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Fauna & Flora Assessment
Assessment of Significance
1650 Horsley Drive
Horsley Park

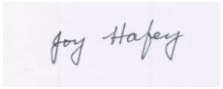
August 2015

CERTIFICATION

Fauna & Flora Assessment: Assessments of Significance, Shale Plains Woodland (SPW), *Meridolum corneovirens*, 1650 Horsley Drive, Horsley Park

Prepared by :-
Name : Joy Hafey
Qualifications : B.Sc. ecology & molecular biology

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 4th August 2015……..

Executive Summary

Joy Hafey was engaged by Bethol Mar Thoma Church Sydney to undertake a Fauna and Flora Assessment on the property, 1650 Horsley Drive, Horsley Park. The assessment forms a part of a development proposal for the construction of a church / hall and associated infrastructure The site is zoned Ru 2 (Rural landscape) under Fairfield Local Environment Plan 2013.

The ecological field study was undertaken over a period of 5 days in June and July 2014 by Joy Hafey, ecologist. The survey found that the site is substantially ecologically degraded. While there are a small number of native species in the area surrounding a small dam, environmental and noxious weeds dominating the subject site. It is considered that the resilience of the native community to regenerate in this area is low. The field survey, on the subject site, noted 4 faunal species, 15 avifauna, 94 plant species (67 exotic).The only native plant species noted, occurred adjacent to the mid western boundary in the vicinity of the small dam .

A search of the NSWNPWS Wildlife Atlas and the Commonwealth Protected Matters Search Tool found that 10 threatened flora, 21 threatened fauna and 1 threatened flora population, were recorded as occurring within 5km of the subject site. No threatened flora or live threatened fauna species, listed under the NSW Threatened Species Conservation Act 1995 (TSC Act) or the commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) were noted on the subject site. However a damaged snail shell was noted in woodland (SPW) on the western boundary and as *Meridolum corneovirens* is noted as occurring adjacent to the subject site, the "precautionary principle" must apply and an Assessment of Significance is undertaken for the species. Conformation of the identity of the shell was sought from the Australian Museum. To date there has been no result.The site is unlikely to provide habitat for any other threatened species.

Remnant vegetation, adjacent to the site has been mapped by Department of Environment Conservation Climate Change and Water (NSW NPWS 2002)) as Shale Hills Woodland (SHW), a part of the Critically Endangered Ecological Community of the Cumberland Plain Woodland. It is listed under the state TSC Act 1995 and the commonwealth EPBC Act 1999.
The small area of vegetation on the western boundary of the subject site contained species indicative of the **Shale Plains Woodland**.

The majority of the site is considered to be environmentally degraded to the extent that, the vegetation is not considered to form habitat of the SPW listed community. There is a lack of structural and species diversity within this area and the vegetation consists almost entirely of exotic species. Additionally the past history of the site, with extensive top soil reforming and nutrient increase, weed invasion and constant cropping, it is considered that there would be no Cumberland Plain Woodland seed in the soil seed bank for the SPW community to regenerate.

The small area of vegetation, around the small dam (indicated in Figure 2), contains 27 plant species characteristic of the Shale Plains Woodland community. Additionally juvenile recruitment of native species is occurring. This small area contains a vegetation structure and species diversity characteristic of the SPW. Constraints would therefore exist on this section of the subject site with regard to a future development.

An Assessment of Significance, under Section 5A of the Environmental Planning and Assessment Act 1997, was undertaken to examine the potential impacts of a proposed development on the ecological community of Shale Plain Woodlands and the threatened species *Meridolum corneovirens.* While it was concluded that there would be no significant impact on the ecological communities of SPW or the threatened species, *Meridolum corneovirens*, ameliorating measures designed to preserve and enhance the Shale Plains Woodland community and to remove the threat of extinction, were recommended. Ameliorating measures associated with a proposed development include

- Removal of noxious and environmental weed species on site.
- Regeneration and management of the remaining remnant vegetation on the western boundary of the subject site.

Such actions are in line with the Recovery Plan for the Cumberland Plain Vegetation Communities and the purpose of the TSC Act 1995 and the EPBC Act 1999.
The long term consequences of no development on the site will lead to the gradual extinction of this small remnant of SPW as a result of further weed invasion. The concept plan of the proposed development includes a pond on the western boundary. The small dam is located within this area and with remedial work would provide the basis for this pond. The bank on the western boundary could be retained with the SPW species intact.
It is considered that a proposed development on the subject site would accord with the TSC Act, EPBC Act and Fairfield LEP 2013.

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1.0Introduction

This flora and fauna report has been commissioned by Bethol Mar Thoma Church Sydney to undertake an ecological assessment on the property, Lot 90A DP 17288, 1650 Horsley Drive, Horsley Park. The property is referred to in this report as the subject site and is zoned Ru 2 (Rural landscape) under Fairfield Local Environment Plan 2013.
The report forms a part of a Development Application proposal, for the construction of a church / hall and associated infrastructure .

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 5km of the study site.

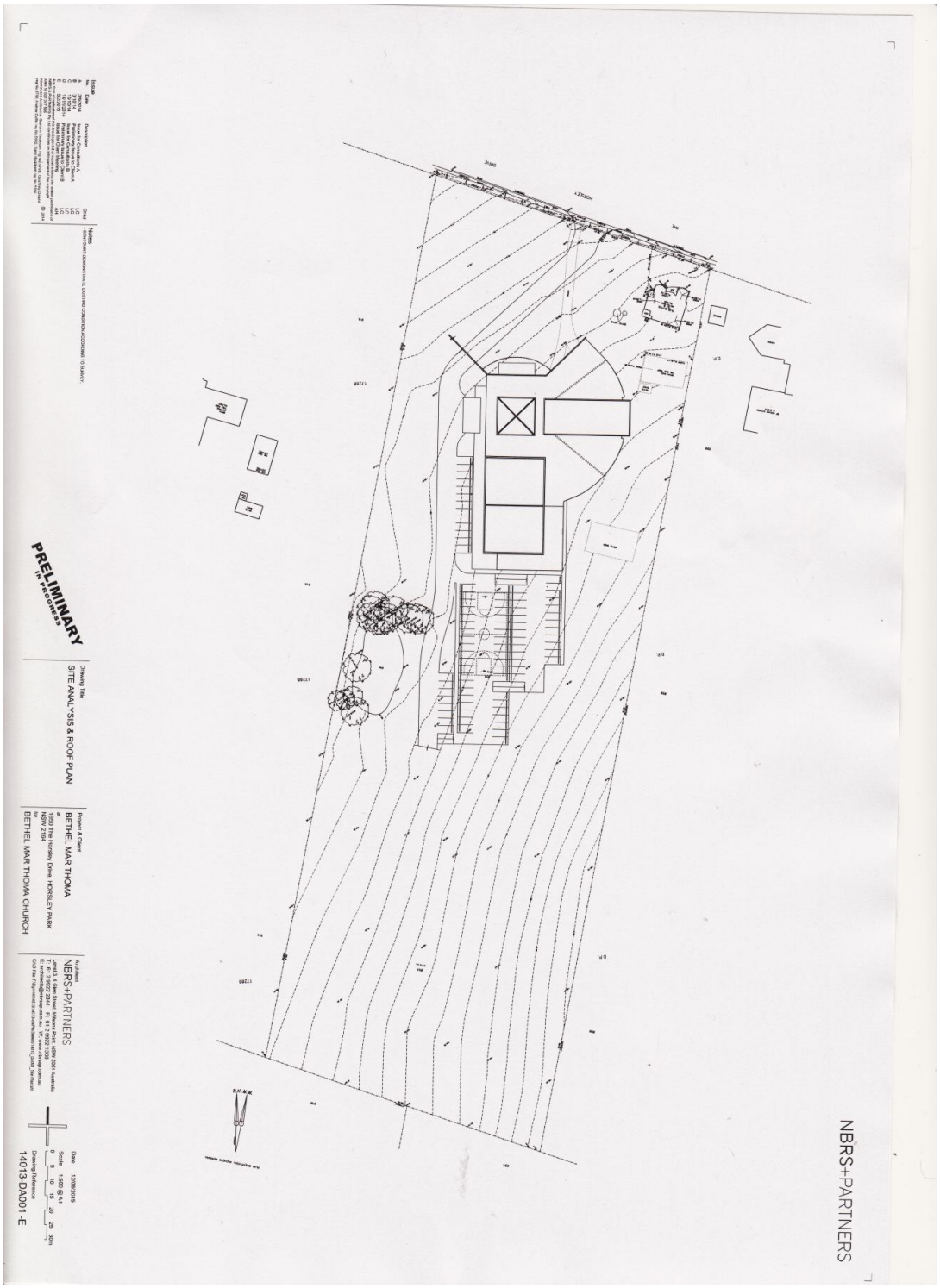
2 Identify habitat potential of the site and identify areas of high conservation significance that could be managed for biodiversity conservation. Identify the wildlife corridor potential of the site.

3 Ascertain any constraints on the site which may restrict development of the site. Identify mitigating measures to ameliorate any impacts likely to occur as a result of the proposed development.

4 Identify issues relating to: Threatened Species Conservation Act 1995 (TSC Act 1995), Environmental Planning & Assessment Act (EP&A Act), Environment Protection and Biodiversity Conservation Act 1999 (EPCB Act) and State Environment Planning Policy 44(SEPP44) Potential Koala Habitat and the Noxious Weeds Act .

5 Address the Fairfield Local Environment Plan 2013

▼**Figure 1 Subject Site Proposed Development:** The subject site concept plan is outlined below.



▼**Figure 2 Subject Site Aerial Overview, Vegetation and Location:** The site, indicated by green dot, is located 0.5km to the east of the M7 expressway and to the south of Horsley Drive, Horsley Park, in the Fairfield LGA. Remnant native vegetation occurs on the western boundary.

2. Description of the Study Site

The subject site covers an area of approximately 30,000m² and is predominantly cleared with a small number of scattered trees surrounding a small dam on the western boundary, see Figures 2 and 3. Existing development includes a residence, garages and other smaller amenity buildings in the north east corner.

2.1 History: The subject site has a long history of agricultural land use with the last enterprise, a market garden. The raised garden beds with irrigation infrastructure are still present on the subject site. The northern section of the subject site has been extensively mown. However in later years, little has been done to maintain the site and the property is dominated by extensive weed invasion.

2.2 Location –The study site is situated 0.5 km east of the M7 motorway and approximately 40km west of Sydney CBD in the Fairfield LGA.

2.3 Landform- The subject site forms a part the undulating hills and flats of the Cumberland Plain. The property is relatively flat with a slight slope to

the north west.The site forms a part of the Eastern Creek catchment.

2.4 Soils – The geology of the region consists of the mid Triassic period with Wianamatta Group Shales overlaying Hawkesbury Sandstone. Soils on site are predominantly fertile clays of the Blacktown soil landscape (UBBS).

2.5 Climate - The climate of the area is temperate with the mean daily maximum temperature at 23.2 ° C, the highest temperatures are recorded in December, January and February. The mean daily minimum temperature is11.7° C with the lowest temperatures recorded in June, July and August. (Bureau of Meteorology). Frosts are common and the annual rainfall for the area is approximately 860 mm per annum.

▼**Figure 3 Subject Site Detail Aerial View:** The site has been extensively cultivated with rows of garden beds clearly visible. A small area of native vegetation is located fringing the north and west of an existing small dam on the western boundary. Trap lines (red lines) were set in the dam area.

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 field survey was conducted during mild cool weather over a period of 5 days in June and July 2014, by Joy Hafey ecologist.
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, random meander methodology was undertaken with subjective visual inspections and assessment of vegetative biodiversity noted. A "random meander" method of Cropper (1993) was applied to target threatened species.
A series of 20 by 20 m quadrats (0.04 ha) were undertaken to determine the identity of the vegetation communities on the subject site. Vegetative communities are described in terms of dominant plant species and vegetation height and density. Nomenclature was standardized to follow Harden 1993. Topographic maps and aerial photographs were used to identify features of the vegetation for investigation during fieldwork.

3.2 Fauna 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. Any captured animals were released at the point of capture. Location of trap lines is indicated in Figure 3.

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. Dip netting was undertaken in the small dam.

Reptiles were sampled by turning over rocks, bricks and other 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 NSW NPWS Wildlife Atlas Report 2014
2 Australian Museum Records
3 Fairfield City Council, Liverpool Local Environment Plan 2013
4 Rare or Threatened Australian Plants (ROTAP)
5 Commonwealth EPBC Act Protected Matters Report 2014
6 Fairley A.2004 Seldom Seen Rare Plants of Greater Sydney
7 NSW NPWS Flora and Fauna Guidelines for Development & Activities 2009
8 NSW NPWS Vegetation Maps of the Cumberland Plain 2002
9 Urban Bushlands Biodiversity Study NSW NPWS 1997

The literature review found that

- 13 threatened flora species and 42 threatened fauna species occur within 10km radius of the subject site.
- Vegetation community maps, indicate the presence of the Critically Endangered Ecological Community of the Shale Hills Woodland of the Cumberland Plain Woodland on the subject site, see Figure 4.
- Ten (10) threatened flora, eighteen (21) threatened fauna and 1 threatened flora population (listed under the TSC Act) were noted as occurring within a 5 km radius of the study site.

Appendix 1 lists these species and the likelihood of occurrence on the study site. Habitat for *Meridolum corneovirens* occurs on subject site.

The field survey found that

- The site provides habitat for 94 flora species (27 native) and 19 fauna species. Appendix 2 and 3 list species noted The most abundant flora species noted were exotic pasture grasses.

- A number of environmental and noxious weeds were noted and included, *Tradescantia albiflora* (Wandering Jew), *Ligustrum sp* (Privet), *Rubus fruiticosa* (Blackberry) and *Asparagus asparagoides* (Bridal Creeper). Noxious weeds and Weeds of National Significance are listed in Appendix 4

- A small degraded remnant of vegetation characteristic of the Shale Plains Woodland occurs on the subject site, see Figure 2

- No threatened flora or live fauna species were noted on the subject site.

4.1 Flora Survey Results

As a result of past land practices the vegetation on site is modified to the original vegetation, both in species diversity and structural diversity.

The site supports 2 general vegetation communities: These are as follows

- A highly disturbed modified community with exotic grasses and weeds. This community covers approximately 98% of the subject site.

- Shale Plain Woodlands of the Cumberland Plain Woodland.

These communities are discussed below and the extent and location of these communities is indicated in Figures 2 and 3 and Plate 1.

Modified grassland community. This community dominates the site and extends, from Horsley Drive to the southern boundary. A view of this community is shown in the photograph on the front cover of the report and Plate 1. The community is highly modified and reflects the anthropological disturbance that has occurred over a long period of time. Disturbance includes farming, construction, soil reforming with nutrient increase and mowing. The structural diversity and biological diversity of this community is low with invasive exotic species the predominant vegetation.
The ground stratum vegetation is predominantly dense exotic grasses and weeds to 1m in height. Species includes *Pennesetum clandestinum* (Kikuyu), *Biddens pilosa* (Farmers Friends), *Cynodon dactylon* (Couch), *Cisium vulgare* (Scotch Thistle) and *Conyza albida* (Fleabane)
The ecological health of this community is poor and it is considered that the resilience of the original native vegetation community to regenerate is low.

▼**Plate 1 Modified Grassland Community:** Exotic weeds and grasses dominate the subject site.

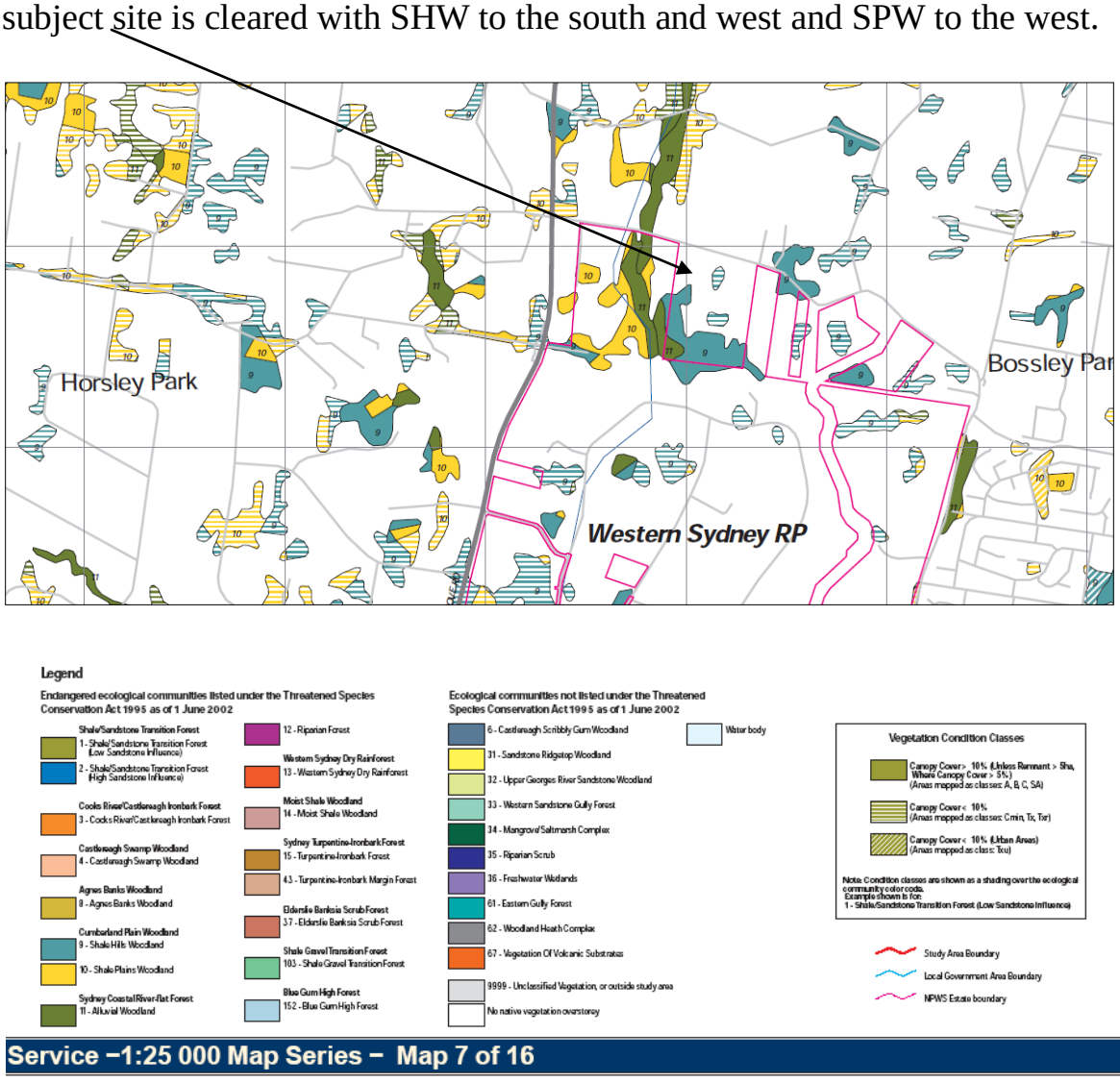
▲**Plate 2 Western Boundary Section of the Subject Site**: The black line delineates the western boundary. Remnant SPW species occur in the vicinity of the dam area and are contiguous with vegetation to the west on the adjoining property.

Shale Plains Woodland (SPW) While Figure 4 indicates this vegetation is a part of the Shale Hills Woodland, given its location and species diversity, it is more likely Shale Plains Woodland. Vegetation characteristic of SPW occurs on the western section of the subject site. Its occurrence is outlined by the canopy vegetation indicated in Figures 2 and 3.A view of this community is presented in Plate 2 with the black line indicating the western boundary.

Canopy species consists predominantly of *Eucalyptus tereticornis* (Forest Redgum) and *E.amplifolia* (Cabbage Gum). Canopy height averages 16m with a cover of approximately 20%. Lower canopy species includes *Eucalypt sapplings* with exotic weed species eg *Olea europa ssp Africana.* **The native understorey stratum** has a moderate density and consists of exotic weed species *Olea europa ssp Africana* (African Olive) and *Ligustrum* species (Privet). **The groundcover stratum** consists predominantly of leaf litter and weeds. However there is a moderate density of native grasses and forbs eg *Microleana stipoides* (Weeping Grass),

Themeda australis (Kangaroo Grass), *Aristida vagans* (Thee awned Grass), *Dichondra repens* (Kidney Weed), and *Einadia hastata* (Saloop).
The health of this community is poor with exotic weed recruitment occurring. The presence of African Olive and Privet is a threat to this regeneration of the critically Endangered Ecological Community of the SPW.

Figure 4 NSW NPWS Native Vegetation of the Cumberland Plain: The subject site is cleared with SHW to the south and west and SPW to the west.



4.2 Fauna Survey 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 4 faunal and 15 avifaunal species noted on the survey site .

No small animals were caught or noted.
Other mammals were in evidence on and near the study site.

- Rabbits were abundant as indicated by scats, scrapes and observations.
- Brushtail Possums (*Trichosurus vulpecular)*scratches and scats noted

No bats were observed.

Note: Food trees for Koalas, were identified on the study site, with *Eucalyptus tereticornis* and *E.amplifolia* noted. However given the site is approximately 98% cleared the site is not Potential Koala Habitat.

Amphibians. *Crinia signifera* (Eastern Toadlet) was heard on the adjacent site to the west. It is unlikely, given the poor water quality in the small dam, that the subject site would support amphibians.

Reptiles noted were *Lampropholis guichenoti* (Common Garden Skink).

Avifauna: A total of 15 bird species were recorded, by observations or identification of calls on site visits. Birds noted included gramnivorous, nectivorous, frugivors and insectivorous species (Appendix 3)

Molluscs: No live snails were noted on subject site, however a snail shell was noted in the woodland area adjacent to the western boundary. Given that the shell was damaged, see Plate 3, the identification of the shell as *Meridolum corneovirens* (Cumberland Plain Land Snail) was inconclusive. The "precautionary principle" must therefore apply and it is assumed the snail may be present in the small woodland area. It is noted that *Meridolum corneovirens* was noted in close proximity to the western boundary (NSW NPWS Wildlife Atlas 2014.

Note: No other threatened fauna species were noted on the subject site. Habitat for the threatened species**,** *Meridolum corneovirens* is present.

▲**Plate 3 Unidentified Snail Shell**: This shell was found in leaf litter at the base of a eucalypt in a woodland area fringing a small dam on the western boundary. The shell is more uniform in colour than the exotic species *Helix aspera*

4.3 Discussion of Flora and Fauna Results and Survey Constraints

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 winter 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.

In general, the habitat potential of the proposed development site has been considerably reduced. Ecosystem simplification and the addition of introduced flora and fauna has generally depleted natural resources such as food and shelter for native animals. Agricultural land use in the past and the establishment of invasive plant species, has severely restricted the diversity and abundance of native plant species on the site.

The most abundant native fauna species noted were the avifauna. This reflected the abundance and diversity of tree species in the vegetation assemblage along the corridor of Eastern Creek and the regional park to the south.

An Assessment of Significance (7 part test) is required to look at the impact any proposed development would have on the critically endangered ecological community of SPW and those threatened species listed in Appendix 1, where habitat exists on the subject site and there is a likelihood of occurrence.

5.0Habitat Potential & Wildlife Corridor Potential

The subject site has been predominantly cleared of native vegetation and subjected to disturbance over a long period of time. The subject site is **ecologically degraded**. The following observations were noted

- There is a lack of structural diversity and species diversity over much of the site
- Exotic grasses, shrubs and trees have replaced native species thereby reducing food resources and shelter sites.
- There are few 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 is a very limited spreading canopies of mature trees to provide important habitat for fauna.
- There is a lack of large tree hollows to provide nesting sites
- With the exception of the mid western section of the site there is no juvenile recruitment of native tree species occurring.

In general the habitat potential of the subject site is low.

The potential for the site to be part of a wildlife corridor was assessed. Aerial photographs 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 This study site is highly modified and separated by roads and other cleared areas of vegetation. It does contain a small number of canopy species on the mid western boundary which are contiguous with vegetation mapped in the Fairfield LEP2013Terrestrial Biodiversity Map. The site is not considered to form part of a wildlife corridor.

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 10 flora and 21 fauna species, listed under the TSC Act, occurring within the local area that need to be considered.*

The likelihood of occurrence of these species is addressed in Appendix 1 The critically endangered ecological community of SPW occurs on the site and there is a likely occurrence of the threatened species, *Meridolum corneovirens,* to utilize habitat on the subject site. Assessments of Significance are undertaken below.

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".*

An Assessment of Significance (7 part test) is required to look at the impact the proposed development would have on the ecological community of Shale Plain Woodlands and *Meridolum corneovirens.*

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 eg. Wetlands protected by the Ramsar Convention, nationally listed threatened species, nationally listed migratory species, nuclear developments.*

The site does not contain any threatened fauna and flora species listed under the EPBC Act, Ramsar wetlands, nor is the site involved with nuclear development. However the study site does contain habitat for the critically endangered communityof the SPW. The impact on this community and the threatened species of *Meridolum corneovirens*, is addressed below.

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)

Scientific Name	***Common Name***
Eucalyptus albens	*White Box*
Eucalyptus camaldulensis	*River Red Gum*
Eucalyptus haemastoma	*Broad-leaved Scibbly Gum*
Eucalyptus microcorys	*Tallowwood*
Eucalyptus populnea	*Poplar Box*
Eucalyptus punctata	*Grey Gum*
Eucalyptus robusta	*Swamp Mahogony*
Eucalyptus signata	*Scibbly Gum*
Eucalyptus tereticornis	*Forest Red Gum*
Eucalyptus viminalis	*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 *food trees* constitutes less than 15% of the upper and lower canopy of tree species.
On the basis of DEC Draft Recovery Plan for *Phascolarctos cinereus* the site does constitute Potential Koala Habitat as the following tree species constitute more than 15% of the upper and lower canopy of tree species, , *E.tereticornis* and *E.amplifolia.*
Note: It is unlikely that Koalas would visit the site given that they are an historical record from the area.

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"

The objective of an **Assessment of Significance,** under section 5A of the Environmental Planning & Assessment Act 1979 (EP&A Act), "is to improve the standard of consideration afforded to threatened species, populations and ecological communities, and their habitats through the planning and assessment process, and to ensure that the consideration is transparent." The seven part test applies a number of questions that need to be answered, so that determining and consent authorities may be able to gauge whether a proposed development is likely to have a significant affect on threatened species, populations or ecological communities.
The revised factors (7part test) focus on the original intent of the legislation as well as focusing particularly on the likely impacts to the local environment.

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)

7.1 Assessment of Significance Critically Endangered Ecological Communities Shale PlainsWoodland. (CEEC)

Note: *Degraded sites may still be regarded as SPW as defined in the Final Determination. Highly disturbed sites that have "few if any native species in the understorey are specifically included in the community, provided vegetation, either understorey or overstorey or both, would under appropriate management, respond to assisted natural regeneration, such as where natural soil and associated seed bank are still at least partially intact" (NPWS 2001). Sites with isolated paddock trees or sites where there is unlikely to be sufficient residue seed in the soil seed bank as a*

consequence of intensive cropping or continued pasture improvement, are unlikely to be part of the community.

Note: The outlines of the following vegetation communities is referenced from the NPWS 2000 The Native Vegetation of the Cumberland Plain Western Sydney Technical Report. Changes in the classification of the **Cumberland Plain Woodland** (CPW) from its original listing under the TSC Act 1995 are addressed below.

Note:"Previous classification of the **Cumberland Plain Woodland** as described by Benson 1992 (Map Units 9b,10c and 10d) and listed under the TSC Act 1995 is herein divided into two separate communities:

Map Unit 9 (Shale Hills Woodland) and
Map Unit 10 (Shale Plains Woodland).

Map unit 10 includes areas previously recognised as Map Units 9b, 10c and 10 d (Benson 1992) NPWS 2000.

The Critically Endangered Ecological Communities (CEEC) of the Cumberland Plain. are listed on Part 2 of Schedule 1A of the Threatened Species Conservation Act (1995),

These ecological communities occur on areas, with soils derived from predominantly Wianamatta shales and lie within or on the fringes of the Cumberland Plain.

These ecological communities occur within the L.G.A. of Auburn, Bankstown, Balkham Hills, Blacktown, Camden, Campbelltown, Fairfield, Hawkesbury, Holroyd, Liverpool, Paramatta, Penrith and Wollondilly.

These ecological communities were listed as a critically endangered ecological community because of the following reasons

- The floristic uniqueness
- Their endangered conservation status. Clearing over the past 200 years has reduced significantly the area they now cover. Very little of the remaining communities are currently protected in the National Parks Estate and reserves and much of these CEECs and EECsurvive as remnant patches on private land and are often degraded. Remnants

of all sizes are important, a survey of a 1.5 ha patch yielded 78 native species (U.B.B.S.1997).

- The on-going threatening processes include clearing for agriculture, grazing and other agricultural activities, urban development, invasion of exotic plants and increased nutrient load. It has been stated that these communities will be extinct if pressures, are not alleviated.

Assessment of Significance Critically Endangered Ecological Community of the Shale Plains Woodland TSC Act.

It is considered that part of the remnant vegetation on the subject site (Figure 2 above), in the Eastern Creek riparian corridor, is a part of the **SPW** a critically endangered ecological community. Tree species characteristic of this community, as well as ground covers species were identified.

"7 part test" SPW

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.
Not applicable.

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.

The community is not an endangered population. No endangered populations exist on the site.

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.
The proposed development will not require a significant area to be modified or removed. The area to be modified or removed is considered to be

significantly lacking in biodiversity and has significant weed invasion. The footprint of the development is considered to be outside the area where the SPW occurs. As a result of the long history of agricultural land use it is unlikely that the area covered by the footprint of development is habitat for the SPW.

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.
The proposed development is unlikely to isolate any currently inter connecting or proximal areas of habitat. The area to be impacted upon adjoins cleared properties. The area is already significantly disturbed with weed invasion and reduced native biodiversity. The proposed development is unlikely to impact on the long-term survival of any 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 proposed development is unlikely to impact on critical habitat. The development will occur on cleared disturbed areas of the study site.

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

The retention of the SPW and implementation of regeneration would be in keeping with the successful implementation of the Cumberland Plain Recovery Plan. The regeneration process will develop an understanding and enhance awareness of the Cumberland Plain threatened species, populations and ecological communities. The regeneration process will also increase the knowledge of threats to the survival of the Cumberland Plain threatened species, populations and ecological communities.

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
Key threatening process that may operate on this community are

- Invasion and spread of *Lantana camara,Olea europa ssp africana*
- Invasion of native plant communities by exotic perennial grasses.
- Loss of hollow bearing trees, removal of dead wood.
- Invasion and spread of invasive scramblers and vines.
- Ecological consequences of high fire regimes.
- Alteration to the natural flow of rivers and streams and their floodplains and wetlands.

This development will see the little destruction of habitat for the community of SPW. While clearing does constitute a key threatening process, it is not likely to result in the operation of, or increase the impact of, any key threatening process. Clearing will be undertaken in an area already significantly modified and considered to no longer provide habitat for SPW. The end process will be restoration of sections of the community with removal of invasive weed species and improvement in biodiversity. Agricultural production has altered the natural topography of the site and replaced the natural flora of the area. The creation of a pond and the regeneration of this area with native plant species will introduce a more natural landscape with habitat creation particularly for wetland birds.

In conclusion and in considering the above factors, there will not be a significant impact on the critically endangered ecological community of SPW or its habitat as a result of the proposed development. “Sites with isolated paddock trees or sites where there is unlikely to be sufficient residue seed in the soil seed bank as a consequence of intensive cropping or continued pasture improvement, are unlikely to be part of the community. The area mapped as SPW on the subject site would respond to regeneration with the removal of invasive weed species.

7.2 Assessment of Significance TSC Act Cumberland Plain Land Snail (*Meridolum corneovirens*)

Species Outline
Meridolum corneovirens is an endangered native land snail that occurs in the area covered by the endangered ecological communities of the Cumberland Plain. This spans northward to Windsor-Richmond area, southwards to

Picton and westwards to the Blue Mts. I. It has been declared an Endangered species under the NSW TSC Act 1995 and Endangered EPBC Act 1999 as it is on the edge of extinction due to habitat loss. Urban expansion is the major cause of this habitat loss.
The normal habitat of *Meridolum corneovirens* is in leaf litter and under logs in dry sclerophyll forest and open woodland. It is found in the litter around the base of gum trees or at the base of clumps of grass. In sites where rubbish has been discarded, it has been found under bricks, sheets of tin etc *Meridolum corneovirens* feeds on fungi not plants and must be considered an important spreader of fungal spores in the environment, aiding the process of decay (Australian Museum, 1998).
Meridolum corneovirens is 25-30mm long and is uniformly 'horny-yellow' to dark brown, although the shell around the mouth or aperture is often lighter in colour. It has a thin semi-translucent shell which is glossy on the underside (Australian Museum, 1998). There is a similarity between the introduced common garden snail (*Helix aspersa*) and *Meriolum corneovirens*,however there are distinguishing feature that separate the species

- the garden snail has a pattern of dark blotches over the shell while the Cumberland Land Snail is more uniform in colour.
- The shell of the garden snail has a higher spire than the native snail
- The garden snail has a more calcified shell ie. it is thicker than *Meridolum corneovirens.*

Note : During dry periods it is difficult to survey for *Meridolum corneovirens* as it can burrow into the ground to prevent desiccation, however there are often dry shells present in habitat areas. The current survey was conducted following good rain in January which was unfortunately followed by heatwave conditions in February. Extensive searching failed to identify this species on the site.

"Seven 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.

.In the case of *Meridolum corneovirens* little is known about it's lifestyle but it is thought that it has a small home range eg a reduced area around the base of a tree and it is unlikely to be found in disturbed areas subjected to

continuous agriculture. It is unlikely that the lifecycle of *Meridolum corneovirens* will be disrupted, such that a viable local population, is likely to be placed at risk of extinction, as the proposed development is outside the areas, where a population is likely to be found.

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.

There have been no endangered populations defined by NPWS as per schedule 1 Part 2 of the TSC Act 1995 on the site.

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.

The species is not an endangered ecological community

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.

The proposed development will not isolate or fragment any currently interconnecting or proximal areas of habitat. The area of the proposed development is degraded and minimal. It is degraded farmland and it is unlikely that *Meridolum corneovirens* would exist on the site as it is intolerant of disturbance (Australian Museum 2001). The remnant vegetation where habitat may exist will be restored with the removal of

weed species.

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 nor will critical habitat be adversely impacted upon.

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

A recovery plan for this species has not been produced but actions are being addressed through rehabilitation of degraded land eg the removal of noxious weeds to improve habitat for this species.

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 removal of tree species is considered to be a key process in accelerating the process of native fauna decline. The amount of clearing will be minimal in the degraded farmland area and as part of the development process rehabilitation of degraded habitat will occuradjacent to the western boundary.

In conclusion, a search for this species failed to identify them on the site, however an unidentified shell was found. Empty shells are often encountered in areas where *Meridolum corneovirens* are present. It is considered that the proposed development will not have a significant impact on the threatened species as it is unlikely that they will inhabit the degraded areas of the property where the footprint of the development will occur. Habitat in the remnant vegetation area will be improved by weed control.

7.3Assessment of Significance SPW, under the EPBC Act 1999

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will
Reduce the extent of an ecological community

Clearing of vegetation is to be limited to the footprint of the development as indicated in Figure 1. The SPW is not present within this area. Only degraded remnants of SPW occur within the mid western boundary area of the subject site. It is therefore considered that the proposed development will not reduce the extent of the community on the subject site. Regeneration of degraded areas by inclusion into landscaping and weed removal will improve the extent of the SPW community.

Fragment or increase fragmentation of an ecological community for example by clearing vegetation for roads or transmission lines.

Little clearing of vegetation, other than exotic weeds and grasses, is to be undertaken within the pastureland community. Development works will be undertaken in areas that have been previously fragmented.

Adversely affect habitat critical to the survival of an ecological community.

Development will occur in an area that has previously been substantially disturbed. The current action will not adversely affect habitat critical to the survival of the community.

Modify or destroy abiotic (non living) factors (such as water, nutrients or soil) necessary for an ecological communitiess survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.

Waste water systems have been designed to mitigate any increased nutrient or hydrological problems in the area of the proposed development. The hydrology of the area will not be altered in the vicinity of the SPW.

Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting.

As the footprint of development is located outside the area of the endangered community, it is unlikely that the proposed action will impact on the ecological function of the community on the subject site, such that keystone or important species of the ecological community are substantially affected or become extinct from the site.

Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including but not limited to: assisting invasive species, that are harmful to the listed ecological community, to become established.

Development is limited to the area of the construction footprint in a substantially degraded area. Removal of invasive species will be undertaken within this development area and as part of consent noxious and environmental weeds will be removed from the area.

Or cause regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.

The proposed action is unlikely to have a significant impact on the ecological community given the past agricultural practices undertaken on the land.

Interfere with the recovery of an ecological community.

Previous disturbance has limited and modified the remnant SPW on the subject site.

7.4 Assessment of Significance EPBC Act *Meridolum corneovirens*
Conservation status for this species under the EPBC Act is Endangered

a) Will the action lead to the long term decrease in the size of an important population of a species?

The proposed activity is unlikely to result in the long term decrease in the populations of *Meridolum corneovirens.* The area of potential habitat for these species, that would be impacted upon by the development, is small and is not likely to lead to a long term decrease in the population size of these species.

*b) Will the action reduce the area of occupancy of the species?*The potential for removal of this small area of habitat is unlikely to reduce the area of occupancy of the species.

c) Will the action fragment an existing population of two or more populations of the species?

The action is not likely to fragment an existing population of two or more populations of the species. No populations of this species were observed on site.

d) Will the action adversely affect habitat critical to the survival of a species?

No critical habitat is listed for this species and potential habitat for these species on site is not critical. As part of the development process potential habitat will be restored with the removal of weed species and regeneration of SPW.

e) Will the action disrupt the breeding cycle of an important population?

As no extant breeding populations are anticipated to be impacted directly by the development it is unlikely that the action will disrupt the breeding cycle of a population.

f) Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The action will remove little habitat for *Meridolum corneovirens* It is unlikely that the area of potential habitat is sufficient to see the species decline.

g) *Will the action result in invasive species that are harmful to a threatened species become established in the threaten species habitat?*

The clearing of native vegetation has the potential to spread invasive species caused by carrying out the works. Weed control and regeneration will be undertaken to minimize invasion of weeds.

h) Will the action interfere substantially with the recovery of the species?

The threatened species were not recorded within the proposed development area and potential habitat for the species is small. Removal of a small amount of habitat is not likely to interfere with the recovery of these species.

Conclusion: The proposed development on the subject site is unlikely to cause a significant impact on the threatened species as determined by the assessment of significance. A referral of this action to Environment Australia is not recommended. Indirect impacts are considered to be manageable by adherence to established building and design protocols. For example construction and excavation protocols to minimize the area of impact by confining them to the construction area will protect adjacent vegetation.

8 Impact of the Development

Impact of the proposed development may be regarded as, direct, indirect and accumulative.

The most significant direct impact will be the removal of vegetation for construction. The proposal will result in the clearance of an area considered significantly degraded.

Run off and sedimentation pollution is unlikely to occur as a result of adherence to best practice methods of construction. All earth forming activities are to be supported by appropriate sediment control fencing

Noise and light pollution from the proposed activity is unlikely to significantly impact on the environment. The construction phase is transitory and the proposed activity is currently under operation in the adjoining facility in close proximity to the subject site. The constant traffic on the M7 already contribute to the noise and light issues affecting the site

Nutrient and water increase is unlikely to occur as the site has town sewerage and the hydrology of the area will be maintained

9.0 Recommendations and Conclusion

The survey conducted, indicated the following:-

1 The proposed development ensures that any disturbance or modification to the environment will occur in an area significantly ecologically degraded
2 The Section 5a "7 part test" concluded that there would be no significant impact on the critically endangered ecological community and threatened species, therefore no further investigation is required, ie a Species Impact Statement is not required.
3 Assessment under EPBS Act found that the proposed development is unlikely to have a significant impact on the critically endangered ecological community of Shale Plains Woodland and the threatened species of *Meridolum corneovirens.* A referral of this action to the minister is not required.

To minimize any development impact on flora and fauna on/off site and to improve the biodiversity, the following mitigating and protective measures are recommended in line with recovery plans and Priority Action Statements.

- The major impact of the will be the removal of exotic vegetation from the site and the subsequent land forming to accommodate the development infrastructure. Erosion and sediment transportation can the mitigated by adhering to construction controls such as the erection of sediment fencing.

- The bushland area in the vicinity of the western boundary could be protected by incorporation of remnant vegetation into the proposed pond area.

- Landscaping of the development area to include native plants to improve the biodiversity of the site, create habitat for native fauna and reduce the threat of salinity.

- The removal of noxious weeds and environmental weeds and the regeneration of vegetation of the SPW along the western boundary. This is in line with the Recovery Plan for Cumberland Plain Vegetation Communities.

In conclusion, the proposed development, with conditions of consent would see regeneration of the SPW community with increased biodiversity and long term conservation

It is considered that there would be no constraints to the proposed development under the EPBC Act or the TSC Act It is considered that the likely impacts of the development will occur in an area that is substantially ecologically degraded and has a low resilience to natural regeneration. The approval of the proposed development in the long term with pond construction and retention of SPW on the western boundary, would result in the protection of remnant native vegetation of high conservation value.

Appendix 1:Threatened Fauna and Flora Noted Within 5km

Table 1 Threatened Fauna likely to occur in the Area & Likelihood of Occurrence on the Development Site

Mammals

Scientific Name	Common Name	TSC Act 1995	EPBC Act 1999	Preferred Habitat & Likelihood of Occurrence
Chalonobolus dwyerii	Large-eared Pied Bat	V		Found in drier habitats including dry sclerophyll forest and woodland. Roosts in caves and abandoned Fairy Martin nests. No habitat sites available. Limited food resources are available. Insectivorous bats known to travel up to 7km a night to feed, unlikely occurrence
Falsistrellis tasmaniensis	Eastern False Pipistrelle	V		Habitat includes dry sclerophyll forest and woodland. Roosts in dense trees. Limited roosting and food resources are available, unlikely occurrence
Miniopterus schreibersii	Common Bent-wing Bat	V		Various roosts, but mainly caves, also under bridges, in old buildings, pipes and hollow trees. Limited food resources are available. Insectivorous bats known to travel up to 7km a night to feed, unlikely occurrence
Mormopterus norfolkensis	Eastern Mastiff or Free-tail Bat	V		In habits temperate to subtropical, wet & dry schlerophyll forest & woodland. Roosts in tree hollows, caves and man-modified habitats. Limited food resources are available. Insectivorous bats known to travel up to 7km a night to feed, unlikely occurrence
Myotis adversus	Large- footed Myotis	V		Roosts in caves & dense vegetation. It utilizes caves as

				maternity crèches. Forages over streams & water bodies Limited food resources are available. Insectivorous bats known to travel up to 7km a night to feed, unlikely occurrence
Phascolarctus cineieus	Koala	V		% of fodder trees establishes site is potential koala habitat. Unlikely occurrence as the area is degraded and fragmented by major roads
Pteropus polyochephalus	Grey – headed Flying Fox	V	V	Common in rainforest and wet schlerophyll forest. Also found in dry sclerophyll forest near orchards. Forages up to 50 km for fruits, eucalypt blossoms and insects Limited food resources are available. unlikely occurrence
Saccomlaimus flaviventris	Yellow-bellied Sheathtail Bat	V		Habitat includes forest woodland and mallee. .Roosts in tree hollows and abandoned glider nests. Limited food resources are available., unlikely occurrence
Scotenax rueppelli	Greater Broad-nosed Bat	V		Habitat includes moist and dry schlerophyll forest, woodland and rainforest. Prefers gullies. Roosts in tree hollows. Habitat limited and food resources are limited, unlikely occurrence

Mollusca

Scientific Name	**Common Name**	**EPBC Act 1999**	**TSC Act 1995**	**Preferred Habitat & Likelihood of Occurrence**
Meridolum corneovirens	Cumberland Plain Land Snail	E	E	Habitat is confined to Cumberland Plain and hills amongst leaf litter at the base of trees and amongst grass clumps. Habitat area has been highly disturbed, however it is found in very close proximity to the site, possible occurrence.

Fauna :Amphibians

Scientific Name	**Common Name**	**TSC Act**	**EPBC Act**	**Preferred Habitat/ likelihood of occurrence**
Litoria aurea	Green & Gold Bell Frog	E	V	Generally an aquatic species found in or near the edge of permanent water bodies. Unlikely occurrence as habitat very degraded.

Birds

Scientific Name	**Common Name**	**TSC Act**	**EPBC Act**	**Preferred Habitat & Likelihood of Occurrence**
Callocephalum fimbriatum	Gang Gang Cockatoo	V		Range of habitats, utilises the canopy of eucalypts for blossoms and fruit, utilizes grassland for seeds as well as parks and gardens. Habitat available but limited and degraded, unlikely occurrence
Calyptorhynchus lathami	Glossy Black Cockatoo	V		Feeds almost exclusively on Casuarinas Habitat not present unlikely occurrence .
Daphoenositta chrysoptera	Varied Sittella	V		Habitat forest ,woodland, scrub, prefers rough barked trees Habitat very limited and degraded. with competition from Noisy Minors, unlikely occurrence
Heiraaetus morphnoides	Little Eagle	V		Range of habitats, open forest, woodland and scrub, large home range, unlikely occurrence
Lathamus discolor	Swift Parrot	E	E	A migrant known to prefer feeding in Blue Gums, as well as Narrow-leaved Ironbarks of the Cumberland Plain and ridge-top shales. Requires winter flowering gums. Preferred habitat very limited, unlikely occurrence
Lophoictinia isura	Square-tailed Kite	V	M	Diverse habitat from woodland to lightly treed country, rocky hillsides. Predator of passerine birds. Habitat limited and degraded, unlikely occurrence

Ninox connivens	Barking Owl	V		Forest & woodlands . Habitat is not present for breeding as no large hollows present.Very large home range required. Limited food resources present, unlikely occurrence.
Ninox strenua	Powerful Owl	V		Roosts in dense forest, often along streams Home range of 400-1000 ha. Forages over forest, woodland and open areas. Habitat limited and degraded unlikely occurrence.
Xanthomyza phrygia	Regent Honeyeater	E	E	Habitat is woodland assemblage, prefers winter flowering gums but also areas where abundant insects are present. Habitat limited and degraded, unlikely occurrence.

E=Endangered
V=Vulnerable

References for habitat assessments NSW DECC, Threatened Species Profiles NSW Scientific Committee,

No threatened faunal species were noted on the small degraded subject site. However a snail shell indicative of Meridolum corneovirens was found.

References for habitat assessments, NSW DECC, Threatened Species Profiles NSW Scientific Committee,

Threatened	**Plants**			
Scientific Name	**Common Name**	**EPBC Act 1999**	**TSC Act 1995**	**Habitat Preference & likelihood of Occurrence**
Acacia pubescens	Downey Wattle	V	V	This species occurs on alluvium, shales, at the intergrade between shales and sandstone.This is a clonal species and reproduction is more likely vegetative. This species does not occur on the small degraded site and is unlikely to occur given the length of time since regeneration.
Eucalyptus benthami	Camden White Gum	V	V	Grows only on sandy alluvial soil of river valleys of south western Sydney. Habitat not present unlikely occurrence
Diuris diuris	Buttercup Doubletail	E	E	Habitat is moist grassy areas among shrubs in sclerophyll forest and heath. Habitat limited and highly degraded unlikely occurrence
Grevillea parviflora ssp parviflora	Small flowering Grevillea	V	V	Grows in sandy or light clay soils usually over thin shales in heath and shrubby woodland. Habitat limited and highly degraded unlikely occurrence
Leucopogon exolasius	Woronora Beard Heath	V	V	Grows chiefly along upper Georges River catchment. Habitat of rocky river bank not present, unlikely occurrence
Leucopogon fletcheri ssp fletcheri			V	Found in woodland on clayey lateritic soils between Wianamatta Shale and Hawkesbury Sandstone, generally on flat to gently sloping ridges and spurs. Habitat not present unlikely occurrence.
Marsdenia viridiflora ssp viridiflora	Native Pear		EP	Typically grows in Sydney Turpentine Ironbark Forest, in vine thickets and open shale woodland. Habitat not present unlikely occurrence

Pimelia spicata	Spiked Rice Flower	E	E	Habitat is clay soils derived from Wianamatta Shales. Usually shrubland Unlikely occurrence habitat substantially degraded
Pterostylis saxocola		E	E1	Preference for growing in small pockets of shallow soils on sandstone rock shelves. Habitat not present unlikely occurrence.
Persoonia nutans	Nodding Geebung	E	E	Found in range of sclerophyll forest and woodland communities on Aeolian and alluvial sediments. Habitat limited and highly degraded unlikely occurrence

E =Endangered
V =Vulnerable
EP= Endangered Population

No threatened flora species or population listed under the TSC Act 1995 or the EPBC Act 1999 were observed during the field survey.
The degraded site does not provide suitable habitat for these threatened species
References for habitat assessments, NSW DECC, Threatened Species Profiles NSW Scientific Committee,

Appendix 2 Flora Noted on Survey Site

A) Native Flora

Genus Name	***Species Name***	***Common Name***
Asteraceae	*Senecio hispidula*	
Chenopodiaceae	*Einadia hastata* *Atriplex semibaccata*	*Saloop* *Berry Saltbush*
Commelinaceae	*Commelina cyanea*	*Scurvey Weed*
Convolvulaceae	*Dichondra repens*	*Kidney Weed*
Cyperaceae	*Carex sp.*	
Euphorbiaceae	*Poranthera microphylla*	*Small Poranthera*
Fabaceae	*Glycine clandestinum*	*Twining Love Vine*
Goodeniaceae	*Goodenia hederacea*	*Ivy Goodenia*
Juncaceae	*Juncus ursitatus*	*Common Sedge*
Laminaceae	*Plectanthus parvifolius*	*Cockspur*
Lobeliaceae	*Pratia purpurescens*	*White Root*
Myrtaceae	*Eucalyptua amplifolia* *Eucalyptus tereticornis*	*Cabbage Gum* *Forest Red Gum*
Poaceae	*Aristida ramosa* *Dichelachne crinita* *Echinopogon caespitosus* *Eragrostis sp* *Microleana stipoides* *Oplismenus sp* *Poa sp* *Themeda australis*	*Three-awn SpearGrass* *Plume Grass* *Hedgehog Grass* *Love Grass* *Weeping Grass* *Basket Grass* *Poa* *Kangaroo Grass*
Ranunculaceae	*Clematis aristida*	*Old Mans Beard*
Rubiaceae	*Asperula conferta*	
Scrophulariaceae	*Veronica plebeia*	
Solanaceae	*Solanum prinophyllum*	*Forest Nightshade*

Note: identification of species was difficult as a result of

- ***some grasses had dropped their seed***
- ***lack of floristic features***

Key

Sp = species

Ssp= subspecies

Var=variety

b) Exotic Flora Noted on the Study Site

Genus Name	***Species Name***	***Common Name***
Apiaceae	*Foeniculum vulgare*	*Fennel*
Asclepiadaceae	*Araujia sericifera* *Gomphocarpus fruiticosa*	*Mothvine NW* *Narrow leafed Cotton Bush*
Asparagaceae	*Myrsiphyllum asparagoides*	*Bridal Creeper WONS NW*
Asteraceae	*Arctotheca calendulla* *Biddons pilosa* *Cirsium vulgare* *Conyza bonariensis* *Cotula coronopiflora* *Hypocharis glabra* *Hypocharis radicata* *Setaria gracilis* *Sonchus oleaceous* *Senecio madagascariensis* *Taraxacum officinale*	*Capeweed* *Farmers Friends* *Scotch Thistle* *Fleabane* *Smooth Catsear* *Catsear* *Slender Pigeon Grass* *Sow Thistle* *Fireweed NW* *Dandelion*
Borganaceae	*Echium plantagineu*	*Patersons Curse* ***NW***
Brassicaceae	*Brassica rapa*	
Cactaceae	*Opuntia sp*	*Ptickly Pear NW*
Caesalpiniaceae	*Sena pendulata var glabrata*	*Easter Cassia NW*
Commelnaceae	*Tradescantia albiflora*	*Wandering Jew NW*
Caprifoliaceae	*Lonicera japonica*	*Honeysuckle NW*
Caryophyllaceae	*Stellaria media*	*Chickweed*
Cyperaceae	*Cyperus eragrostis*	
Euphorbiaceae	*Euphorbia peplus*	*Petty Spurge*
Fabaceae	*Trifolium repens*	*Clover*
Liliaceae	*Asparagus asparagoides*	*Bridal Creeper WONS NW*
Malvaceae	*Sida rhombifolia* *Modiola carolinana*	*Paddys Lucerne* *Red Flowered Mallow*
Oleaceae	*Ligustrum sinense* *Ligustrum lucidum* *Olea euopa ssp africana*	*Small-leaved Privet NW* *Large-leaved Privet NW* *African Olive WONS NW*
Oxalidaceae	*Oxalis pes-caprae*	*Soursob*
Phytolacaceae	*Phytolacca octandra*	

Plantaginaceae	*Plantago lanceolata*	*Lambs Tongue*
Poaceae	*Agrostis avenacea*	*Blown Grass*
	Anthoxanthum odoratum	*Sweet Vernal Grass*
	Avena sativa	*Wild Oats*
	Briza maxima	*Quaking Grass*
	Briza minor	*Shivery Grass*
	Bromus catharticus	*Prairie Grass*
	Chloris gayana	*Rhodes Grass*
	Cortaderia sp	*Pampas Grass*
	Cynodon dactylon	*Couch*
	Dactylis glomerata	*Cocksfoot*
	Digitaria sanguinalis	*Crab Grass*
	Ehrharta erecta	*Panic Veldt Grass*
	Eragrostis curvulova	*African Love Grass NW*
	Hordeum sp	*Barley Grass*
	Lolium perenne	*Perenial Rye Grass*
	Paspalum dilatatum	*Paspalum*
	Pennesetum clandestinum	*Kikuyu*
	Phalaris minor	*Phalaris*
	Setaria gracilis	*Slender Pigeon Grass*
	Stenotaphrum secundatum	*Buffalo Grass*
	Trifolium repens	*White Clover*
Polygonaceae	*Acetosella vulgaris*	*Sorrel*
	Rumex crispus	
Primulaceae	*Anagallis arvensis*	*Scarlet Pimpernel*
Rosaceae	*Rubus rubiginosa*	*Sweet briar NW*
	Rubus fruiticosa	*Blackberry WONS NW*
Solanaceae	*Cestrum parqui*	*Green Cestrum NW*
	Lycium ferocissimum	*African Boxthorn NW*
	Solanum hermannii	
	Solanum nigrum	*Deadly Nightshade*
Verbenaceae	*Verbena bonariensis*	*Purpletop*

Key
NW = Noxious Weed
WONS=weed of National Significance

Appendix 3) Avifauna Noted on, or Near the Survey Site

COMMON NAME	SCIENTIFIC NAME
Australian Magpie	*Gymnorhina tibicen*
Australian Raven	*Corvus coronoides*
Common Bronzwing	*Phaps chalcoptera*
Common Blackbird	*Turdis merula* *
Common Myna	*Acridotheres tristis* *
Crested Pigeon	*Geophaps lophotes*
Crimson Rosella	*Platycerus elegans*
Grey Fantail	*Rhypidura fuliginosa*
Laughing Kookaburra	*Dacelo novaeguineae*
Noisy Minor	*Manorina melanocephala*
Silvereye	*Zosterops lateralis*
Sulphur Crested Cockatoo	*Cacatua galerita*
Superb Fairy Wren	*Maluris cyaneus*
Willy Wagtail	*Rhypidura leucophrys*
Yellow-tailed Cockatoo	*Calyptorhynchus funereus*

Appendix 4: Noxious Weeds Declared NSW & Fairfield LGA (Reference Dept Primary Industry Oct 2011)

Weeds declared noxious in New South Wales

by Stephen Johnson

The following weeds are currently declared noxious in New South Wales, as gazetted by Weed Control Order 28.
All noxious weeds are divided into five Classes. To find the noxious weed and its category for your Local Control Authority area go to www.dpi.nsw.gov.au/weeds

Schedule of Noxious Weeds

Common name	Botanical Name	Control Class
African boxthorn	*Lycium ferocissimum*	C4
African feather grass	*Pennisetum macrourum*	C5
African lovegrass	*Eragrostis curvula*	C4
African olive	*Olea europaea* subspecies *cuspidata*	C4
African turnip weeds	*Sisymbrium runcinatum* *Sisymbrium thellungii*	C5
Aleman grass	*Echinochloa polystachya*	C2
Alligator weed	*Alternanthera philoxeroides*	C2, C3
Anchored water hyacinth	*Eichhornia azurea*	C1
Annual ragweed	*Ambrosia artemisiifolia*	C5
Arrowhead	*Sagittaria montevidensis*	C4
Artichoke thistle	*Cynara cardunculus*	C5
Arundinaria reed	*Arundinaria* spp.	C3
Asparagus fern	*Asparagus aethiopicus*	C4
Athel pine	*Tamarix aphylla*	C5
Balloon vine	*Cardiospermum grandiflorum*	C4
Bathurst burr	*Xanthium spinosum*	C4
Bear-skin fescue	*Festuca gautieri*	C5
Bitou bush	*Chrysanthemoides monilifera* subspecies *rotundata*	C2, C3, C4
Black knapweed	*Centaurea nigra*	C1
Black willow	*Salix nigra*	C2, C3
Blackberry	*Rubus fruticosus* (spp. agg.) except named cultivars	C4
Blue heliotrope	*Heliotropium amplexicaule*	C4
Blue hound's tongue	*Cynoglossum creticum*	C2
Boneseed	*Chrysanthemoides monilifera* subspecies *monilifera*	C2, C4
Bridal creeper	*Asparagus asparagoides*	C4
Broad-leaf pepper tree	*Schinus terebinthifolius*	C3
Broomrapes	*Orobanche* spp. except *O. minor* and native *O. cernua* var. *australiana*	C1
Buffalo burr	*Solanum rostratum*	C4
Burr ragweed	*Ambrosia confertiflora*	C5
Cabomba	All *Cabomba* species except *C. furcata*	C5
Californian burr	*Xanthium orientale*	C4
Camel thorn	*Alhagi maurorum*	C4
Camphor laurel	*Cinnamomum camphora*	C4
Cape broom	*Genista monspessulana*	C2, C3, C4
Cape ivy	*Delairea odorata*	C4
Cape tulips	*Moraea* spp.	C4
Castor oil plant	*Ricinus communis*	C3, C4
Cat's claw creeper	*Macfadyena unguis-cati*	C4
Cayenne snakeweed	*Stachytarpheta cayennensis*	C5
Cherry guava	*Psidium cattleianum*	C3
Chilean needle grass	*Nassella neesiana*	C3, C4
Chinese celtis	*Celtis sinensis*	C3
Chinese tallow tree	*Triadica sebifera*	C3
Chinese violet	*Asystasia gangetica* subspecies *micrantha*	C1
Cineraria	*Cineraria lyratiformis*	C4
Climbing asparagus fern	*Asparagus plumosus*	C4
Clockweed	*Gaura parviflora*	C5
Cockle burr	*Xanthium ambrosioides*	C4
Cockspur coral tree	*Erythrina crista-galli*	C4
Columbus grass	*Sorghum x almum*	C3, C4
Coolatai grass	*Hyparrhenia hirta*	C3
Corn sowthistle	*Sonchus arvensis*	C5
Creeping knapweed	*Rhaponticum repens*	C4
Crofton weed	*Ageratina adenophora*	C4
Devil's claw (purple-flowered)	*Proboscidea louisianica*	C4
Devil's claw (yellow-flowered)	*Ibicella lutea*	C4
Dodder	All *Cuscuta* species except natives	C5
East Indian hygrophila	*Hygrophila polysperma*	C3, C4
Espartillo	*Amelichloa brachychaeta* and *A. caudata*	C5
Eurasian water milfoil	*Myriophyllum spicatum*	C1
Fine-bristled burr grass	*Cenchrus brownii*	C5
Fireweed	*Senecio madagascariensis*	C4
Flax-leaf broom	*Genista linifolia*	C4
Fountain grass	*Pennisetum setaceum*	C5
Galenia	Galenia pubescens	C4
Gallon's curse	*Cenchrus biflorus*	C5
Giant Parramatta grass	*Sporobolus fertilis*	C3, C4
Giant rat's tail grass	*Sporobolus pyramidalis*	C3

Noxious weed declarations

Common name	Botanical Name	Control Class
Giant reed/ elephant grass	*Arundo donax*	C3, C4
Glaucous star thistle	*Carthamus glaucus*	C5
Glory lily	*Gloriosa superba*	C3
Golden dodder	*Cuscuta campestris*	C4, C5
Golden thistle	*Scolymus hispanicus*	C5
Gorse	*Ulex europaeus*	C2, C3
Green cestrum	*Cestrum parqui*	C3
Grey sallow	*Salix cinerea*	C3, C5
Groundsel bush	*Baccharis halimifolia*	C3
Harrisia cactus	*Harrisia* spp.	C4
Hawkweed	*Hieracium* spp.	C1
Hemlock	*Conium maculatum*	C4
Heteranthera/ kidneyleaf mud plantain	*Heteranthera reniformis*	C1
Hoary cress	*Cardaria draba*	C4
Honey locust	*Gleditsia triacanthos*	C3
Horehound	*Marrubium vulgare*	C4
Horsetail	*Equisetum* spp.	C1
Hunter burr	*Xanthium italicum*	C4
Hydrocotyl/ water pennywort	*Hydrocotyle ranunculoides*	C1
Hygrophila	*Hygrophila costata*	C2
Hymenachne	*Hymenachne amplexicaulis* and hybrids	C1
Illyrian thistle	*Onopordum illyricum* subspecies *illyricum*	C4
Italian bugloss	*Echium italicum*	C4
Johnson grass	*Sorghum halepense*	C3, C4
Karoo thorn	*Acacia karroo*	C1
Khaki weed	*Alternanthera pungens*	C4
Kochia (other than summer or mock cypress)	*Bassia scoparia* except subspecies *trichophylla*	C1
Koster's curse/ clidemia	*Clidemia hirta*	C1
Kudzu	*Pueraria lobata*	C3
Lacy ragweed	*Ambrosia tenuifolia*	C4
Lagarosiphon	*Lagarosiphon major*	C1
Lantana	*Lantana camara*	C3, C4
Lantana (creeping)	*Lantana montevidensis*	C3, C4
Leafy elodea	*Egeria densa*	C4
Lippia	*Phyla canescens*	C4
Long-leaf willow primrose	*Ludwigia longifolia*	C3, C4
Long-style feather grass	*Pennisetum villosum*	C4
Ludwigia	*Ludwigia peruviana*	C3
Madeira vine	*Anredera cordifolia*	C4
Mesquite	*Prosopis* spp.	C2
Mexican feather grass	*Nassella tenuissima*	C1

Common name	Botanical Name	Control Class
Mexican poppy	*Argemone mexicana*	C5
Miconia	*Miconia* spp.	C1
Mikania	*Mikania micrantha*	C1
Mimosa	*Mimosa pigra*	C1
Mintweed	*Saliva reflexa*	C4
Mistflower	*Ageratina riparia*	C4
Montbretia	*Crocosmia* x *crocosmiiflora*	C4
Morning glory (coastal)	*Ipomoea cairica*	C4
Morning glory (purple)	*Ipomoea indica*	C4
Mossman River grass	*Cenchrus echinatus*	C5
Moth vine	*Araujia sericifera*	C4
Mother-of-millions	*Bryophyllum delagoense* *Bryophyllum* x *houghtonii* *Bryophyllum pinnatum*	C3, C4
Mysore thorn	*Caesalpinia decapetala*	C3
Nodding thistle	*Carduus nutans*	C4
Noogoora burr	*Xanthium occidentale*	C4
Ochna	*Ochna serrulata*	C4
Onion weed	*Asphodelus fistulosus*	C4
Pampas grass	*Cortaderia* spp.	C3, C4
Parkinsonia	*Parkinsonia aculeata*	C2
Parthenium weed	*Parthenium hysterophorus*	C1
Paterson's curse	*Echium plantagineum*	C4
Pellitory	*Parietaria judaica*	C4
Perennial ground cherry	*Physalis virginiana*	C3, C4
Perennial ragweed	*Ambrosia psilostachya*	C4
Perennial/ Canada thistle	*Cirsium arvense*	C4
Pond apple	*Annona glabra*	C1
Prairie ground cherry	*Physalis hederifolia*	C3, C4
Prickly acacia	*Acacia nilotica*	C1
Prickly pears (other than Indian fig)	*Cylindropuntia* spp., *Opuntia* spp. except *Opuntia ficus-indica*	C4
Privet (broad-leaf)	*Ligustrum lucidum*	C4
Privet (European)	*Ligustrum vulgare*	C4
Privet (narrow-leaf/Chinese)	*Ligustrum sinense*	C4
Ragwort	*Senecio jacobaea*	C4
Red rice	*Oryza rufipogon*	C5
Rhizomatous bamboo	*Phyllostachys* spp.	C3, C4
Rhus tree	*Toxicodendron succedaneum*	C4
Rubber vine	*Cryptostegia grandiflora*	C1
Saffron thistle	*Carthamus lanatus*	C4
Sagittaria	*Sagittaria platyphylla*	C4, C5
Salvinia	*Salvinia molesta*	C2, C3
Scotch/English broom	*Cytisus scoparius*	C4

Common name	Botanical Name	Control Class
Scotch thistle	*Onopordum acanthium* subspecies *acanthium*	C4
Senegal tea plant	*Gymnocoronis spilanthoides*	C1
Senna	*Senna pendula*	C4
Serrated tussock	*Nassella trichotoma*	C3, C4
Siam weed	*Chromolaena odorata*	C1
Silk forage sorghum	*Sorghum* sp. hybrid cultivar	C3, C4
Silver-leaf nightshade	*Solanum elaeagnifolium*	C3, C4
Smooth-stemmed turnip	*Brassica barrelieri* subspecies *oxyrrhina*	C5
Soldier thistle	*Picnomon acarna*	C5
South American burr	*Xanthium cavanillesii*	C4
Spanish broom	*Spartium junceum*	C4
Spiny burr grasses	*Cenchrus incertus and C. longispinus*	C4
Spiny emex	*Emex australis*	C4
Spotted golden thistle	*Scolymus maculatus*	C4
Spotted knapweed	*Centaurea stoebe* subspecies *micranthos*	C1
St. Barnaby's thistle	*Centaurea solstitialis*	C4
St. John's wort	*Hypericum perforatum*	C3, C4
Star thistle	*Centaurea calcitrapa*	C4
Stemless thistle	*Onopordum acaulon*	C4
Sweet briar	*Rosa rubiginosa*	C4
Sweet pittosporum	*Pittosporum undulatum*	C3
Taiwan/ tiger lily	*Lilium formosanum*	C4
Taurian thistle	*Onopordum tauricum*	C4
Texas blueweed	*Helianthus ciliaris*	C5
Trad/wandering jew	*Tradescantia fluminensis*	C4
Tree-of-heaven	*Ailanthus altissima*	C4
Tropical soda apple	*Solanum viarum*	C2, C3
Turkey rhubarb	*Acetosa sagittata*	C4
Tussock paspalum	*Paspalum quadrifarium*	C3
Vipers bugloss	*Echium vulgare*	C4
Water caltrop	*Trapa* spp.	C1
Water hyacinth	*Eichhornia crassipes*	C2, C3, C4
Water lettuce	Pistia stratiotes	C1
Water soldier	*Stratiotes aloides*	C1
Wild radish	*Raphanus raphanistrum*	C4
Willows (other than weeping and two pussy willows	*Salix spp.* except *S. babylonica*, *S.* x *calodendron* and *S.* x *reichardtii*	C5
Witchweed	*Striga* spp. except native *S. parviflora*	C1
Yellow bells	*Tecoma stans*	C3
Yellow burrhead	*Limnocharis flava*	C1
Yellow nutgrass	*Cyperus esculentus*	C5

Noxious weed declarations

Weed control classes

The following weed control classes may be applied to a plant by a weed control order:

Control Class	Weed type	Example control requirements
Class 1	Plants that pose a potentially serious threat to primary production or the environment and are not present in the State or are present only to a limited extent.	The plant must be eradicated from the land and the land must be kept free of the plant. The weeds are also 'notifiable' and a range of restrictions on their sale and movement exist.
Class 2	Plants that pose a potentially serious threat to primary production or the environment of a region to which the order applies and are not present in the region or are present only to a limited extent.	The plant must be eradicated from the land and the land must be kept free of the plant. The weeds are also 'notifiable' and a range of restrictions on their sale and movement exist.
Class 3	Plants that pose a serious threat to primary production or the environment of an area to which the order applies, are not widely distributed in the area and are likely to spread in the area or to another area.	The plant must be fully and continuously suppressed and destroyed.*
Class 4	Plants that pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area.	The growth of the plant must be managed in a manner that reduces its numbers, spread and incidence and continuously inhibits its reproduction.*
Class 5	Plants that are likely, by their sale or the sale of their seeds or movement within the State or an area of the State, to spread in the State or outside the State.	The requirements in the *Noxious Weeds Act 1993* for a notifiable weed must be complied with.

* In some cases the following wording has also been inserted 'the plant may not be sold, propagated or knowingly distributed'.

All Class 1, 2 and 5 weeds are notifiable weeds. All outbreaks of these weeds must be reported to the local control authority within three days of discovery. They are also prohibited from sale or purchase in any area of NSW.

Appendix 5 References

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