



2.2.2 Indigenous Plant Species

During the survey some 82 flora species were recorded within the Study Area. Of these, only 43 species (~52.4%) were considered to be naturally occurring, locally indigenous species, while a number of generally 'Australian' or non-indigenous native species, which are believed to have been planted, were also recorded. A list of the indigenous flora species recorded in the Study Area is provided in Appendix 1, with introduced species and weeds listed in Appendix 2.

Note: this list does not represent a comprehensive list of all species present in the Study Area. Only those species observed while searching for rare, threatened, vulnerable, or regionally significant species have been recorded.

Threatened Species

A search of *EPBC Act* Online Database and the NPWS Atlas of New South Wales Wildlife Database listed the threatened species displayed in Table 2.2 as occurring within a 10 km radius of the Study Area. Of these, NO flora species listed under the NSW *TSC Act 1995* or Commonwealth *EPBC Act 1999* was recorded during this survey.

Although no species listed under the NSW *TSC Act* or Commonwealth *EPBC Act* were located within the Study Area during the current (March/April 2010) survey, good quality bushland on the lower part of the eastern slopes (officially part of the STP) provide potential habitat for a number of threatened species, including *Eucalyptus* sp. *Cattai*, *Epacris purpurascens* var. *purpurascens*, *Persoonia hirsuta*, and *Acacia bynoeana*, all of which have been recorded nearby (DECCW 2009).

Plate 2: Group of mature trees on western boundary, looking south to Wrights Road





Table 2.2: Flora Species of State or National Conservation Significance occurring in the Region⁴

Source of Records

1 = DECC (2007). Search area: 10 x 10 km centred on the Study Area (State Significance)

2 = DEWHA (2006). Search area: 5 km radius centred on the Study Area (National Significance)

SPECIES	COMMON NAME	SOURCE		LOCATED WITHIN 1 KM
		1	2	
<i>Acacia bynoeana</i>	Bynoe's Wattle	E1	V	
<i>Acacia gordonii</i>		E1		
<i>Acacia pubescens</i>	Downy Wattle	V	V	
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	V	V	
<i>Darwinia biflora</i>		V	V	V
<i>Epacris purpurascens</i> var. <i>purpurascens</i>		V		V
<i>Eucalyptus</i> sp. <i>Cattai</i>		E1		
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flowered Spider Flower	V	V	
<i>Hibbertia superans</i>		E1		V
<i>Leucopogon fletcheri</i> subsp. <i>fletcheri</i>		E1		
<i>Melaleuca deanei</i>	Deane's Melaleuca	V	V	
<i>Persoonia hirsuta</i> subsp. <i>hirsuta/evoluta</i>		E1	E	
<i>Persoonia mollis</i> subsp. <i>maxima</i>		E1	E	
<i>Pimelea curviflora</i> var. <i>curviflora</i>		V	V	
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	V		
<i>Tetradlea glandulosa</i>		V	V	V

NO species listed under threatened species legislation were recorded during the survey of the Study Area (See Table 2.3). Although other threatened species known for the area (e.g. within the Castle Hill STP bushland) none were located during this survey, it is possible that they do occur either as undetected individuals or as seed held in the soil seed bank.

The threatened shrub *Epacris purpurascens* var. *purpurascens* is known to occur in the far south-eastern corner of the STP bushland, but despite a targeted search no individuals of this threatened species was recorded uphill in the current Study Area.

⁴ Region being an area ~10 km in diameter, centred on the Study Area



2.2.3 Non-Indigenous Flora Species

A total of 39 weeds or introduced species were recorded during the field survey (see Appendix 2). Of these, eight (8) plants declared as 'noxious weeds' in THSC⁵ were recorded in the Study Area at 177 Wrights Road, Castle Hill (see Table 2.3).

Note: *Asparagus asparagoides*, *Lantana camara* and *Rubus discolor* have been declared as Weeds of National Significance ('WoNS').

Table 2.3: Noxious Weeds Listed for THSC & Recorded in the Study Area at Wrights Road

BOTANIC NAME	COMMON NAME	CLASS (NW ACT 1993)*	STATUS (OTHER)
<i>Asparagus asparagoides</i>	Bridal Creeper	5	WoNS
<i>Cestrum parqui</i>	Green Cestrum	3	
<i>Cortaderia selloana</i>	Pampas Grass	3	
<i>Ligustrum lucidum</i>	Large leaf Privet	4	
<i>Ligustrum sinense</i>	Small-leaved Privet	4	
<i>Lantana camara</i>	Lantana	5	WoNS
<i>Opuntia sp.</i>	Prickly Pear	4	
<i>Rubus discolor</i> (part of <i>fruiticosus</i> aggregate)	Blackberry	3	WoNS

Actions Required For Noxious Weed Classes

- 1 The plant must be eradicated from the land and the land must be kept free of the plant
- 2 The plant must be eradicated from the land and the land must be kept free of the plant
- 3 The plant must be fully and continuously suppressed and destroyed
- 4 The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed.
- 5 The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with.

⁵ Hawkesbury River County Council is a single-purpose weed control authority, with Baulkham Hills, Blacktown, Hawkesbury and Penrith LGAs as constituent councils.



Figure 2.1: Condition of Vegetation





2.2.4 Vegetation Communities

According to Tozer *et al.* 2006, the bushland on the eastern boundary of the Subject Property and extending downslope into the Castle Hill STP is Hinterland Sandstone Gully Forest. However our survey determined the vegetation to be **Sydney Hinterland Transition Woodland ('SHTW')**. AS well, the report for SWC by UBM (2008) also found the community SHTW to be present.

Sydney Hinterland Transition Woodland (SHTW) (Tozer *et al.* 2006)

Conservation Significance

TSC Act: N/A

EPBC Act: N/A

Sydney Hinterland Transition Woodland ('SHTW') is eucalypt woodland with an open understory of sclerophyll shrubs, sedges, forbs and grasses. This transition woodland encircles the Cumberland Plain rain shadow, on loamy soils typically derived from sediments belonging to the Hawkesbury or Mittagong Formations. SHTW belongs to the Sydney Hinterland Dry Sclerophyll Forests vegetation class described by Keith (2004). About 1/3rd of its original extent has been cleared, and clearing continues in localised areas of suburban expansion including Dural-Maroota, the lower Blue Mountains and east of Campbelltown. However, considerable areas are represented within conservation reserves.

Species composition varies between sites depending on geographical location and the local environmental conditions (DECCW 2009). Dominant species typical to SHTW include (Tozer *et al.* 2006):

Tree: *Corymbia gummifera* (Red Bloodwood), *Eucalyptus punctata* (Grey Gum), *Angophora costata* (Smooth-bark Apple), and *Syncarpia glomulifera* (Turpentine)

Shrub: *Persoonia linearis* (Narrow-leaf Geebung)

Groundcover: *Entolasia stricta*, *Lomandra multiflora*, *Phyllanthus hirtellus*.

Structure within the Study Area⁶

Within the Study Area, the SHTW had the following general structure:

Tree: The average height was 20m with a cover of 35%. The dominant species were *Eucalyptus punctata* (Grey Gum), *Angophora costata* (Smooth-bark Apple), and *Eucalyptus racemosa* (Scribbly Gum).

⁶ Common Species (* denotes exotic species)



Shrubs: The average height was 2.5 metres with a cover of between 35% and 95%. The dominant species were *Ligustrum sinense** (Narrow-leaved Privet), *Grevillea mucronulata* and *Persoonia linearis* (Narrow-leaf Geebung).

Groundcover: The average height was 0.8 metres, with a cover of between 15% and 55%. The dominant species were *Microlaena stipoides*, *Imperata cylindrica*, *Pomax umbellata* and *Lepidosperma laterale*.



Plate 3: Central open grassland, with scattered native trees



Plate 4: Top of eastern slope adjoining STP, with weed thickets





2.3 CONSERVATION VALUE OF THE VEGETATION IN THE STUDY AREA

The native vegetation in the Subject Property is concentrated along the western and eastern boundaries, with a small area of relatively intact bushland located at the northern end of the Property. The plant community in this site is described as **Sydney Hinterland Transition Woodland**, a community which is not currently listed under the environmental legislation.

The fringing vegetation around the central cleared and grassed area comprises individual and small stands of native canopy trees with only minimal understorey present. The bushland on the eastern slopes adjoining the Castle Hill STP is badly degraded and support dense stands of Privet, Lantana and other noxious weeds. The control of noxious weeds on private property is the responsibility of the landowner and a program of weed control should be undertaken at the earliest possible time.

No endangered ecological community and no threatened flora species were recorded during the current field investigations, and therefore it is considered that there are no flora constraints to the proposed rezoning Proposal and any future development the Subject Property.

The conservation value of the vegetation in the Study Area resides in the large canopy trees, which provide linkages and connectivity to nearby bushland in the Castle Hill STP and the Cattai Creek Corridor. The conservation value of these large canopy trees is considered to be medium to high.

The flat central area is maintained as open grassland and would provide habitat for a number of introduced and native invertebrates and for small reptiles. Seed eating birds would also use this area. Wallabies may also utilise this area for grazing on occasion, although the presence of domestic dogs in the residence and on adjoining properties would doubtless discourage this usage. The conservation value of the central open grassland is considered to be low.

However, the bushland on the eastern slopes of the Property has been badly degraded through the deposition of fill soil and rubble at some time in the past; and its subsequent colonisation by woody and weed thickets. The conservation value of the bushland on the eastern slopes is considerate to be low.



2.4 ASSESSMENT OF SIGNIFICANCE

An Assessment of Significance (Seven-part Test) under Section 5A of the *Environmental Planning and Assessment Act 1979* is designed to determine "whether there is likely to be a significant effect on threatened species, populations, ecological communities or their habitats" (as listed on the Schedules of the NSW TSC Act), and consequently, to determine whether a Species Impact Statement is required.

NO EECs, flora species or populations were recorded within or directly adjacent to the Study Area. Therefore no Assessment of Significance has been undertaken and NO further consideration of flora issues is required.

Having said this, it must be pointed out that the landowner has a legal obligation to control noxious weeds on private property and prevent their spread to adjoining land. The chronically degraded area on the eastern slopes must be cleared of woody weeds and maintained so that they do not re-establish in this area.

Plate 5: Existing house and garden with native bushland to east (RHS photo)





3 FAUNA ASSESSMENT

The current fauna survey was undertaken to describe the current status of the fauna in, and adjacent to, the Study Area. The value of the fauna in the National, State, and regional context has been considered in relation to habitat types, fauna populations and species.

3.1 METHODOLOGY

3.1.1 Literature Review and Field Guides

Prior to the fieldwork, previous studies conducted in the Region and known databases were consulted to identify the diversity of fauna species known for, or potentially occurring in, the Study Area. These species may utilise the Study Area on occasion but only a small selection of these were observed, recorded or indicated during the field investigations.

The studies, reports and databases referred to include:

- Commonwealth Protected Matters Search Tool (DEWHA 2009);
- Atlas of NSW Wildlife Database (DECCW 2009a);
- Western Sydney: Urban Bushland Biodiversity Survey (NPWS 1997);
- Review of Environmental Factors for a Proposed Cycleway Link in Fred Caterson Reserve (UBM 2008); and
- Flora and Fauna Survey and Management Recommendations for Castle Hill STP – UBM for Sydney Water Corporation. (UBM 2009).

Other reports and documents referred to are provided within the References Section of this Report.

The Protected Matters Search Tool (DEWHA 2009) was searched with a search area of 10 km radius around the Study Area centroid (-33.704826, 150.966628 [long/lat]); and the NPWS Atlas of NSW Wildlife Database (DECCW 2009a; search area: 150.91663, -33.75483, 151.01663, -33.65483) were both accessed to identify previous recordings of fauna species of conservation significance recorded for the Region.

All relevant reports and databases were reviewed and drawn upon. Particular attention was paid to records of species listed under the Schedules of the *EPBC* or *TSC Acts* previously recorded in the Region by UBM and other workers (Appendix 3).

Field guides and standard texts used during the fieldwork were:

- Slater *et al* (2005) – birds;
- Churchill (2009) – insectivorous bats;
- Cogger (1992) – reptiles and amphibians;
- Strahan (1995) – mammals;



- Triggs (2004) – identification of scats, tracks and markings; and
- Bayley and Brouwer (2004) – determination of vegetation structural form.

The naming of those species recorded within, or surrounding the Study Area follows the nomenclature presented in these texts, or as described on the Schedules to the *EPBC* and *TSC Acts*.

By identifying likely fauna species, particularly any threatened ones, the most appropriate species-specific survey techniques may be selected should their associated habitats be present. The literature search also ensures that the results from surveys conducted during different climatic, seasonal and date periods are considered and drawn upon as required, thereby avoiding any issues inherent with a one-off 'snap shot' study. This approach increases the probability of considering the presence of, and possible impacts on, all known and likely native fauna species, particularly any that are of regional, State and/or National conservation concern.

The conservation significance of those animals recorded is made with reference to:

- *EPBC Act*;
- *TSC Act*; and
- Regionally Significant Species listed in the Western Sydney: Urban Bushland Biodiversity Survey (NPWS 1997).

3.1.2 Fauna Field Survey

The diurnal and nocturnal field surveys were undertaken by Jennifer Edwards (B. A.) on the 7th April 2010. Weather conditions during the diurnal survey consisted of overcast skies (100%cc), light to moderate northeast winds and mild temperatures (18°C). The evening weather remained overcast with lighter winds from the northeast and warmer temperatures (20°C).

Field surveys for fauna were aimed at assessing the species richness of the site and investigate the fauna habitats present and the potential for local threatened fauna species to occur. The survey incorporated a range of techniques to target species from all fauna groups including mammals, birds, reptiles and amphibians. These techniques included several diurnal bird censuses, ultrasonic call detection for microchiropteran bats, nocturnal census (spotlighting, owl call playback and frog searches), searches for active herpetofauna (reptiles and amphibians), hollow investigation and recording of indirect evidence of fauna presence (tracks, scats, nests, diggings, bones and other traces). In addition, all opportunistic sightings of fauna were recorded.

Diurnal Birds

A formal bird census was conducted in addition to opportunistic bird sightings. Formal census involved point counts on a transect line located along the existing cleared pathways and proposed vegetated pathways (Error! Reference source not found.). Approximately 15 minutes was spent at each point during the late afternoon session, where birds were identified on the basis of visual identification and characteristic calls. All opportunistic observations of bird species were recorded whilst undertaking general survey activities within the Reserve.



Herpetofauna Census

All opportunistic sightings of active herpetofauna were noted. Reptiles and amphibians were surveyed by hand-searches in suitable habitat, and spotlighting for nocturnal species. Hand searches were concentrated around the sloping and rocky habitats, watercourses and around dead trees and included turning rocks or logs wherever encountered. Frogs were identified on the basis of their characteristic call as well as by direct observation where possible.

Snail Census

Ground debris, rocks, logs, leaf litter and urban refuse was searched for any sheltering Land Snails.

Mammals

Spotlighting was undertaken for all terrestrial and arboreal mammals, as well as nocturnal birds, by two observers over one night using a Lightforce 100Watt hand-held spotlight. A red filter was used over the spotlight to minimise the impacts of bright lights on nocturnal species observed. The locations of sightings of fauna species were recorded during the spotlighting surveys (see Figure 3.1). The spotlighting session lasted for approximately two (2) hours, and was undertaken both during and after dusk.

Bats

Stationary ultrasonic bat call detectors (Anabat SD and Anabat ZCAIM, Titley Electronics) were used to record microchiropterans both on and after dusk (**Error! Reference source not found.**). The echolocation detectors were set in place and collected after a period of approximately 2.5 hours after dusk. Spotlighting and listening for calls of megachiropterans (*Pteropus* spp.) was also conducted during the spotlighting activities.

Nocturnal Birds

Nocturnal birds were surveyed using the playback of pre-recorded calls of threatened owl species. Calls were played at the start of the spotlighting surveys (**Error! Reference source not found.**). These surveys involved an initial listening period at dusk for 10 minutes, followed by broadcasting pre-recorded calls of those species potentially occurring, these calls lasting for 5 minutes per species. At the completion of the call playbacks, a 10 minute listening period was undertaken, this aimed at identifying any audible response to the call playbacks. At the completion of the call playbacks, the area was spot lite for a period of around 10 minutes. The pre-recorded calls were played through a portable CD player and broadcast via a megaphone. Species targeted included the Powerful Owl, Masked Owl, Sooty Owl and Barking Owl.

Searches and listening for calls of other nocturnal birds were conducted during the spotlighting surveys.