, 4.2 & 4.3).

- ***Aerial Photograph Interpretation*** - Aerial photography via Google Earth, Bing Images and Spatial Information Exchanged were utilised to identify the extent of vegetation with respect to the site and surrounding areas.

- ***Accuracy of Identification*** - Specimens of plants not readily discernible in the field were collected for identification. Structural descriptions of the vegetation were made according to Specht *et. al.* (1995).

- ***Landscape Assessment*** – The site was inspected to assess presence or absence of watercourses, terrestrial connectivity, aquatic habitat, in-situ habitat and peripheral land use and connectivity. Vegetative and habitat type survey was also conducted onsite for the purposes of identifying the site's vegetation and extent, and the presence of threatened species and endangered ecological communities.

Fauna survey work has been restricted to desktop assessment at this point with habitat values noted during the botanical survey, including incidental sightings of any threatened or migratory fauna species.

2.3 Habitat trees

A hollow-bearing tree assessment was undertaken across the majority of the subject site where it was considered there would be potential for future development or asset protection zones, i.e. all vegetation essentially outside of the gully or on slopes less than 18 degrees. This area was targeted as it was rarely constrained by EEC vegetation and also provided potential habitat for threatened microbat species.

Hollow-bearing trees were identified and recorded within the subject site on a *Trimble* handheld GPS unit during surveys. All data such as hollow types, hollow size, tree species, diameter at breast height, canopy spread and overall height were collected

A summary of hollow-bearing tree results is provided in Table 4.4.

Field Survey Method

Table 2.1 details the flora, riparian and hollow-bearing tree survey effort undertaken for the subject site.

Table 2.1 – Survey methodology and dates

Survey	Method	Dates
Vegetation Communities	Survey of the boundaries of most vegetation communities (GPS and aerial photographic interpretation)	21/07/10 - 23/07/10 & 29/07/10
Stratified Sampling	20x20 metre quadrats in all existing vegetation remnants	21/07/10 - 23/07/10 & 29/07/10
Target Searches	Target searches in known habitats	21/07/10 - 23/07/10 & 29/07/10
Riparian Assessment	Identify end points of watercourses by aerial and or GPS	29/07/10
Hollow-bearing Tree Survey	GPS the location of hollow-bearing trees and note the tree and hollow characteristics	23/07/10 & 29/07/10