

3 Environment affected by the Program

This section provides a detailed description of the environment likely to be affected by the Program. It describes:

- the broad environmental and heritage values of the area that may be impacted (both directly and indirectly);
- important ecological processes of the environment, including components of biodiversity and landscape connectivity; and
- issues of environmental significance under NSW environmental legislation.

The matters of national environmental significance protected under the EPBC Act that may be affected by the Program are also outlined in this section. A brief assessment of the likely presence of each matter within the Growth Centres is presented and the matters requiring more detailed consideration and analyses are identified.

The matters that warrant detailed discussion and analysis are addressed in Section 4. This includes a detailed assessment of the nature and significance of potential impacts as a result of proposed development within the Growth Centres.

3.1 REGIONAL CONTEXT

The North West and South West Growth Centres are situated on the Cumberland Plain in Western Sydney (Figure 17). The Cumberland Plain is bounded by the Hornsby Plateau to the north, the base of the Blue Mountains to the west, the Woronora Plateau to the south and the centre of Sydney to the east. The total area of the Cumberland Plain is 275,000 ha.

The Cumberland Plain comprises gently undulating plains and low hills, rising gradually from the flat, low lying areas just above sea level in the north to an altitude of around 350 m (Fairley & Moore 2000). Most of the plain receives less than 800 mm of rainfall a year (Benson et al. 1996), making it the driest part of Sydney. The area consists of a deep almost unbroken layer of Wianamatta Shale, which has produced the most fertile soils in the Sydney region, especially in comparison to those of the surrounding sandstone plateaus (DEC 2005u).

As a result of its topographic and geological characteristics, the Cumberland Plain had a much higher capability to support agricultural and urban land use activity than the surrounding plateaus (Bannerman & Hazelton 1990). Agricultural development was under way as early as 1792 and by the mid-nineteenth century the majority of the Cumberland Plain was either under cultivation or subject to grazing (Tozer 2003). Agriculture in the Sydney Basin includes market gardens, poultry, orchards, cut flowers, nurseries and turf and is valued at around \$1 billion. It represents up to 12% of agricultural production in NSW (DoP 2010).

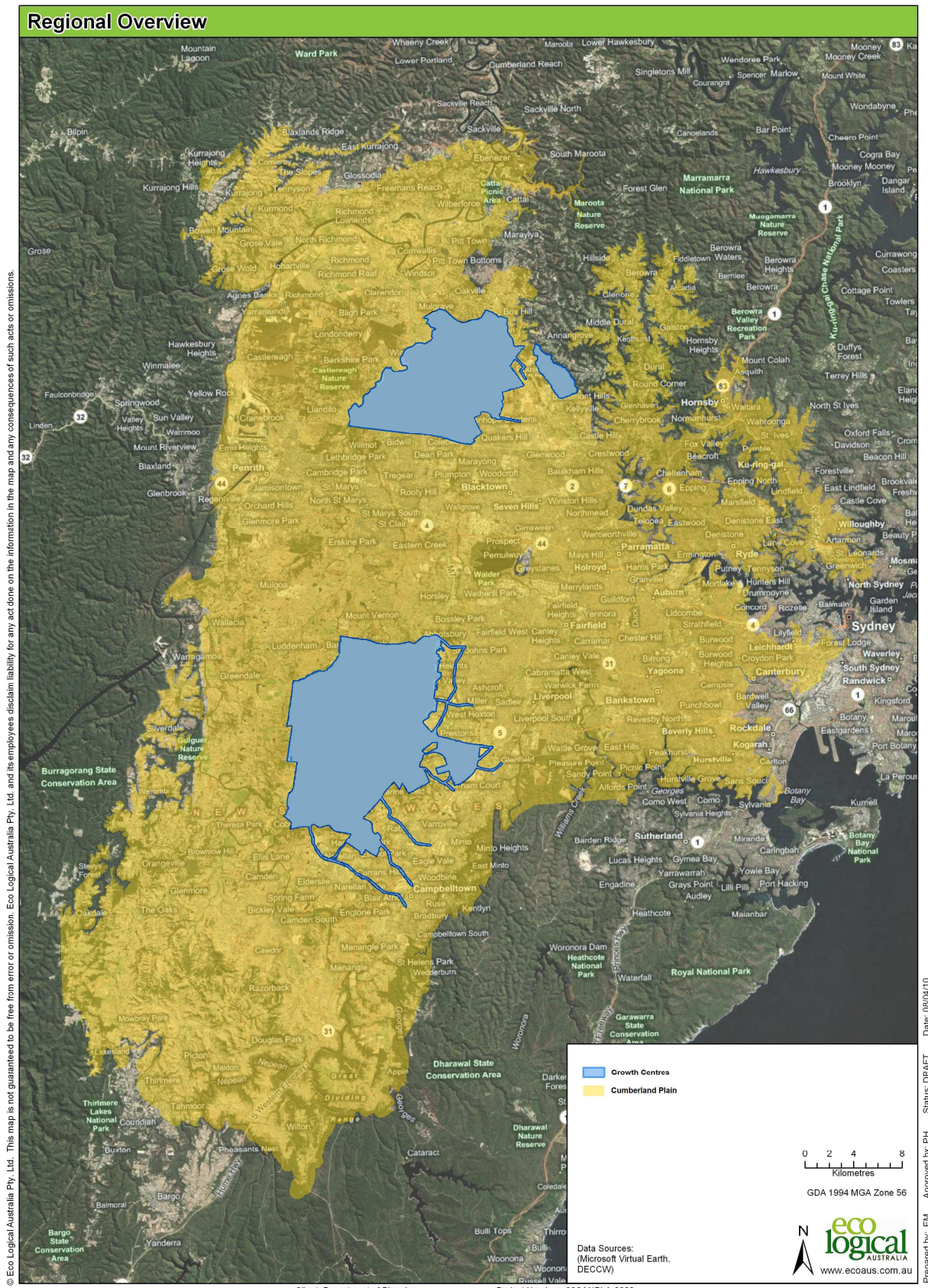


Figure 17: Map of the Sydney Growth Centres and the Cumberland Plain

Urban expansion into Western Sydney has been ongoing since European settlement, and has accelerated in the second half of the twentieth century (Benson & Howell 1990). In the year 2000, the suburbs of Western Sydney held an estimated 20% of the population of NSW (University of Western Sydney 2000). It is projected that by 2036, Western Sydney will be home to almost 3 million people or approximately 49% of the metropolitan Sydney population (DoP 2010). It is intended that land release to support this increased population will be focused primarily in the North West and South West Growth Centres (DoP 2005).

There is a stark contrast between the vegetation of the Cumberland Plain and the surrounding plateaus (Tozer 2003). The unique environment of the plain has resulted in plant communities ranging from open woodlands with a grassy understorey, to forests with tall ironbarks and turpentine trees, and from dry rainforest to floodplain communities on the Hawkesbury–Nepean River. Twenty-two distinct ecological communities have been identified (Tozer 2003).

Past and continuing land-use pressures have had major consequences for the biodiversity of the Cumberland Plain. 13% of the pre-1750 extent of the region's vegetation remains as intact bushland, with an additional 12% occurring as scattered trees in disturbed areas (NPWS 2002a). This remaining vegetation is highly fragmented. There are estimated to be 2446 remaining remnants on the Cumberland Plain, ranging in size from less than 1 ha to ~3600 ha. While smaller remnants are more numerous, over half of the remaining vegetation (51%) lies within remnants that are greater than 50 ha in size (DECC 2008a). The high levels of clearing and fragmentation have led to many of the vegetation communities on the Cumberland Plain being listed as threatened under both NSW and Commonwealth environmental legislation (DECCW 2009b).

The Cumberland Plain supports a diversity of flora and fauna, including a range of threatened and migratory species. The area is one of the most threatened regions within Australia (DECC 2008a). In addition to the on-going land use pressures, there are few formal reserves. 7% of the remaining bushland on the Cumberland Plain is protected within the formal reserve system. The majority (76%) is privately owned (DEC 2005u).

3.2 NATURAL ENVIRONMENTAL VALUES

This section discusses the broad environmental values that occur within the Growth Centres. For the purposes of context, this includes values that are relevant to both NSW and Commonwealth legislation.

The values are discussed below under the headings of vegetation, flora, fauna and aquatic/riparian ecosystems.

3.2.1 VEGETATION

Vegetation within the Growth Centres predominately occurs in fragmented patches across the landscape. This is reflective of the pattern of vegetation across the majority of the Cumberland Plain.

All threatened ecological communities recorded in the Growth Centres are listed in Table 3.

Three ecological communities that are listed as threatened under the EPBC Act occur (to varying extents) within Growth Centres. These are:

- Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest;

- Shale Sandstone Transition Forest; and
- Turpentine-Ironbark Forest of the Sydney Basin Bioregion.

Table 3: Vegetation communities within the Growth Centres that are listed as threatened under NSW TSC Act and EPBC Act

Vegetation community (NSW NPWS Act definition)	NSW TSC Act listing	EPBC Act	
		Listing	Status
Shale Hills Woodland	EEC (as Cumberland Plain Woodland)	Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest	Critically endangered
Shale Plains Woodland			
Shale Gravel Transition Forest in the Sydney Basin Bioregion	EEC		
Shale Sandstone Transition Forest – High Sandstone Influence	EEC (Shale Sandstone Transition Forest in the Sydney Basin Bioregion)	Shale Sandstone Transition Forest	Endangered
Shale Sandstone Transition Forest - Low Sandstone Influence			
Turpentine Ironbark Margin Forest	EEC	Turpentine-Ironbark Forest of the Sydney Basin Bioregion	Critically endangered
Alluvial woodland	EEC (as River-flat Eucalypt Forest on Coastal Floodplains)	N/A	N/A
Castlereagh Swamp Woodland Community	EEC	N/A	N/A
Cooks River/ Castlereagh Ironbark Forest in the Sydney Basin Bioregion	EEC	N/A	N/A
Moist Shale Woodland in the Sydney Basin Bioregion	EEC	N/A	N/A

Consistent with trends across the Cumberland Plain region, the remaining vegetation within the Growth Centres is highly fragmented:

- 68% of all habitat remnants are less than 4 ha in size but only contribute to 2% of the total area of habitat.
- 20% of remnants range in size from between 4 ha and 50 ha (covering 14% of the total habitat area).
- 12% of remnants are greater than 50 ha (occupying 84% of the habitat) (Growth Centres Commission 2007).

Weeds are a major ongoing threat to the vegetation of the Cumberland Plain in general and the Growth Centres specifically. African Olive and Bridal Creeper have been identified as particularly significant weeds as they are highly competitive and appear able to suppress native understorey species (Benson

1992, Tozer 2003). These two species are also a threat to the nationally endangered plant *Pimelea spicata* that occurs within the Growth Centres (Willis et al. 2003). Additionally, the establishment of African Olive can also significantly alter the types of fauna using vegetation (DECC 2007b).

An additional factor contributing to the fragmented nature of the vegetation across the Cumberland Plain is the pattern of existing land tenure. Within the Growth Centres, there is a particularly complex pattern of land tenure as a consequence of historical planning processes. This often means that vegetation remnants are owned by multiple landowners, which tends to reduce the effective level of security and prospect for protection and management.

Due to its urban setting, there are a number of other threats to vegetation within the Growth Centres. These include:

- changed fire regimes;
- increased run-off from urban areas that can carry high nutrient and sediment loads, which can encourage weed invasion in addition to the soil erosion caused by the run-off;
- impacts from recreational uses;
- grazing and mowing;
- altered hydrology; and
- salinity (DECCW 2009b).

3.2.2 FLORA

The vegetation communities of the Growth Centres support a wide diversity of plant species, several of which are endemic to the Cumberland Plain (DEC 2005u). Of the species recorded within the Growth Centres, 18 are listed as threatened under NSW and/or Commonwealth environmental legislation (Growth Centres Commission 2007). These are listed in Table 4.

DECCW (2009b) have noted that small remnant patches of vegetation may support threatened flora species in the short to medium term. However, they also note that the long term viability of these patches is uncertain and likely to be susceptible to the effects of urbanisation and climate change.

Table 4: Threatened plants species recorded within the Growth Centres (Growth Centres Commission 2007).

Species	NSW TSC Act status	EPBC Act status
<i>Acacia bynoeana</i>	Endangered	Vulnerable
<i>Acacia pubescens</i>	Vulnerable	Vulnerable
<i>Allocasuarina glareicola</i>	Endangered	Endangered
<i>Cynanchum elegans</i> **	Endangered	Endangered
<i>Darwinia biflora</i>	Vulnerable	Vulnerable
<i>Dillwynia tenuifolia</i>	Vulnerable	Vulnerable
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	Vulnerable	N/A
<i>Eucalyptus</i> sp. <i>Cattai</i>	Endangered	N/A

<i>Grevillea juniperina</i> subsp. <i>juniperina</i>	Vulnerable	N/A
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Vulnerable	Vulnerable
<i>Hibbertia superans</i>	Endangered	N/A
<i>Leucopogon fletcheri</i>	Endangered	N/A
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i>	Endangered population	N/A
<i>Micromyrtus minutiflora</i>	Endangered	Vulnerable
<i>Persoonia hirsuta</i>	Endangered	Endangered
<i>Persoonia nutans</i>	Endangered	Endangered
<i>Pimelea spicata</i>	Endangered	Endangered
<i>Pultenaea parviflora</i>	Endangered	Vulnerable

**Although *Cynanchum elegans* is recorded within the Growth Centres, this record of occurrence is incorrect. Refer to Section 5.

3.2.3 FAUNA

The vegetation communities of the Growth Centres support a number of fauna species, some of which are endemic to the Cumberland Plain.

The Cumberland Land Snail (*Meridolum corneovirens*) is one species considered to be endemic to the Cumberland Plain region and is listed as endangered under the NSW TSC Act. The Cumberland Land Snail is primarily found in Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest but also occurs in other types of woodland and has been found throughout the Growth Centres.

Approximately 60 species of mammals were thought to be originally present on the Cumberland Plain, however the region now supports a reduced mammal faunal diversity (NSW Scientific Committee 2008). Within the Growth Centres, the only commonly found mammals are the Eastern Grey Kangaroo, the Common Brushtail Possum and a number of bat species including the EPBC Act listed Grey-headed Flying Fox and the Large-eared Pied Bat (Growth Centres Commission 2007).

Many bird species were relatively common on the Cumberland Plain until the 1950s when declines commenced. They persisted longer than many mammal species but finally collapsed across most of Western Sydney in the 1970s and are no longer commonly seen. However, not all bird species were equally affected. Clearing and underscrubbing have created suitable habitat for a number of large and aggressive native and introduced species including the Sulphur-crested Cockatoo, Australian Magpie and Noisy Miner. These species have all increased in Western Sydney and now out-compete smaller woodland bird species in areas of fragmented vegetation (DECCW 2009b).

Many of the threatened fauna species that occur within the Growth Centres are sensitive to fragmentation and are known to be absent from smaller vegetation patches. Those species that are less sensitive to fragmentation and can potentially utilise all remaining vegetation patches tend to be highly mobile species such as birds and bats. Furthermore, some species have specific habitat requirements and depend on areas such as freshwater wetlands that have reduced distribution within the Growth Centres, such as the Green and Golden Bell Frog (Growth Centres Commission 2007).

The 21 fauna species listed as threatened under NSW and/or Commonwealth environmental legislation that have the potential to be present in the Growth Centres are listed in Table 5. Species listed as migratory under the EPBC Act are discussed in Section 3.4.5.

Table 5: Threatened fauna species recorded within the Growth Centres (Growth Centres Commission 2007)

Scientific name	Common name	TSC Act status	EPBC Act status
<i>Litoria aurea</i>	Green and Golden Bell Frog	Endangered	Vulnerable
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	Vulnerable	N/A
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	Vulnerable	N/A
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	Vulnerable	N/A
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	Vulnerable	N/A
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	Vulnerable	N/A
<i>Meridolum corneovirens</i>	Cumberland Land Snail	Endangered	N/A
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper	Vulnerable	N/A
<i>Oxyura australis</i>	Blue-billed Duck	Vulnerable	N/A
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	Vulnerable	N/A
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Vulnerable	N/A
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable	Vulnerable
<i>Phascolarctos cinereus</i>	Koala	Vulnerable	N/A
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Vulnerable	Vulnerable
<i>Myotis macropus</i>	Large-footed Myotis	Vulnerable	N/A
<i>Ninox strenua</i>	Powerful Owl	Vulnerable	N/A
<i>Pyrrholaemus saggitatus</i>	Speckled Warbler	Vulnerable	N/A
<i>Tyto novaehollandiae</i>	Masked Owl	Vulnerable	N/A
<i>Lophoictinia isura</i>	Square-tailed Kite	Vulnerable	N/A
<i>Lathamus discolor</i>	Swift Parrot	Endangered	Endangered
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-bat	Vulnerable	N/A

3.2.4 AQUATIC AND RIPARIAN ECOSYSTEMS

The major creeks that run through the North West Growth Centre are South Creek, Eastern Creek, and Cattai Creek. The area also has a number of smaller tributary creeks, freshwater wetlands and floodplain areas and small farm dams scattered throughout (Eco Logical Australia 2003a).

South Creek is a major creek system within the South West Growth Centre and there are additional small permanent and ephemeral creeks, which join South Creek and eventually drain into the Hawkesbury-Nepean River at Windsor. These creeks include Badgerys Creek, Kemps Creek, Bonds Creek, Lowes Creek, Rileys Creek and Thompsons Creek. Ephemeral wetlands, small dams and weirs are also found scattered throughout the South West Growth Centre (Eco Logical Australia 2003b).

The catchments within the Growth Centres are highly degraded due to poor land practices, intensive agriculture and urban development. All creeks are highly degraded with very poor water quality, aquatic weed infestations, algal blooms and exotic fish species. Road crossings, culverts and other structures intersect the creeks and act as barriers to fish passage. Riparian zones along many of the creeks are degraded with weeds and streambank erosion evident in many places. The riparian and instream vegetation is a mix of both native and introduced weeds (Eco Logical Australia 2003a & b).

Database searches indicate that two threatened fish species have the potential to occur in the Growth Centres: Macquarie Perch and Australian Grayling. However, due to the highly degraded nature of the waterways within the Growth Centres it is considered highly unlikely that these species will be present.

3.3 HERITAGE VALUES

Consideration of the cultural and natural heritage values associated with the Growth Centres in the context of this strategic assessment focuses upon places and values that have a level of protection under the EPBC Act. There are four heritage lists that have varying levels of protection and require consideration under the EPBC Act.

Heritage List	Protected as a matter of national environmental significance under the EPBC Act	Needs to be <u>considered</u> by the Commonwealth Minister under this strategic assessment
World Heritage List (WHL)	YES	YES
National Heritage List (NHL)	YES	YES
Commonwealth Heritage List (CHL)	NO	YES
Register of the National Estate (RNE)	NO	YES

This is not a comprehensive assessment of the full range of values associated with heritage places in the Growth Centres. It is acknowledged that there are likely to be Indigenous and non-Indigenous, cultural and natural heritage places and values present within the Growth Centres that whilst not meeting the criteria for inclusion on the WHL, NHL, CHL or RNE are nevertheless valued by the community (e.g. places on state heritage lists that are not included on the above lists).

These places will continue to be protected under NSW legislation and it is considered that existing heritage and planning legislation provides a sufficient and effective regulatory framework for the ongoing management of these places and values.

The Australian Heritage Database was used to identify relevant heritage places for discussion. Examination of publicly available records for both the North West and South West Growth Centres indicate that at present there are no places listed on the WHL or NHL within the Growth Centres. It should be noted that these lists are not static and that it is possible that places within these areas may be included on either of these two lists at some point in the future.

Based on the following assessment of the heritage places (RNE and CHL) and their protection within the Growth Centres, it is considered unlikely for there to be significant impacts to those places arising from the Growth Centres Program.

3.3.1 NORTH WEST GROWTH CENTRE

There are three places listed on the RNE that are located within the North West Growth Centre:

- Rouse Hill House (RNE 2985);
- Rouse Hill Garden (RNE 2986); and
- Shale Woodland Llandilo (RNE 16587).

There are no places on the CHL that occur within the North West Growth Centre (Refer to Figure 18).

ROUSE HILL HOUSE & GARDEN

Rouse Hill House is a large two storey Georgian building of sandstone construction with a slate roof, a separate two storey brick service wing and offices forming an arcaded courtyard. The various elements of the place were built between 1817 and 1876 with construction of Rouse Hill House itself dating to the period 1810 – 1820 (Australian Council of National Trusts 1982.)

The garden, established by Richard Rouse, has five distinct areas - the entrance drive containing a late nineteenth century planting of scattered trees; the shrubbery and lawn, made up of a north facing rectangular sloping lawn with flanking shrubberies; the original orchard, now planted with exotics; the utility area between the house and outbuildings; and the vineyard (RNE 1/14/005/0001).

Rouse Hill House and gardens are listed on the NSW State Heritage Register and are managed by the NSW Historic Houses Trust. It is also zoned “Public Recreation – Regional” under the Growth Centres SEPP.

SHALE WOODLAND LLANDILO

The Llandilo site is referred to in this report as the Air Services Australia site at Shanes Park. It was included on the RNE for its natural values and in particular the fact that it contains one of the largest remnants of native vegetation on the Cumberland Plain. The vegetation includes a substantial area of the EPBC listed Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest as well as a range of EPBC listed threatened flora. The values of the site to these matters of national environmental significance are discussed further in Sections 3 and 4.

The Growth Centres SEPP zones the site as an environmental conservation area.

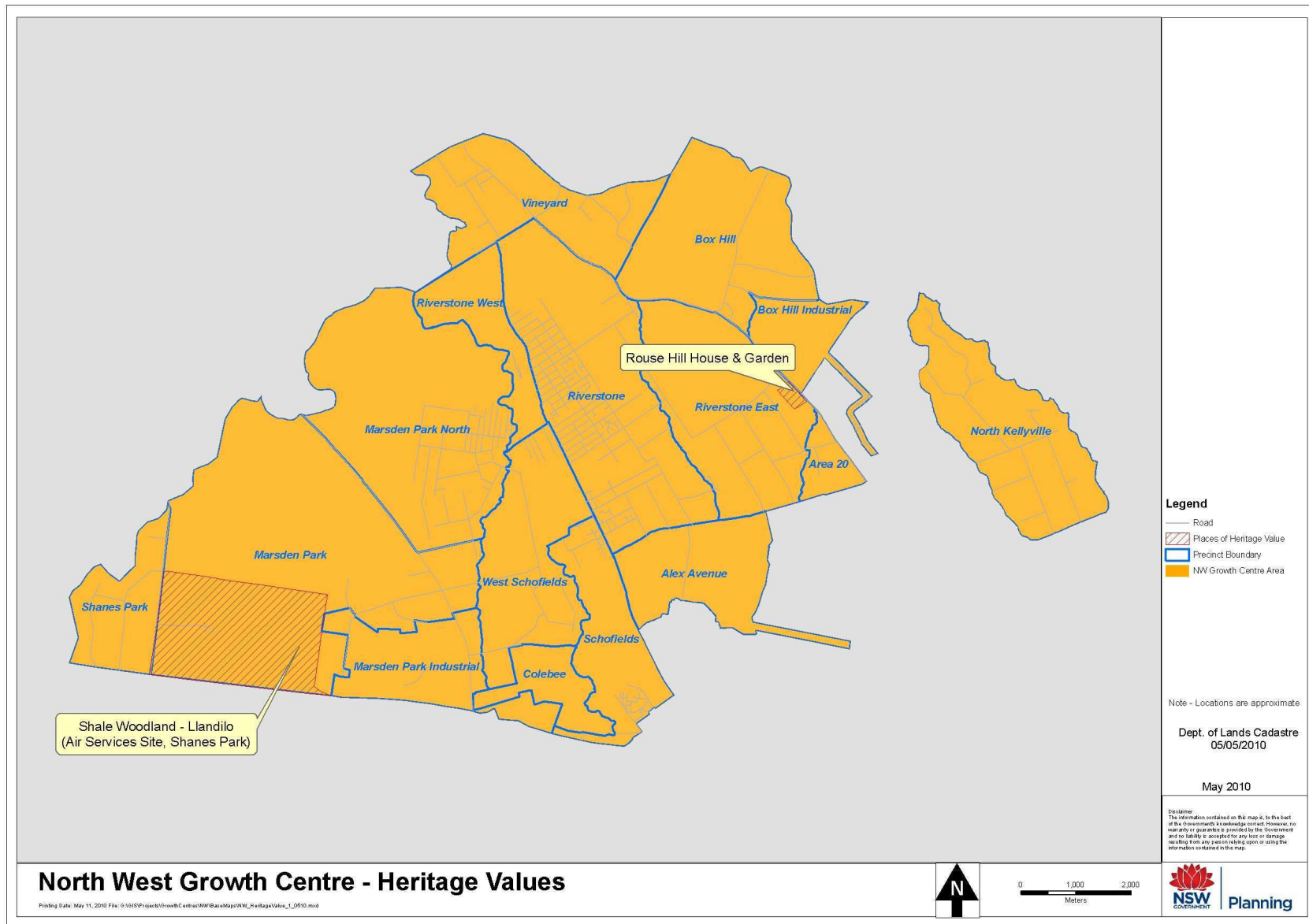


Figure 18: Commonwealth Heritage Values in the North West Growth Centre

3.3.2 SOUTH WEST GROWTH CENTRE

There are eight places included on either the RNE or CHL that are located the South West Growth Centre:

- Church of the Holy Innocents (RNE 3297);
- Denbigh homestead (RNE 3235);
- Ingleburn Army Camp (RNE 101050, CHL 105649);
- Pre-fabricated Cottages – Ingleburn Army Camp (RNE 103576, CHL 105657)
- Kelvin House and out buildings (RNE 3298);
- Maryland House and out buildings (RNE 3246);
- Maryland House gardens (RNE 3247); and
- Kemps Creek Natural Area (RNE 16379) (Refer to Figure 19).

CHURCH OF THE HOLY INNOCENTS

The Church of the Holy Innocents, built in 1848, is an example of Gothic Revival architecture within a largely intact rural setting. The architects may have been John Verge and John Bibb but this has not been conclusively established (Heritage Council of NSW 2007). The Church building is constructed of English bonded face brick with sandstone facings to doors, windows, floors and buttress caps. It consists of a nave, the west of which is surmounted by a belfry, chancel, vestry and finely detailed open timber porch with a timber shingled roof and stained glass windows.

The Church of the Holy Innocents is listed as a heritage item in the Liverpool Local Environment Plan 2008.

DENBIGH HOMESTEAD

A relatively intact example of an early homestead colonial that continues to function as a farmhouse. The main house has rubble walls clad with teak weatherboards, small paned windows with shutters and the front doorway has small sidelights. The homestead was built by Charles Hook c1822 and later sold to local identity Thomas Hassall in 1926. A brick stuccoed two storey section was subsequently added during Hassall's ownership (Heritage Council of NSW, undated).

A major contributing factor to the sites significance is that the homestead and associated farm continue to function as a working rural property on its original 1812 land grant (Heritage Council of NSW, undated).

The Denbigh Homestead and farm (incorporating the whole of the 1812 land grant – an area of 1100 acres) is listed on the NSW State Heritage Register. It is also zoned as E4 Environmental Living under the Growth Centres SEPP in order to ensure its ongoing protection.

INGLEBURN ARMY CAMP & PRE-FABRICATED COTTAGES

With the entry of Australia into World War II there was a need to train infantry in the Sydney region. The Army formally acquired the 684 acres in 1940 - although there were already personnel accommodated on the land tents. The camp in its original form consisted of 333 buildings. It was the first purpose-built army camp for the training of Australian infantry to fight in World War II and became the major training facility in New South Wales (Godden Mackay Logan 2001).

By 1959, sporting fields and a large area of the Married Quarters (Ingleburn Village) had been added to the camp. The pre-fabricated buildings erected in the western half of the Village included 35 Riley-Newsum Type CA4 houses, produced by H Newsum Sons & Company Ltd in Lincoln, England and later prefabricated Amals Sagverk Aktibolag cottages were also erected in the village area (Department of Works and Housing n.d.; Godden Mackay Logan 2001).

From the end of World War II the Camp's main function was a training facility for the National Service Scheme (1951-1972) and then as the Headquarters of Second Training Group of the Army Reserves (post 1973).

From the mid-1990s, activity at the Camp was scaled back with its functions transferred to other ADF locations. A number of existing buildings were destroyed by fire in the late 1990s and the site has been vacant since late 2000 (Godden Mackay Logan 2001)

The Commonwealth Department of Defence are proposing to sell the site to NSW and the sale of land has been approved under the EPBC Act. This approval includes requirements to conserve the heritage values of the site.

KELVIN HOUSE & OUT BUILDINGS

Kelvin House was built by Thomas Laycock (jnr) in 1820 following receipt of the Bringelly land grant in 1818. The house is stuccoed single storey Georgian farmhouse with a hipped iron roof, cranked in vernacular fashion over wide high veranda on three sides that is paved with sandstone. The interior is characterised by extensive high quality cedar joinery. Outbuildings include a sand stock brick kitchen, dairy, offices, and a small carriage house. It is well sited above Thompson's Creek and is surrounded by a beautifully landscaped garden (RNE 1/15/009/0024).

Kelvin House and Outbuildings are listed as a heritage item on the NSW State Heritage Register and in the Liverpool LEP 2008.

MARYLAND HOUSE, OUT BUILDINGS & GARDENS

The original Maryland House was constructed on the existing site c1820 with the present building having been built between 1850-1859. Maryland House is a large single storey brick and stone rubble homestead finished in plaster to imitate ashlar with sandstone quoins. It has flagged verandas with turned timber posts to north and east fronts. The interior has a large vestibule with flagged floor of exceptional quality and painted joinery throughout. There are a number of out buildings including a separate kitchen and offices and two Gothic style sandstone lodges. The gardens are a rare example of a created rural landscape in the English landscape tradition (Australian Council of National Trusts 1982).

The property is a rare example of a holding dating from the 1820s that is still functioning as a working farm.

Maryland House, Out Buildings and Gardens are listed as heritage items in the Camden LEP No. 48.

KEMPS CREEK NATURAL AREA

The Kemps Creek Natural Area is an important area of remnant native vegetation, and is encompassed by the Kemps Creek Nature Reserve. The vegetation communities that are present provide a good example of southern Wianamatta shale vegetation particularly associated with low lying creek habitats.

The vegetation is protected through its reserve status and is discussed in more detail in other areas of this report that address potential impacts to vegetation protected under the EPBC Act.

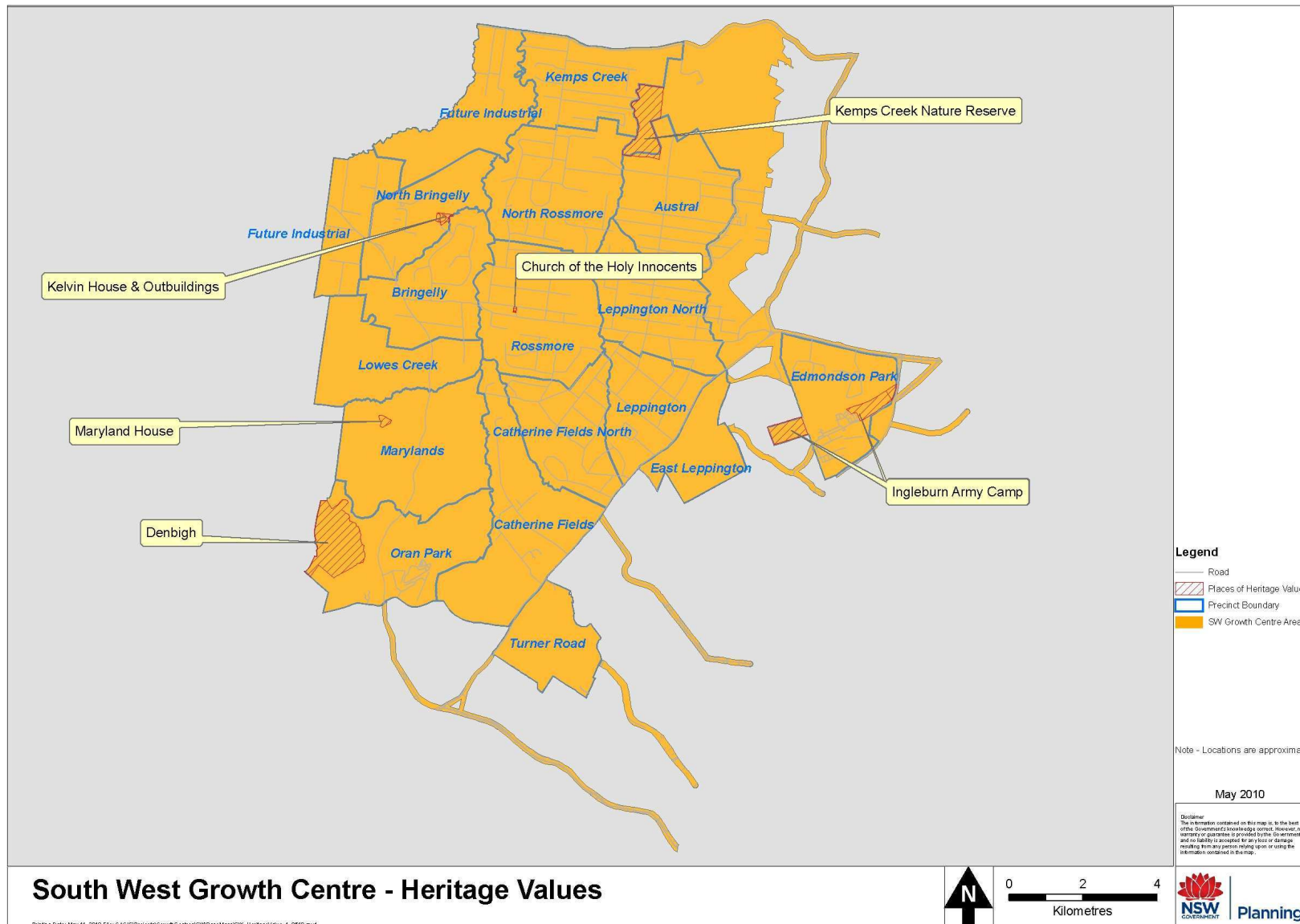


Figure 19: Commonwealth Heritage Values in the South West Growth Centre

3.4 MATTERS PROTECTED BY THE EPBC ACT

An analysis of the matters of national environmental significance protected under the EPBC Act that may be potentially present within the area to be affected (either directly or indirectly) by the Program was undertaken.

The DEWHA online EPBC Act Environmental Reporting Tool was used to generate a list of the potential matters for discussion. These include:

- World Heritage properties;
- National Heritage places;
- Wetlands of international importance (Ramsar wetlands);
- Threatened species and ecological communities; and
- Migratory species.

Commonwealth land (also protected by the EPBC Act) is also included in this section. However, the Commonwealth marine environment and nuclear actions are not discussed as they are not relevant to development within Western Sydney.

3.4.1 WORLD HERITAGE PROPERTIES

No World Heritage Properties occur within the vicinity of the North West or South West Growth Centres. Potential impacts to these matters are therefore considered unlikely to occur.

3.4.2 NATIONAL HERITAGE PLACES

No National Heritage Places occur within the vicinity of the North West or South West Growth Centres. Potential impacts to these matters are therefore considered unlikely to occur.

3.4.3 WETLANDS OF INTERNATIONAL IMPORTANCE (RAMSAR WETLANDS)

The Environmental Reporting Tool identified one Ramsar wetland, Towra Point Nature Reserve, as potentially relevant to the proposed development in the South West Growth Centre.

Towra Point Nature Reserve lies on the northern side of Kurnell Peninsula, forming the southern and eastern shores of Botany Bay. The South West Growth Centre is over 30 km west of Towra Point Nature Reserve and it is considered highly unlikely that development within the Growth Centre will impact these wetlands.

3.4.4 THREATENED SPECIES AND ECOLOGICAL COMMUNITIES

The likelihood of occurrence of EPBC Act listed species and ecological communities has been determined. Five terms for the likelihood of occurrence of species are used:

- | | |
|--------------|--|
| Known = | the species or ecological community was or has been observed on the site |
| Likely = | a medium to high probability that a species or ecological community occurs on the site |
| Potential or | suitable habitat for a species or ecological community occurs on the site, but |

Potential Habitat =	there is insufficient information to categorise the species or ecological community as likely to occur, or unlikely to occur
Unlikely =	a very low to low probability that a species or ecological community occurs on the site
No =	habitat on the site and in the vicinity is unsuitable for the species or ecological community

All species and ecological communities identified as potentially present through the Environmental Reporting Tool are identified, with species or communities with a likelihood of occurrence of “known”, “likely” or “potential” (highlighted in blue) discussed in detail. Species and ecological communities with the potential to be impacted by the Program are then subject to a complete analysis in Part B of the report.

Potential impacts are considered against a range of issues, but particularly within the context of two key concepts commonly applied under the EPBC Act for threatened species and ecological communities (DEWHA 2009a):

- habitat critical to the survival of a species or ecological community; and
- important population.

What is habitat critical to the survival of a species or ecological community?

“Habitat critical to the survival of a species or ecological community’ refers to areas that are necessary:

- *for activities such as foraging, breeding, roosting, or dispersal*
- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*
- *to maintain genetic diversity and long term evolutionary development, or*
- *for the reintroduction of populations or recovery of the species or ecological community.*

Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/ or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.”

What is an important population of a species?

“An ‘important population’ is a population that is necessary for a species’ long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- *key source populations either for breeding or dispersal*
- *populations that are necessary for maintaining genetic diversity, and/or*
- *populations that are near the limit of the species range.”*

Source: DEWHA 2009.

BIRDS			
Scientific name	Common name	EPBC listing status	Likelihood of Occurrence
<i>Anthochaera phrygia</i> (<i>Xanthomyza phrygia</i>)	Regent Honeyeater	Endangered Migratory	Potential (rare migratory visitor)
<i>Lathamus discolor</i>	Swift Parrot	Endangered	Known
<i>Rostratula australis</i>	Australian Painted Snipe	Vulnerable	Potential (rare migratory visitor)

REGENT HONEYEATER (*ANTHOCHAERA PHRYGIA*)

The Regent Honeyeater can be found throughout south-eastern Australia including areas throughout New South Wales, South Australia and the southern-limits of Queensland. The species is endemic to this region. They are known to breed at three sites including: the Capertee Valley and Bundarra-Barraba area within NSW and around Chiltern in Victoria between May and March (DEWHA 2009h). They have also been recorded breeding in areas surrounding these locations. Regent Honeyeaters usually nest in the horizontal branches or forks in tall mature eucalypts and sheoaks and have also been known to nest in mistletoe haustoria (DEC 2005f).

Regent Honeyeaters mostly occur in dry box-ironbark eucalypt woodland and dry sclerophyll forest associations, where they prefer the most fertile sites available, e.g. along creek flats, or in broad river valleys and foothills. In NSW, riparian forests containing *Casuarina cunninghamiana* (River Oak) and *Amyema cambagei* (Needle-leaf Mistletoe) are also important for feeding and breeding.

The species is highly mobile and is able to travel great distances, with movements largely being governed by availability of food sources such as flowering mature box and ironbark eucalypts and, occasionally banksias and mistletoes (DEC 2005f; Oliver 2000). Records of the species along the coast of NSW (and in Sydney) are generally in response to eucalypt flowering events (DEWHA 2009h).

Threats to the remaining populations of Regent Honeyeater can mainly be attributed to loss, fragmentation and degradation of their feeding and breeding habitat (DEWHA 2009h). Given the species' preference for tall, mature eucalypt species for feeding and occasionally nesting, retaining such trees is of particular importance to the survival of the species (Oliver 2000).

There are no records of the Regent Honeyeater within the Growth Centres and the nearest critical breeding habitat occurs more than 100 km from the Growth Centres. However they may visit the site as rare migrants.

The Growth Centres are not known to support habitat critical to the survival of the species or an important population, and it is considered unlikely for the Program to lead to significant impacts to the Regent Honeyeater

SWIFT PARROT (*LATHAMUS DISCOLOUR*)

The Swift Parrot breeds in Tasmania and over-winters on mainland Australia. The principal over-wintering habitat on the mainland is the box-ironbark forests and woodlands inland of the Great Dividing Range in Victoria and NSW (DEWHA 2009j). On the mainland they occur in areas where eucalypts are flowering profusely and favoured feed trees include winter flowering species such as Swamp Mahogany

Eucalyptus robusta, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens* (DEC 2005g). It is a highly mobile species able to utilise a variety of nectar sources over large areas.

On the mainland the main threat to Swift Parrots is loss of habitat through clearing for agriculture and urban development. Collisions with wire netting fences, windows and cars during the breeding season and winter migration (especially where such obstacles are in close proximity to suitable habitat) are also a threat to this species (DEC 2005g).

The Swift Parrot has been recorded in both the North West and South West Growth Centres (NSW Wildlife Atlas 2009). There is one record in Shanes Park (North West Growth Centre) and two records in Edmondson Park (South West Growth Centre). There is also suitable foraging habitat throughout the Growth Centres, with Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest vegetation recognised as being important habitat for the Swift Parrot (DEWHA 2009j).

Given the potential presence of this species within the Growth Centres, a more detailed analysis of the likely presence and potential impacts of the Program is provided in Section 6.

AUSTRALIAN PAINTED SNIPE (*ROSTRATULA AUSTRALIS*)

The Australian Painted Snipe is most common in eastern Australia, where it has been recorded at scattered locations throughout much of Queensland, NSW, Victoria and south-eastern South Australia (DEWHA 2009i). The species generally inhabits shallow terrestrial freshwater (and occasionally brackish wetlands), including temporary and permanent lakes, swamps and claypans.

There are no records of the Australian Painted Snipe within the Growth Centres; however they may visit the area as rare migrants. Given the limited potential for the Australian Painted Snipe to be present within the Growth Centres due to a lack of suitable habitat, it is considered unlikely for the Program to lead to significant impacts on this species.

FROGS			
Scientific name	Common name	EPBC listing status	Likelihood of Occurrence
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	Vulnerable	Known
<i>Litoria aurea</i>	Green and Golden Bell Frog	Vulnerable	Known
<i>Litoria littlejohni</i>	Littlejohn's Tree Frog	Vulnerable	Unlikely
<i>Litoria raniformis</i>	Growling Grass Frog	Vulnerable	No
<i>Mixophyes balbus</i>	Stuttering Frog	Vulnerable	No
<i>Mixophyes iteratus</i>	Southern Barred Frog	Endangered	No

GIANT BURROWING FROG (*HELEIOPORUS AUSTRALIACUS*)

The Giant Burrowing Frog is a large, slow-moving frog that grows to about 10 cm long. It occurs from the NSW Central Coast to eastern Victoria, but is most common on Sydney sandstone. It has been

found from the coast to the Great Dividing Range. The frog is a difficult species to detect, even in areas where it is known to occur (Penman *et al.* 2008).

The Giant Burrowing Frog can be found in heath, woodland and open forest with sandy soils. It generally lives in heath or forest and will travel several hundred metres to creeks to breed (DEC 2005a). Across its range, this frog appears to be dependent on areas with native vegetation as no individuals have been recorded from cleared lands (DEWHA 2009k). This is a burrowing species, which often spends significant periods of time underground during unfavourable conditions and/or to avoid detection from predators during the day.

The Giant Burrowing Frog has been recorded once in the North West Growth Centre. However, this record was disregarded in the Growth Centres Conservation Plan (Growth Centres Commission 2007), as the record was from an existing urban area at Riverstone and there is a lack of generally suitable habitat for this species across most of the Growth Centres.

Given the lack of habitat critical to the survival of the species or an important population, it is considered unlikely for the Program to lead to significant impacts to this species.

GREEN AND GOLDEN BELL FROG (*LITORIA AUREA*)

The Green and Golden Bell Frog has been recorded along the south-east coast of Australia, from East Gippsland in Victoria, north to approximately Byron Bay in north-east NSW. Currently, there are 43 known key populations in mainly near-coastal locations (DEC 2005i). The geographic spread of these locations highlights the highly fragmented distribution of this species.

The Green and Golden Bell Frog is found in association with almost every type of water body except fast flowing streams. Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as *Gambusia holbrooki*, have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region, occur in highly disturbed areas (DEC 2005i).

There are a number of threats to the on-going survival of the Green and Golden Bell Frog. These include destruction of wetlands and alteration of drainage patterns, predation by exotic fish and other feral animals, herbicides and other weed control measures, road mortality and the Chytrid Fungus (DEC 2005i).

Green and Golden Bell Frogs have been recorded in the North West Growth Centre within the Riverstone Precinct and further investigation work was required under the Biodiversity Certification in relation to this population as part of precinct planning.

Given the potential presence of this species within the Growth Centres, a more detailed analysis of the likely presence and potential impacts of the Program is provided in Section 6.

MAMMALS			
Scientific name	Common name	EPBC listing status	Likelihood of Occurrence
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Vulnerable	Known
<i>Dasyurus maculatus maculatus</i> (SE mainland)	Spotted-tail Quoll	Endangered	No

<i>population)</i>			
<i>Petrogale penicillata</i>	Brush-tailed Rock Wallaby	Vulnerable	No
<i>Potorous tridactylus tridactylus</i>	Long-nosed Potaroo (SE mainland)	Vulnerable	No
<i>Pteropus poliocephalus</i>	Grey-headed Flying Fox	Vulnerable	Known

LARGE-EARED PIED BAT (*CHALINOLOBUS DWYERI*)

The current and former distributions of the Large-eared Pied Bat are poorly known. Records exist from Shoalwater Bay, north of Rockhampton, Queensland, through to the vicinity of Ulladulla, NSW. It is generally rare with a very patchy distribution in NSW (DEC 2005j).

Little is known about the habitat and roosting requirements of the Large-eared Pied Bat, but natural roosts may depend heavily on sandstone outcrops (DEWHA 2009l). The species is thought to roost in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Hirundo ariel*). These bats frequent low to mid-elevation dry open forest and woodland close to the above features and are also found in well-timbered areas containing gullies (DEC 2005j).

There is one record of the Large-eared Pied Bat in the North West Growth Centre at Schofields and potential habitat for bats to forage within, or pass through, exists across the Growth Centres.

Given the potential presence of this species within the Growth Centres, a more detailed analysis of the likely presence and potential impacts of the Program is provided in Section 6.

GREY-HEADED FLYING FOX (*PTEROPUS POLIOCEPHALUS*)

The Grey-headed Flying Fox is known to occur along the eastern coast of Australia from Bundaberg in Queensland to Melbourne in Victoria (DEC 2005k). Due to the high mobility of the species, there are no separate or distinct populations of this species as individuals move between camps and throughout its geographic distribution (DEWHA 2009m).

The species inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas (Churchill 1998, Eby 1998). Urban gardens and fruit crops also provide foraging habitat for the Grey-headed Flying Fox. The species roosts in aggregations of various sizes on exposed branches of trees which are often located in gullies, typically close to water, in vegetation with a dense canopy (Churchill 1998).

The main threat to the survival of the species is habitat loss and disturbance through the clearing of foraging habitat and roosting locations for development and farming (DEWHA 2009m). Other threats to the species include unregulated shooting and electrocution on powerlines.

Given the potential presence of this species within the Growth Centres, a more detailed analysis of the likely presence and potential impacts of the Program is provided in Section 6.

RAY FINNED FISHES			
Scientific name	Common name	EPBC listing status	Likelihood of Occurrence
<i>Macquaria australasica</i>	Macquarie Perch	Endangered	No
<i>Prototroctes maraena</i>	Australian Grayling	Vulnerable	No

REPTILES			
Scientific name	Common name	EPBC listing status	Likelihood of Occurrence
<i>Hoplocephalus bungaroides</i>	Broad-headed snake	Vulnerable	No

PLANTS			
Scientific name	Common name	EPBC listing status	Likelihood of Occurrence
<i>Acacia bynoeana</i>	Bynoe's Wattle	Vulnerable	Potential
<i>Acacia pubescens</i>	Downy Wattle	Vulnerable	Known
<i>Cynanchum elegans</i> **	White-flowered Wax Plant	Endangered	Potential
<i>Darwinia biflora</i>		Vulnerable	Known
<i>Dillwynia tenuifolia</i>		Vulnerable	Known
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flowered Grevillea	Vulnerable	Known
<i>Melaleuca deanei</i>	Deane's Wattle	Vulnerable	Unlikely
<i>Micromyrtus minutiflora</i>		Vulnerable	Known
<i>Persoonia hirsuta</i>		Endangered	Known
<i>Persoonia nutans</i>		Endangered	Known
<i>Pimelea curviflora</i> var. <i>curviflora</i>		Vulnerable	Unlikely
<i>Pimelea spicata</i>		Endangered	Known
<i>Pomaderris brunnea</i>	Rufous Pomaderris	Vulnerable	Unlikely
<i>Pultenaea parviflora</i>		Vulnerable	Known
<i>Tetradthea glandulosa</i>		Vulnerable	Unlikely

<i>Thelymitra sp. Kangaloon</i>	Kangaloon Sun-orchid	Critically endangered	No
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** *Cynanchum elegans* potentially occurs within the Growth Centres however the record of occurrence is incorrect. Refer to Section 5.

BYNOE'S WATTLE (*ACACIA BYNOEANA*)

A. bynoeana is known to occur within scattered locations throughout central eastern NSW. Populations of the species have been recorded around Morisset in the south of the Hunter District to the Southern Highlands and west of the Blue Mountains (DEC 2005l; DEWHA 2009n). The total population of the species is estimated to be only a few hundred plants (DEWHA 2009n) and is only known from 30 locations.

Habitat for the *A. bynoeana* includes heath and dry sclerophyll forest, typically on a sand or sandy clay substrate, often with ironstone gravels (DEC 2005g). The species seems to prefer open and sometimes slightly disturbed sites. They are also known to often grow among rock platforms. Characteristic overstorey species include: *Corymbia gummifera*, *Eucalyptus haemastoma*, *Eucalyptus gummifera*, *Eucalyptus parramattensis*, *Eucalyptus sclerophylla*, *Banksia serrata* and *Angophora bakeri*. Shrubs often associated with the species include *Banksia spinulosa*, *Banksia serrata*, *Angophora oxycedrus*, *Angophora myrtifolia* and *Kunzea* spp. (Winning 1992; James 1997).

Given the fragmented nature of existing populations of the species and their limited abundances in these locations, the species is particularly susceptible to the threat of local extinction as a result of habitat clearance and disturbance (DEC 2005l). Invasion by weed species in suitable habitat for Bynoe's Wattle is also a threat to the survival of remaining populations.

There are no known occurrences of the species within the Growth Centres, with scattered records to the east and west of the North West Growth Centre (NSW Wildlife Atlas 2009). It is considered that there is limited potential for the species to occur within the Growth Centres (Growth Centres Commission 2007). Therefore, it is unlikely for the Program to lead to significant impacts to the species.

DOWNY WATTLE (*ACACIA PUBESCENS*)

Acacia pubescens is confined to the Sydney district, with most occurrences on the Cumberland Plain (DEWHA, 2009o). A total of 116 populations across 151 sites are currently known to exist.

The species occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils in these areas are characteristically gravelly soils, often with ironstone. Habitat for the species includes Alluvial Woodland, Cooks River/Castlereagh Ironbark Forest, Castlereagh Scribbly Gum Woodland, Shale Gravel Transition Forest, Shale Hills Woodland, Shale Plains Woodland and Shale Sandstone Transition Forest (DEC 2005m).

The National Recovery Plan for the species lists two key threats to the survival of existing populations: loss of habitat and degradation of habitat (NPWS 2003a). Over 90% of the original distribution of the species has been cleared. Threats to remaining sites include weed invasion, mechanical damage, rubbish dumping, illegal track creation and arson.

This species has been previously recorded at several sites in the South West Growth Centre, with a potentially important population occurring at Kemps Creek (Growth Centres Commission 2007). There is also potential habitat for the species throughout other areas of the Growth Centres.

A more detailed analysis of known and potential presence and potential impacts of the Program on this species is provided in Section 5.

WHITE-FLOWERED WAX PLANT (*CYNANCHUM ELEGANS*)

Cynanchum elegans is currently known from 86 locations within NSW, where it is most commonly found within the Kempsey Region. Other locations include the Cumberland Plain, the Forster area, Manning Valley, Hunter Valley, Yabbra State Forest, Brunswick Heads, Gerroa, Merriwa and northeast of Tenterfield (DEWHA 2009p).

The species occurs on the edges of dry rainforest vegetation, littoral rainforest; Coastal Tea-tree *Leptospermum laevigatum* – Coastal Banksia *Banksia integrifolia* subsp. *integrifolia* coastal scrub; Forest Red Gum *Eucalyptus tereticornis* aligned open forest and woodland; Spotted Gum *Eucalyptus maculata* aligned open forest and woodland; and Bracelet Honeymyrtle *Melaleuca armillaris* scrub to open scrub (DEC 2005n).

The species is subject to a number of threats including habitat loss and habitat degradation.

There is one record of *C. elegans* within the Growth Centres, however following further analysis it was determined to be an incorrect record. A more detailed analysis of known and potential presence and potential impacts of the Program on this species is provided in Section 5.

DARWINIA BIFLORA

Darwinia biflora has a restricted distribution, only being found in the northern and north-western suburbs of Sydney, in the Ryde, Hills Shire, Hornsby and Ku-ring-gai local government areas. The species has been identified at 241 sites which are thought to represent 105 populations (DEC 2005o; DEWHA 2009q).

D. biflora occurs within habitat areas where the weathered shale-capped ridges intergrade with Hawkesbury Sandstone. Vegetation communities associated with these soil types typically consist of Sandstone Ridge-top Woodlands (DEWHA 2009q). It often inhabits the gentle slopes near the crests of ridges or on sheet rock with moss beds. Flowering of the species occurs throughout the year, however is largely concentrated in autumn months (DEC 2005o).

Threats to the species includes habitat loss, increased fragmentation, inappropriate fire regimes, bushrock removal, clearing for maintenance, track creation, weed invasion and impacts from surrounding developed areas (DEWHA 2009q).

North Kellyville Precinct in the North West Growth Centre contains a number of records of the species. There are no recorded occurrences of the species within the South West Growth Centre. A number of sites within the Kellyville region have also been identified as containing important populations of *D. biflora* (DEC 2004).

A more detailed analysis of known and potential presence and potential impacts of the Program on this species is provided in Section 5.

DILLWYNIA TENUIFOLIA

Dillwynia tenuifolia is predominately found on the Cumberland Plain, from Windsor to Penrith, and east to Deans Park and consists of approximately 35 populations. These populations are locally disjunct, with several of the populations listed as endangered populations (DEWHA 2009r).

The species typically occurs in habitat containing scrubby/dry heath and including the vegetation communities Castlereagh Ironbark Forest and Shale Gravel Transition Forest. The species has also been recorded in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland (DEC 2005p). A key factor in the abundance of the species within these habitats is the occurrence of fire. While fire kills above-ground individuals, the species is able to re-establish itself from soil-stored seed (DEC 2005p).

As with other plant species occurring within the Cumberland Plain, key threats to the distribution and abundance of *D. tenuifolia* include the clearance and fragmentation of habitat, inappropriate fire regimes, uncontrolled vehicular access, fill and rubbish dumping and weed invasion.

There are numerous records of the species occurring throughout the Growth Centres, with populations in Marsden Park (North West Growth Centre) and Kemps Creek (South West Growth Centre). At one site, there is a population of over 1,000 individuals (Growth Centres Commission 2007). The population at Marsden Park is recognised as a significant population for the species (DEWHA 2009r). The Kemps Creek population has been listed as an Endangered Population under Section 11 of the NSW *Threatened Species Conservation Act 1995* as the population is disjunct, occurs on unreserved land and is at the spatial limit of the known distribution of the species.

A more detailed analysis of known and potential presence and potential impacts of the Program on this species is provided in Section 5.

GREVILLEA PARVIFLORA SUBSP. PARVIFLORA

This species is sporadically distributed throughout the Sydney Basin with the main occurrence around Picton, Appin and Bargo (and possibly further south to the Moss Vale area). Separate populations are also known further north from Putty to Wyong and Lake Macquarie on the Central Coast and Cessnock and Kurri Kurri in the Lower Hunter (DEC 2005q).

Habitat for the species includes sandy or light clay soils usually over thin shales, with individuals growing in a range of vegetation types from heath and shrubby woodland to open forest. It is found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests and often occurs in open, slightly disturbed sites such as along tracks (DEC 2005q). Flowering has been recorded between July to December as well as between April and May. Flowers are insect-pollinated and seed dispersal is limited.

There are a number of threats to the species including clearing and fragmentation of habitat and high fire frequency.

There are three reliable records of the species within the South West Growth Centre, including an important population within Kemps Creek.

A more detailed analysis of known and potential presence and potential impacts of the Program on this species is provided in Section 5.

MICROMYRTUS MINUTIFLORA

Micromyrtus minutiflora has a very limited distribution. Occurrences of the species are restricted to Western Sydney, between Richmond and Penrith. There are currently only a total of 1800 individuals known to occur within 11 sites within this region (TSSC 2008a).

Habitat for the species occurs on sandy clay or gravelly soils of Tertiary alluvium. Associated vegetation communities in which the species occurs includes Castlereagh Scribbly Gum Woodland, Ironbark Forest and Shale Gravel Transition Forest (DECC 2005b).

Given the limited distribution of the species, *M. minutiflora* is particularly susceptible to the threat of local population extinction. Such impacts have the potential to occur as a result of habitat loss through vegetation clearing for urban development, frequent fire, and habitat degradation through weed invasion, arson, grazing, trail bike riding and rubbish dumping (TSSC 2008).

There are a number of records of *M. minutiflora* within the Growth Centres, largely occurring in the Marsden Park Precinct in the North West Growth Centre. These records have not been identified as significant populations (Growth Centres Commission 2007).

A more detailed analysis of known and potential presence and potential impacts of the Program on this species is provided in Section 5.

HAIRY GEEBUNG (*PERSOONIA HIRSUTA*)

The current distribution of *Persoonia hirsuta* occurs across a patchy range of locations including the Sydney Coastal area, Blue Mountains, Southern Highlands, Yanderra and Hill Top (DECC 2005r). Throughout these areas, the species occurs as individuals or in small groups of less than 10 individual plants. The species is considered to be generally rare throughout the Sydney Region (DEWHA 2009t).

Habitat for the species consists of dry sclerophyll eucalypt woodland or forest and shrub-woodland, which grow in sandy to stony soils derived from sandstone. The species is rarely found in areas of shale (DEWHA 2009t).

Though little is known of the ecology of the species, it is considered likely that fire can kill adult plants of the species, however it is likely to be able to regenerate from soil-stored seed (DECC 2005r). Changes to natural fire regimes for the purposes of hazard reduction may therefore threaten the survival of the species. Other threats to *P. hirsuta* include clearance of habitat and potential impacts to reproduction of the species as a result of the ineffective pollination techniques of the introduced European Honey bee (*Apis mellifera*) (DECC 2005r).

There is one reliable record for the species within the North West Growth Centre which was the subject of further investigation in 2007 as part of the precinct planning process for the North Kellyville Precinct.

A more detailed analysis of known and potential presence and potential impacts of the Program on this species is provided in Section 5.

PERSOONIA NUTANS

Persoonia nutans is endemic to Western Sydney. It occurs between Richmond, Macquarie Fields & East Hills, particularly near the Nepean and Georges Rivers. Specific localities at which this species has been recorded include: Londonderry; Kemps Creek; Georges River opposite East Hills; Macquarie Fields and near the Georges & Nepean Rivers (DEWHA 2009u)

The ecology of *P. nutans* is not well understood, however it is considered to be a relatively short-lived species similar to other obligate seed regenerating species which reach maturity in about 10 years. The species is known to be associated with dry woodland, including Castlereagh Scribbly Gum Woodland, Agnes Banks Woodland and sandy soils associated with tertiary alluvium and occasionally poorly drained soils.

Immediate threats to the survival of populations of *P. nutans* include inappropriate fire regimes and habitat loss through clearing and degradation (DECC 2006a).

There are a number of records of *P. nutans* within the Growth Centres, all within the Kemps Creek Precinct in the South West Growth Centre.

A more detailed analysis of known and potential presence and potential impacts of the Program on this species is provided in Section 5.

PIMELEA SPICATA

Pimelea spicata is restricted to the Cumberland Plain and coastal Illawarra south of Sydney, with 28 populations known to occur across these areas (DECC 2005b), the majority of which (23 populations) are located within the Cumberland Plain. In Western Sydney, the species' current known distribution extends from Mount Annan and Narellan Vale in the south to Freemans Reach in the north and from Penrith in the west to Georges Hall in the east.

In both the Cumberland Plain and Illawarra environments this species is found on well-structured clay soils. On the inland Cumberland Plain sites it is associated with Grey Box and Ironbark. In the coastal Illawarra it occurs commonly in Coast Banksia open woodland with a better developed shrub and grass understorey (DEC 2005b).

The main threats to the species are habitat loss through vegetation clearing and disturbance. Invasion of habitat by exotic plants is also a key threat to the survival of *P. spicata*.

There are five records of *P. spicata* within the Growth Centres, occurring in both the North West and South West. Four of these records comprise a potentially important population for the species at Denham Court Road.

A more detailed analysis of known and potential presence and potential impacts of the Program on this species is provided in Section 5.

PULTENAEA PARVIFLORA

This species is endemic to the Cumberland Plain. Key areas of distribution within the Cumberland Plain occurs from Windsor to Penrith and east to Dean Park. A number of outlier populations have also been previously recorded from Kemps Creek and Wilberforce (DECC 2005c).

Habitat for *Pultenaea parviflora* occurs within areas of scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. It is also known to occur in areas of Castlereagh Scribbly Gum Woodland which adjoin the above mentioned vegetation communities (DECC 2005c). Flowering of *P. parviflora* occurs between August and November however is largely dependent on suitable environmental conditions (DECC 2005c).

The main threats to this species include clearance and fragmentation of habitat for residential, industrial and rural purposes, inappropriate fire regimes, uncontrolled vehicular access, fill and rubbish dumping and weed invasion (DECC 2005c).

There are a number of records of *P. parviflora* within the Growth Centres, occurring in both the North West and South West Growth Centres. A large number of records occur within Marsden Park in the North West Growth Centre. These records comprise a total of over 700 individuals (Growth Centres Commission 2007).

A more detailed analysis of known and potential presence, and potential impacts of the Program on this species is provided in Section 5.

ECOLOGICAL COMMUNITIES		
Name	EPBC listing status	Likelihood of Occurrence
Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest	Critically Endangered	Known
Shale/Sandstone Transition Forest	Endangered	Known
Turpentine-Ironbark Forest in the Sydney Basin Bioregion	Critically endangered	Known

CUMBERLAND PLAIN SHALE WOODLANDS AND SHALE GRAVEL TRANSITION FOREST

This ecological community is restricted to the driest parts of the Sydney Basin Bioregion. Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest occurs in the Auburn, Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Hawkesbury, Hills Shire, Holroyd, Liverpool, Parramatta, Penrith and Wollondilly local government areas (TSSC 2008b).

The remainder of the ecological community exists as around 1727 fragmented patches across the Cumberland Plain with an average patch size of 6 ha. The largest remaining patch is 478 ha. These patches are distributed among both private and public lands.

Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest occurs on soils derived from Wianamatta Shale. Grey Box *Eucalyptus moluccana* and Forest Red Gum *Eucalyptus tereticornis* are the dominant canopy trees, with Narrow-leaved Ironbark *Eucalyptus crebra*, Spotted Gum *Corymbia maculata* and Thin-leaved Stringybark *Eucalyptus eugenioides* occurring less frequently. The shrub layer is dominated by Blackthorn *Bursaria spinosa*, and it is common to find abundant grasses such as Kangaroo Grass *Themeda australis* and Weeping Meadow Grass *Microlaena stipoides* var *stipoides* (TSSC 2008b).

The main threats to the community include: clearing for urban, industrial or rural development; the consequent fragmentation of native vegetation remnants; the low level of protection in reserves; weed invasion; inappropriate fire and grazing regimes; and climate change. Many of the threats to the ecological community also have adverse impacts on threatened species associated with the ecological community (TSSC 2008b).

A total of 2,185 ha of Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest occurs across the Growth Centres.

A more detailed analysis of the presence and potential impacts of the Program on this ecological community is provided in Section 4.

SHALE SANDSTONE TRANSITION FOREST

The majority of remnant areas of Shale Sandstone Transition Forest can be found throughout the Hawkesbury, Hills Shire, Liverpool, Parramatta, Penrith, Campbelltown and Wollondilly local

government areas (DEC 2005d). The current extent of this community has been significantly reduced since European Settlement. It is estimated that a total of 9,950 ha remains within New South Wales.

Shale Sandstone Transition Forest occurs at the edges of the Cumberland Plain where the shale-influenced soils gradually change to sandstone and includes the sub communities with low sandstone influence and high sandstone influence (DEC 2005d). The main tree species within the community vary depending on soil influences, however most stands include Forest Red Gum *Eucalyptus tereticornis*, Grey Gum *E. punctata*, stringybarks (*E. globoidea*, *E. eugenioides*) and ironbarks (*E. fibrosa* and *E. crebra*). Areas of low sandstone influence have an understorey that is closer to Cumberland Plain Shale Woodlands (DEC 2005d).

A total of 108 ha of Shale Sandstone Transition Forest is present within the Growth Centres.

A more detailed analysis of the presence and potential impacts of the Program on this ecological community is provided in Section 4.

TURPENTINE-IRONBARK FOREST IN THE SYDNEY BASIN BIOREGION

This ecological community has a restricted extent of approximately 2495 ha. The remaining remnants of Turpentine-Ironbark Forest in the Sydney Basin Bioregion are associated with the eastern edge of the Cumberland Plain where the average annual rainfall exceeds approximately 950 mm (DEWHA 2010; NPWS 2002a). The distribution of the community occurs throughout 25 local government areas, occurring mostly in the Hawkesbury, Hills Shire, Hornsby, Ku-ring-gai, Parramatta, Ryde, Sutherland and Wollondilly local government areas. Good examples can be seen in small reserves such as Wallumatta Nature Reserve and Newington Nature Reserve (DECC 2008).

Turpentine-Ironbark Forest occurs close to the shale/sandstone boundary on the more fertile shale influenced soils in higher rainfall areas on the higher altitude margins of the Cumberland Plain, and on the shale ridge caps of sandstone plateaus (DECC 2008c).

A total of 2.2 ha of Turpentine-Ironbark Forest in the Sydney Basin Bioregion occurs within the North West Growth Centre.

A more detailed analysis of the presence and potential impacts of the Program on this ecological community is provided in Section 4.

3.4.5 MIGRATORY SPECIES

A total of eleven listed migratory species were determined to be potentially present using the DEWHA online EPBC Act Environmental reporting Tool (see below).

The likelihood of occurrence for these species has been placed into the same five categories that were used for threatened species (known, likely, potential or potential habitat, unlikely, no).

Potential impacts are then considered within the context of two key concepts commonly applied under the EPBC Act for migratory species (DEWHA 2009a):

- important habitat; and
- ecologically significant proportion.

Where neither of these two features of a migratory species are present, impacts are generally not considered as an issue under the EPBC Act (DEWHA 2009a).

What is important habitat for a migratory species?

“An area of ‘important habitat’ for a migratory species is:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or
- habitat that is of critical importance to the species at particular life-cycle stages, and/or
- habitat utilised by a migratory species which is at the limit of the species range, and/or
- habitat within an area where the species is declining.”

What is an ecologically significant proportion?

“Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an ‘ecologically significant proportion’ of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species’ population status, genetic distinctiveness and species specific behavioural patterns (for example, site fidelity and dispersal rates)”.

Source: DEWHA 2009.

TERRESTRIAL AND WETLAND BIRDS			
Scientific name	Common name	EPBC listing status	Likelihood of Occurrence
<i>Anthochaera phrygia</i> (<i>Xanthomyza phrygia</i>)	Regent Honeyeater	Endangered Migratory	Known
<i>Apus pacificus</i>	Fork-tailed Swift	Migratory	Potential
<i>Ardea alba</i>	Great Egret	Migratory	Known
<i>Ardea ibis</i>	Cattle Egret	Migratory	Known
<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle	Migratory	Known
<i>Hirundapus caudacutus</i>	White-throated Needletail	Migratory	Known
<i>Merops ornatus</i>	Rainbow Bee-eater	Migratory	Potential
<i>Monarcha melanopsis</i>	Black-faced Monarch	Migratory	Known
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Migratory	Known
<i>Rhipidura rufifrons</i>	Rufous Fantail	Migratory	Known
<i>Rostratula benghalensis s. lat.</i>	Painted Snipe	Migratory	Known

REGENT HONEYEATER (*ANTHOCHAERA PHRYGIA*, *XANTHOMYZA PHRYGIA*)

Regent Honeyeater is listed as both a threatened and migratory species under the EPBC Act. See Section 3.4.4 for the analysis relating to this species.

FORK-TAILED SWIFT (*APUS PACIFICUS*)

The Fork-tailed Swift is a wide-ranging migratory species found throughout most of Australia. The species has been recorded as occasionally travelling with Needletails (e.g. *Hirundapus caudacutus*). Given its wide distribution, it is found in a variety of habitats with a possible tendency to more arid areas but also over coastal and urban areas (Simpson & Day 1999).

Little information regarding the ecology of the species is available.

The Fork-tailed Swift may occasionally transit through the Growth Centres. However, the Growth Centres do not support important habitat or an ecologically significant proportion of the species. As such, it is considered unlikely that the Fork-tailed Swift will be impacted by the Program.

GREAT EGRET (*ARDEA ALBA*)

This species has a wide distribution, being found throughout most areas of Australia (DEWHA 2009c). Coastal areas within the Northern Territory support the largest breeding colonies, however there are a number of locations throughout Australia which support smaller breeding populations. Within NSW, these areas occur in the north and north-east of the state (DEWHA 2009c). The total population for the species is currently estimated at 60,000 individuals.

The Great Egret forages in a wide range of wet and dry habitats including permanent and ephemeral freshwaters, wet pasture and estuarine mangroves and mudflats (McKilligan, 2005). The species frequents shallow waters and nests in the upper strata of trees or shrubs standing in or near water or sometimes in inundated reed beds.

Threats to the remaining population of the Great Egret include habitat loss and degradation. Specifically, changes to water flows, draining and clearing of wetlands, invasion by weed species and increased salinisation of foraging habitat has the potential to displace populations (DEWHA 2009c).

The Growth Centres are not known to support large breeding populations of the Great Egret, with only one record of the species previously made within North Kellyville (North West Growth Centre). The Growth Centres do not support important habitat or an ecologically significant proportion of the species. As such, it is considered unlikely that the Great Egret will be impacted by the Program.

CATTLE EGRET (*ARDEA IBIS*)

The Cattle Egret is a highly mobile, wide ranging migratory species. It has been recorded throughout most of Australia (DEWHA 2009b).

Cattle Egrets forage on pasture, marsh, grassy road verges, rain puddles and croplands, but not usually in the open water of streams or lakes and are known to avoid marine environments (McKilligan, 2005). Some individuals stay close to the natal heronry from one nesting season to the next, but the majority leave the district in autumn and return the next spring. Cattle Egrets are likely to spend the winter dispersed along the coastal plain and only a small number have been recorded west of the Great Dividing Range (McKilligan, 2005).

Threats to the species include habitat loss and degradation, specifically as a result of urban development and agricultural practices.

There are seven records of this species within the Growth Centres area. However, the Growth Centres do not support important habitat or an ecologically significant proportion of the species. As such, it is considered unlikely that the Cattle Egret will be impacted by the Program.

WHITE-BELLIED SEA-EAGLE (*HALIAEETUS LEUCOGASTER*)

This species is distributed throughout coastal areas of Australia, with breeding pairs mainly occurring along the east coast from Queensland to Victoria and Tasmania (DEWHA 2009d). Their distribution is thought to be influenced by climatic conditions, moving from inland rivers to coastal areas during dry seasons.

The White-bellied Sea-eagle forages over large open fresh or saline water bodies, coastal seas and open terrestrial areas (Marchant & Higgins 1993, Simpson & Day 1999). Breeding habitat consists of tall trees, mangroves, cliffs, rocky outcrops, silts, caves and crevices and is located along the coast or major rivers. Breeding habitat is usually in or close to water, but may occur up to a kilometre away (Marchant & Higgins 1993).

The species survival is under threat from habitat loss and disturbance of nesting sites. Nesting pairs are particularly sensitive to disturbance, often abandoning nests if anthropogenic interactions occur (DEWHA 2009d).

There is one record of the White-bellied Sea-eagle within Marsden Park within the North West Growth Centre. The species is unlikely to use the site for foraging, but may transit through the study area to either inland or coastal areas to forage and breed. There are no known nesting sites within either the North West or South West Growth Centres.

Given that the Growth Centres do not support important habitat or an ecologically significant proportion of the species, it is considered unlikely that the White-bellied Sea-eagle will be impacted by the Program.

WHITE-THROATED NEEDLETAIL (*HIRUNDAPUS CAUDACUTUS*)

The species occurs commonly throughout eastern and south-eastern Australia (DEWHA 2009e). The species winters in Australia between late October and February, with breeding occurring outside of Australia throughout a number of areas in Asia.

The White-throated Needletail forages aerially over a variety of habitats usually over coastal and mountain areas, most likely with a preference for wooded areas (Marchant & Higgins 1993; Simpson & Day 1999). The species has been observed roosting in dense foliage of canopy trees, and may seek refuge in tree hollows in inclement weather (Marchant & Higgins 1993).

Due to the species' widespread distribution and movement through a variety of habitats, there are minimal threats known to the species other than occasional collision with buildings (DEWHA 2009e).

No records are known for the White-throated Needletail within the North West or South West Growth Centres. However, there is potential for the species to forage in woodland areas throughout the study area. Given the species widespread distribution, its high mobility, and the lack of important habitat within the Program, it is unlikely that impacts to the species will occur as a result of the Program.

RAINBOW BEE-EATER (*MEROPS ORNATUS*)

The Rainbow Bee-eater has a wide distribution throughout Australia, occurring in most areas except Tasmania and the arid inland regions of the continent (DEWHA 2009f). Seasonal movement patterns of the species are not yet well understood. It is thought that the southern breeding populations migrate

north during winter, while the northern breeding populations are present throughout the year and may only migrate within a short range throughout their northern distribution (DEWHA 2009f).

Habitat for the Rainbow Bee-eater occurs in open country, chiefly at suitable breeding places in areas of sandy or loamy soil such as: sand-ridges; riverbanks; road-cuttings; sand-pits; and occasionally coastal cliffs. The nest is located in a chamber at the end of a burrow, up to 1.6 m long, tunnelled in flat or sloping ground, sandy bank or cutting. Nesting areas are thought to be re-used each breeding season, although new nests are also excavated in these areas (DEWHA 2009f).

Cane toads have been found to be the main threat facing the survival of the species. The cane toad feeds on eggs, nestlings and occupies nesting burrows (DEWHA 2009f). Nest predation by other introduced and native species has also been found to affect the breeding success of the species (Boland 2004).

There are no records of this species within the Growth Centres. No important nesting sites have been recorded in the area, although individuals may transit through the area for opportunistic foraging. Given the absence of important habitat for the species within the Growth Centres, it is considered unlikely that impacts will occur as a result of the Program.

BLACK-FACED MONARCH (*MONARCHA MELANOPSIS*)

The Black-faced Monarch is found along the coastline of eastern Australia. The species is resident in the north of its range, but is a summer breeding migrant to coastal south-eastern Australia, arriving in September and returning northwards in March. It may also migrate to Papua New Guinea in autumn and winter (Australian Museum 2005).

The species predominantly inhabits rainforest and eucalypt forests, feeding on insects in tangled understorey. Individuals may forage in more open woodland areas when migrating. Black-faced Monarchs nest in tree forks, creating a deep cup of *Casuarina* needles, bark, roots and spider web. Threats to the species include habitat loss and degradation (Australian Museum 2005).

There are no records of the species occurring within the Growth Centres. As the species is likely to only occur as a rare migrant in the area, it is considered unlikely that impacts to the Black-faced Monarch will occur as a result of the Program.

SATIN FLYCATCHER (*MYIAGRA CYANOLEUCA*)

The Satin Flycatcher is a migratory species occurring along the eastern seaboard of Australia (DEWHA 2009g). The species, which is highly mobile, moves northwards in winter and returns south during spring to breed.

Foraging occurs in the mid to upper canopy of tall forests, particularly in wetter habitats such as forested gullies. However the species does not occur in rainforest areas. Nests are built on horizontal branches approximately 3 m to 25 m above the ground, with overhanging foliage.

There are no records of the species occurring within the Growth Centres. Individuals may, however, irregularly transit through the area on their migratory route. Such occurrences are likely to be rare and occur in small numbers. It is considered unlikely that impacts to the Satin Flycatcher will occur as a result of the Program.

RUFOUS FANTAIL (*RHIPIDURA RUFIFRONS*)

The Rufous Fantail is a summer breeding migrant to south eastern Australia (Morcombe, 2004). The species can be found in northern and eastern Australia, being more common in the north.

The Rufous Fantail is found in rainforest, dense wet eucalypt and monsoon forests, paperbark and mangrove swamps and riverside vegetation (Morcombe, 2004). Open country may be used by the Rufous Fantail during migration, including urban areas (Morcombe, 2004).

There are no current records of the Rufous Fantail within the Growth Centres. However, there is potential for the species to use woodlands within the area for opportunistic foraging as the population migrates south for the breeding season.

There is no important habitat for the species within the Growth Centres and it is considered unlikely that impacts to the Rufous Fantail will occur as a result of the Program

AUSTRALIAN PAINTED SNIPE (*ROSTRATULA AUSTRALIS*)

The Australian Painted Snipe is listed as both a threatened and migratory species under the EPBC Act. See Section 3.4.4 for the analysis relating to this species.

3.4.6 COMMONWEALTH LAND

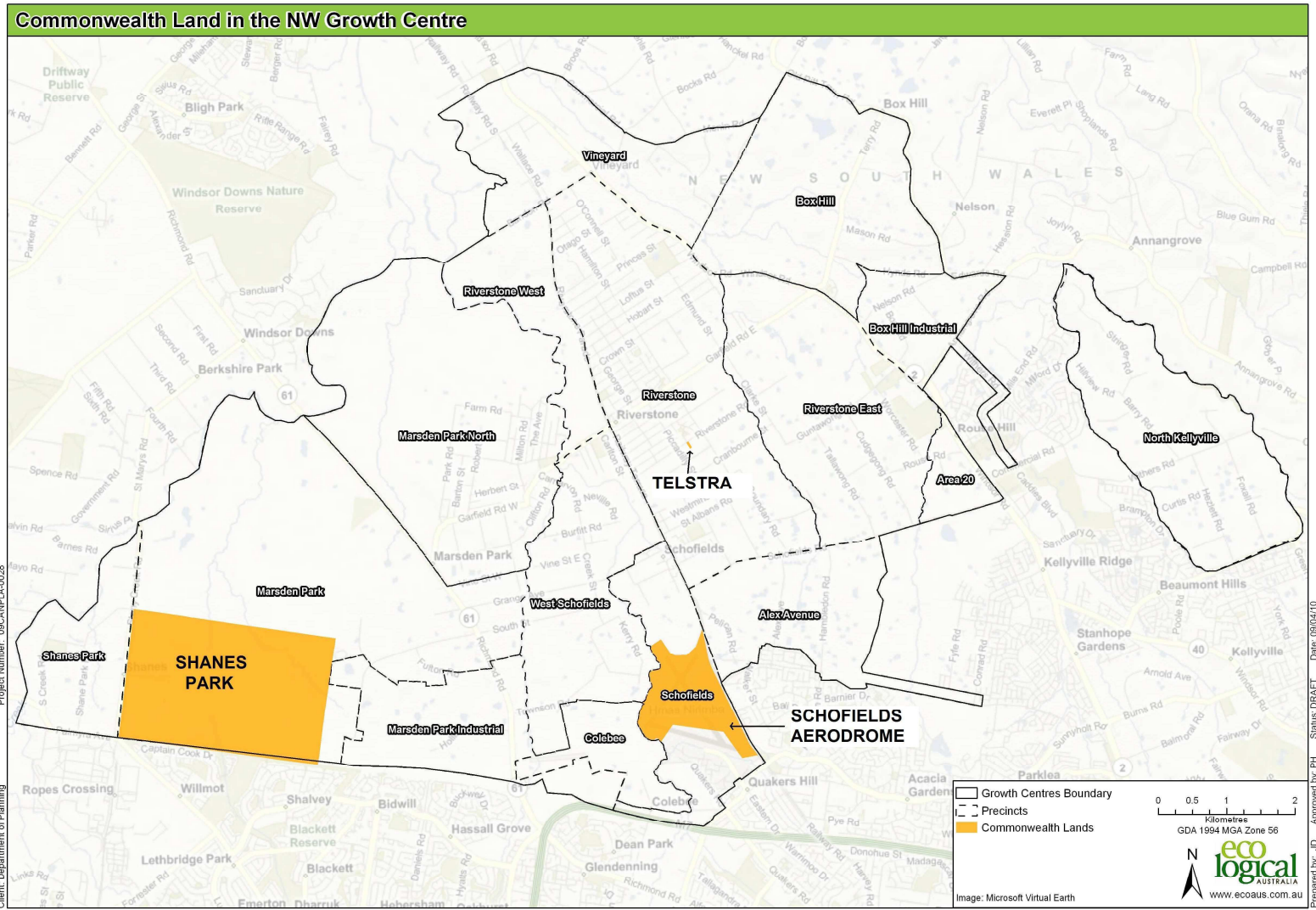
In addition to providing protection to matters of national environmental significance, the EPBC Act also protects: *“the environment, where actions proposed are on, or will affect Commonwealth land and the environment”*.

‘Environment’ is defined in the EPBC Act as:

- a) ecosystems and their constituent parts including people and communities (‘ecosystem’ is defined in the EPBC Act as ‘a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functioning unit’);
- b) natural and physical resources;
- c) qualities and characteristics of locations, places and areas;
- d) heritage values of places (‘heritage value’ is defined in the EPBC Act as including ‘the place’s natural and cultural environment having aesthetic, historic, scientific or social significance, or other significance, for current and future generations of Australians.’ ‘Indigenous heritage value’ is defined as meaning ‘a heritage value of the place that is of significance to Indigenous persons in accordance with their practices, observances, customs, traditions, beliefs or history’); and
- e) the social, economic and cultural aspects of a thing mentioned in paragraphs a, b or c.

There are a number of areas of Commonwealth land within both the North West and South West Growth Centres (see Figure 20 and Figure 21).

Based on the broad analysis of the environmental values of these areas and information about the future uses of the sites, it is considered unlikely that the Program will significantly impact on an area of Commonwealth land.



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Figure 20: Commonwealth land within the North West Growth Centre

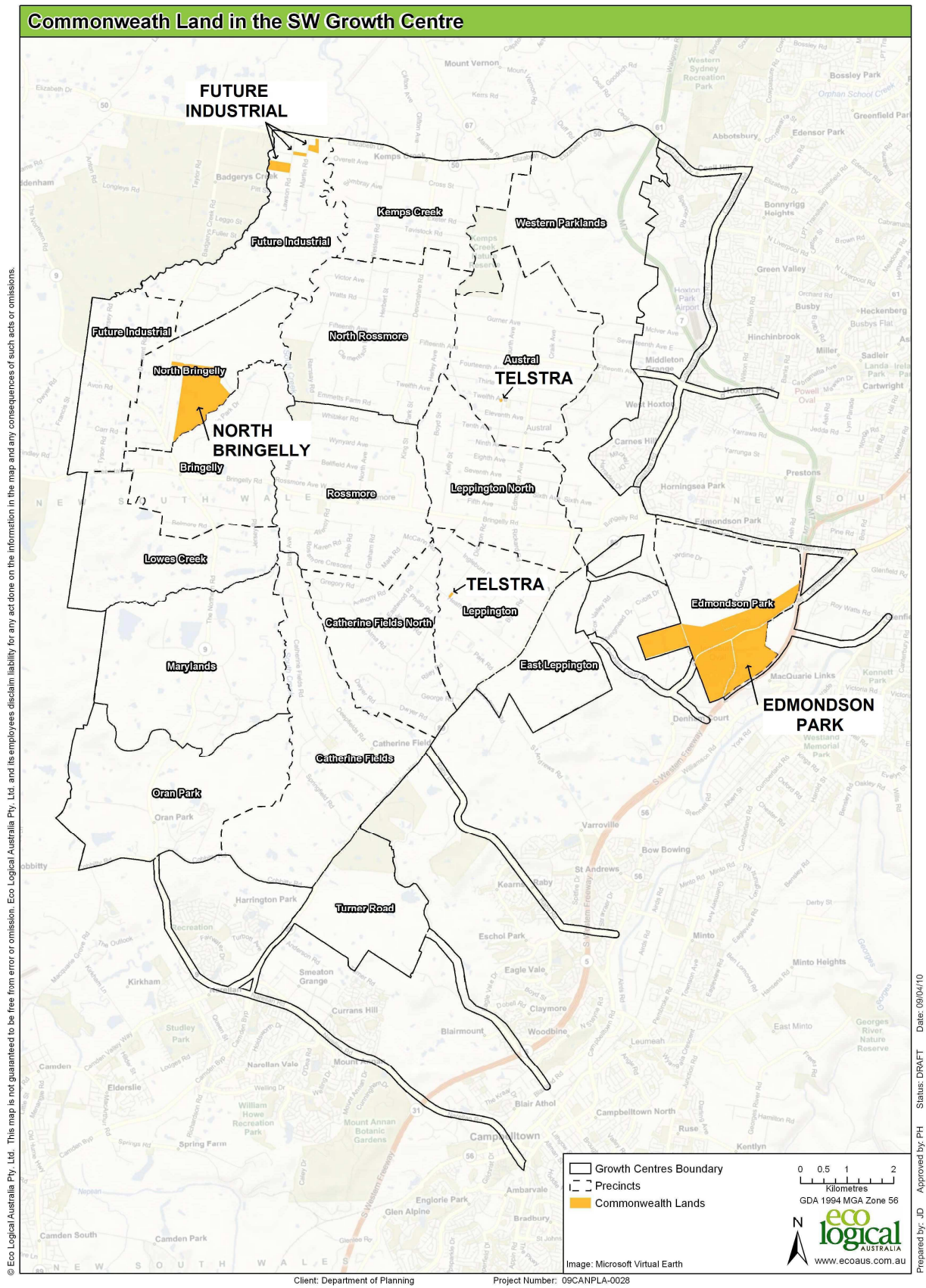


Figure 21: Commonwealth land within the South West Growth Centre

NORTH WEST GROWTH CENTRE

There are three areas of Commonwealth land within the North West Growth Centre (Figure 20). These include:

Reference Name	Owner	Lot #
Shanes Park	Air Services Australia	Lot 1 DP 447543
Schofields Aerodrome	Defence	Lot 4 DP 853847
Telstra Site (Riverstone Precinct)	Telstra	Lot 1 DP 548472

Shanes Park

The Air Services Australia site at Shanes Park is recognised as having significant ecological values. Much of the site remains vegetated and supports significant stands of Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest as well as important populations of a number of threatened species.

As discussed in section 3.3, the site is listed on the Register of the National Estate for its heritage and natural values.

The Growth Centres SEPP zones Shanes Park as an environmental conservation area. Negative impacts to this area are considered unlikely.

Schofields Aerodrome

Schofields Precinct has been released for planning and is currently subject to the precinct planning process. It is understood that the Schofields Aerodrome is surplus to the requirements of the Commonwealth Department of Defence and will be sold. An aerial photo of the site is presented below in Figure 22.

Based on a review of the available information, the site contains limited ecological values. The two relevant features are a riparian corridor along the western boundary of the site, and 1.6 ha of EPBC Act listed Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest on the eastern boundary. The riparian corridor is part of the flood prone lands and vegetation will be protected in accordance with the development controls in the Growth Centres SEPP.

The site is not listed as a heritage place on either the Commonwealth Heritage List or the Register of the National Estate.

Negative impacts on the site are not expected as a result of the Program.

Telstra Site (Riverstone Precinct)

The Telstra site within the Riverstone Precinct is a small parcel of land supporting telecommunications infrastructure. An aerial photo of the site is presented below in Figure 23.

Based on the size and nature of the site and its current use, impacts from the Program are considered unlikely.

Lot 4 DP 853847 Schofields Aerodrome



Approx Scale 1:17366 

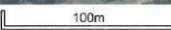
Source - NSW Department of Lands SIX Viewer © six.nsw.gov.au

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Figure 22: Aerial photo of the Schofields Aerodrome

Lot 1 DP 548472 - Telstra, Riverstone Precinct



Approx Scale 1:1839 

Source - NSW Department of Lands SIX Viewer © six.nsw.gov.au

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Figure 23: Aerial photo of the Telstra site in the Riverstone Precinct

SOUTH WEST GROWTH CENTRE

There are five areas of Commonwealth land within the South West Growth Centre. These are shown in Figure 21 and include:

Reference Name	Owner	Lot #
North Bringelly	Defence	Lot 1 DP 90328
Edmondson Park	Defence	Lot A DP 188121 Lot 2 DP 531152 Lot 1 DP 831152 Lot 3 DP 831152 Lot 1 DP 801456 Lot 1 DP 831150 Lot 2 DP 831150 Lot 3 DP 246213 Lot 1 DP 831149 Lot 1 DP 831148
Telstra Site (Leppington Precinct)	Telstra	Lot 1 DP 554127
Telstra Site (Austral Precinct)	Telstra	Lot 31 DP 878676
Future Industrial Precinct	Unknown	Lot 3 DP 611519 Lot 9 DP 226448 Lot 11 DP 226448 Lot 7 DP 3050 Lot 8 DP 3050

North Bringelly

The Department of Defence own a former Receiving Station within the North Bringelly Precinct (approximately 115 ha in size). It is understood that the Commonwealth Department of Defence are considering the disposal of the site within the next few years. However, an assessment of the site has not commenced.

Given there has not been a detailed assessment of the site to determine its ecological and heritage values, a broad desk-top analysis of the area has been undertaken. Figure 24 shows an aerial photo of the area.

Based on a review of the available information, the site contains limited ecological values. The two relevant features are a riparian corridor along the south eastern boundary of the site, and 4.1 ha of EPBC Act listed Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest on the western side of the site. The riparian corridor is part of the flood prone lands and vegetation will be protected in accordance with the development controls in the Growth Centres SEPP.

The site is not listed as a heritage place on either the Commonwealth Heritage List or the Register of the National Estate. Negative impacts on the site are not expected as a result of the Program.

Lot 1 DP 90328 - North Bringelly Precinct**Figure 24:** Aerial photo of Commonwealth land within the North Bringelly Precinct***Edmondson Park***

There is a large area of Department of Defence land within the Edmondson Park Precinct. This area has a range of well recognised ecological and heritage values. Planning within the Edmondson Park Precinct has been ongoing for a number of years and includes a proposal for Defence to sell the land to the NSW Government.

The sale of the Commonwealth land has been approved under the EPBC Act, and the overall planning outcome for the precinct (which includes the protection of ecological and heritage values) has already been approved under the EPBC Act through a conservation agreement. The agreement is available on the website of the Commonwealth Department of the Environment, Water, Heritage and the Arts at <http://www.environment.gov.au/epbc/about/pubs/ca-edmondson-park-precinct.pdf>.

Given that the sale of Edmondson Park is already approved under the EPBC Act, this report will not provide further analysis in relation to this area.

Telstra Site (Leppington Precinct)

The Telstra site within the Leppington Precinct is a small parcel of land supporting telecommunications infrastructure. An aerial photo of the site is presented below in Figure 25.

Based on the size and nature of the site and its current use, impacts from the Program are considered unlikely.

Telstra Site (Austral Precinct)

The Telstra site within the Austral Precinct is a small parcel of land supporting telecommunications infrastructure. An aerial photo of the site is presented below in Figure 26.

Based on the size and nature of the site and its current use, impacts from the Program are considered unlikely.

Future Industrial Precinct

There are five lots of Commonwealth land within the north west corner of the South West Growth Centre. These occur within one of the Future Industrial Precincts and are shown below on Figure 27 and Figure 28.

These areas are predominately under existing rural use, and based on the size and nature of the site and its current use, impacts from the Program are considered unlikely.



Figure 25: Aerial photo of the Telstra site in the Leppington Precinct

Lot 31 DP 878676 - Telsta, Austral Precinct



Approx Scale 1:1770 

Source - NSW Department of Lands SIX Viewer © six.nsw.gov.au

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Figure 26: Aerial photo of the Telstra site in the Austral Precinct

Lot 3 DP 611519 and Lots 9 and 11 226448 - Future Industrial Precinct



Approx Scale 1:3368 

Source - NSW Department of Lands SIX Viewer © six.nsw.gov.au

○ Sydney - Newcastle Aerial photos (High Resolution) - Ausimage © SKM 2008

Figure 27: Aerial photo of Commonwealth land within the Future Industrial Precinct

Lot 7 and 8 DP 3050 - Future Industrial Precinct



Approx Scale 1:3852 

Source - NSW Department of Lands SIX Viewer © six.nsw.gov.au

○ Sydney - Newcastle Aerial photos (High Resolution) - Ausimage © SKM 2008

Figure 28: Aerial photo of Commonwealth land within the Future Industrial Precinct