GROWTH CENTRES
COMMISSION

Growth Centres
CONSERVATION PLAN

EXHIBITION DRAFT

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EXECUTIVE SUMMARY

This Conservation Plan identifies the existing biodiversity values within the Growth Centres and proposes a suite of mechanisms to achieve positive conservation outcomes for Western Sydney, and more broadly, the Sydney Basin, within the context of streamlining the development assessment process and providing for the future urban growth of Sydney.

The objectives of the Conservation Plan are to:

- Outline planning and offsetting proposals for the Growth Centres,
- Assess whether they will Improve or Maintain regional biodiversity values; and
- Confirm the outcomes of the assessments under Section 126G of the *Threatened Species Conservation Act 1995* so that biodiversity certification may be granted to the Growth Centres State Environmental Planning Policy (SEPP) by the Minister for the Environment

Granting of biodiversity certification of the SEPP means that the Minister for the Environment is satisfied that the implementation of mechanisms identified within this Plan will result in the overall Improvement or Maintenance of biodiversity values. This will remove the need to undertake detailed species impact assessments at the development application stage for areas covered by the SEPP.

Improve or Maintain

Improve or Maintain assessments on biodiversity values have been carried out within the Growth Centres to identify potential impacts of development and benefits from protection mechanisms to be implemented. Methods used to carry out the assessments were developed in consultation with DEC and are based on current, best available, science and data.

Specific assessments were carried out on Endangered Ecological Communities, as well as threatened flora and fauna species likely to be affected. These assessments were carried out across all of the Growth Centres lands. They resulted in a series of actions and recommendations for implementation under the Conservation Plan.

Biodiversity Values

The high quality native vegetation within the Growth Centres includes Endangered Ecological Communities, and habitat for a number of threatened flora and fauna species that may be affected through development within the area. The major impact of the delivery of the Growth Centres on these values, over a 30 year staged land release, will be the loss of 1,867ha of high quality native vegetation across a total development area of 20,350ha.

Protection Mechanisms

A range of mechanisms offer potential for the protection of biodiversity values within the Growth Centres. These mechanisms would protect 1,999ha of significant high quality native vegetation in the Growth Centres. The proposed mechanisms are:

- *Protection through Existing Reservation, Zoning or Planning processes* – protection of native vegetation on lands that have been dedicated for

reservation, or are in public ownership or are managed by government agencies for conservation and recreation objectives;

- *Protection through SEPP Zoning* – rezoning of lands for environment conservation and recreation as part of the SEPP, securing these lands into public ownership; and
- *Development Control through SEPP* – designating flood-prone lands and transitional lands, with existing native vegetation retained and protected through the precinct planning process.

In addition to protection mechanisms within the Growth Centres, a program has been identified to further offset the losses of biodiversity values in the Growth Centres. This program includes a mixture of conventional government purchase and reservation of lands for conservation, and perpetual conservation of private land using Biobanking Agreements.

Proposed offset areas outside the Growth Centres must comply with a set of recognised principles agreed with DEC, to ensure mitigation of any loss in biodiversity value. Securing and protecting a minimum of 2,300ha of high quality native vegetation outside the Growth Centres has been suggested as one such offset scenario. It is proposed that when added to areas protected within the Growth Centres, this would be sufficient to offset any anticipated losses.

To assure the successful implementation of the program, a review of the program's compliance with biodiversity certification should be undertaken every four years.

Resources to fund the conservation offset program will be part of Special Infrastructure Contributions (SIC) to be collected as precinct roll-out occurs.

Actions and Recommendations

Key actions for the Improvement or Maintenance of biodiversity values in the Growth Centres are:

1. Protection of 967ha of land containing 643ha of high quality native vegetation through Environment Conservation and Recreation Zones identified by the SEPP;
2. Protection of a further 880ha of native vegetation through development controls identified by the SEPP and associated Development Code; and
3. Implementation of conservation offsets program to secure the protection of at least 2,300ha of priority, high quality vegetation in Western Sydney and the Sydney Basin.

These are combined with 476ha of high quality vegetation which is currently protected within the Growth Centres through existing reservation, zoning or planning processes.

Further supporting actions and recommendations are required to Improve or Maintain biodiversity values. These include:

- further investigation and assessment for the presence of significant high quality native vegetation in the area adjoining the Air Services site at Shanes Park in the north west Growth Centre;

- management and protection of specific threatened flora species through the protection of an area in proximity to Heath Rd reserve near Cattai creek;
- management and protection of specific threatened flora species (*Pimelia spicata* and *Acacia pubescens)* through precinct planning at specific sites identified in the plan;
- management and protection of a specific threatened flora species (*Cynanchum elegans*) through the conservation offsets program outside the Growth Centres; and
- investigation of a threatened population of Green and Golden Bell frog to provide for its management and protection within the Growth Centres.

Conclusions

Biodiversity certification is being sought for those lands considered developable within the Growth Centres. A conditional certification is being sought for flood-prone and transitional lands.

On the basis of the assessment undertaken in this report and the package of conservation actions proposed, it is recommended that the Minister for the Environment grant biodiversity certification to the Growth Centres SEPP in accordance with s.126G of the *Threatened Species Conservation Act 1995*.

1. INTRODUCTION / OVERVIEW

The primary objectives of the Conservation Plan for the Western Sydney Growth Centres are to:

- outline the planning and offsetting proposals for the Growth Centres;
- assess whether they will Improve or Maintain biodiversity values; and
- confirm the outcomes of the assessments under Section 126G of the *Threatened Species Conservation Act 1995* so that biodiversity certification may be granted to the Growth Centres State Environmental Planning Policy (SEPP) by the Minister for the Environment.

Achievement of these objectives, and the granting of certification, will support:

- planned and integrated urban development opportunities in the Growth Centres;
- streamlining of the development approval processes;
- providing certainty of development and conservation outcomes; and
- delivery of strategic outcomes for biodiversity and development in Western Sydney and its ecosystems.

The preparation of the Conservation Plan has followed the Working Draft Guidelines for Biodiversity Certification being prepared by the Department of Environment and Conservation (DEC). Although these Guidelines are still in development, current "work in progress" versions have been made available by the DEC to assist in preparation of this Conservation Plan.

2. STUDY AREA / PROJECT AREA

This Conservation Plan identifies and assesses the biodiversity values of lands within the NW and SW Growth Centres (Figure 1), and the likely impacts on these associated with urban development in the Growth Centres. It also identifies conservation actions and outcomes proposed to be undertaken both within the Growth Centres and elsewhere on the Cumberland Plain or more broadly the Sydney Basin to achieve an improve or maintain outcome for biodiversity.

2.1 North West and South West Growth Centres

In December 2004, as part of the Sydney Metropolitan Strategy, the Government released a plan outlining the future of land releases in the North West and South West of Sydney. It will see the development of an estimated $7.5 billion of infrastructure, including roads, rail, bus networks, educational and health services, linked to the staged release of land for new homes over the next 30 years (NSW Government 2006).

The development of the plan was assisted by an "enquiry by design" process, which involved key stakeholders to explore the principles of best practice and sustainable urban design in the development of early structure planning in Western Sydney as a response to increasing development pressures.

Planning priorities for the Growth Centres and supporting information were publicly exhibited in late 2005 and early 2006. The SEPP was gazetted on 28 July 2006, following consideration of public submissions.

2.2 State Environmental Planning Policy (Sydney Region Growth Centres) 2006 (SEPP)

The SEPP is the legal document that establishes the planning rules and objectives for the Growth Centres. Approval authorities, such as local councils, must apply this policy when they make planning decisions about land within the Growth Centres. Each applicable land area is defined on a series of maps associated with the SEPP. Maps for the Sydney Region Growth Centres include:

- Development Control Map;
- Zoning Map; and
- Precinct Boundaries Map.

The SEPP:

- Zones the following categories of lands:
    - Environment conservation
    - Public recreation – Regional
    - Public recreation - Local
- Identifies other areas of land with particular attributes and values, including:
    - Flood prone land and major creeks
    - Transitional lands
    - Cultural heritage landscape areas
- Includes development controls to protect the values of the above areas

As part of the Growth Centres, precincts have been defined for staged land release over the next 25 years. Each precinct will be the subject of more detailed planning, initially through the preparation of an Indicative Layout Plan which will then form the basis for a Precinct Plan. Each Precinct Plan will include zoning and development controls, a DCP and a s.94 contributions plan.

A Development Code has been drafted which identifies a number of approaches to the retention of existing biodiversity values within the precincts at a neighbourhood level, including:

- open space planning – the location and design of parks to best retain existing vegetation to protect biodiversity;
- water sensitive urban design – integration of existing vegetation and natural drainage lines within subdivision and road design;
- road design – tree retention through sensitive design;
- retention of existing vegetation in areas where lower density is appropriate; and
- retention of existing stands of vegetation where possible, to be associated with passive recreation.

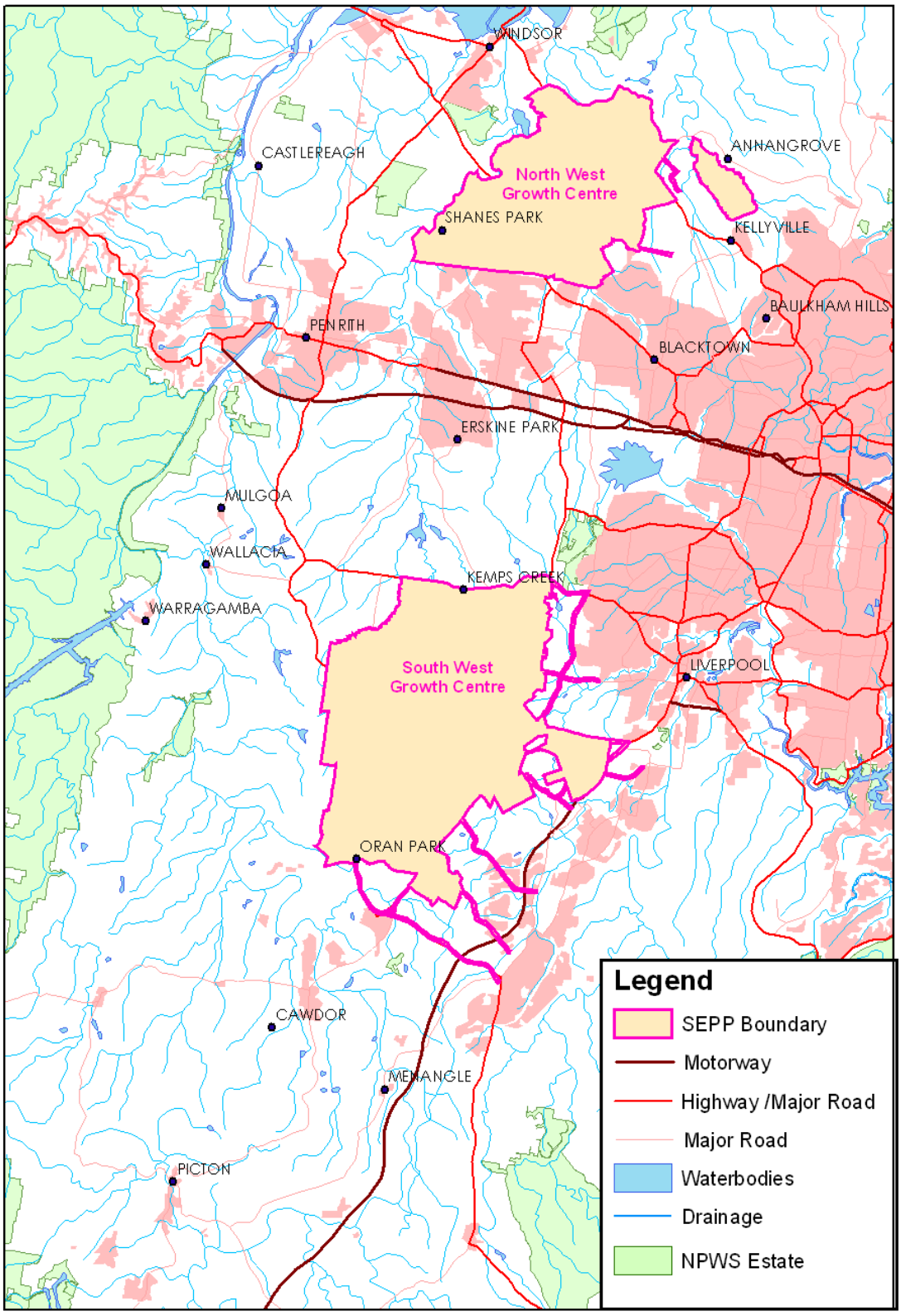
These matters are all to be addressed in the Indicative Layout Plan.

2.3 Existing Protected Lands

A number of other areas within the Growth Centres have already been protected through other means, including:

- Conservation zones at Edmondson Park;
- The Western Sydney Parklands (SREP31);
- Existing reserves managed by DEC and Councils; and
- Lands identified as compensatory habitat offsets for impacts of the M7 / Western Sydney Orbital.

Figure 1 – Study Area



3. BIODIVERSITY CERTIFICATION

The Conservation Plan provides the basis for the Minister for the Environment to consider whether to grant 'biodiversity certification' of the Growth Centres SEPP in accordance with the NSW *Threatened Species Conservation Act, (1995)* (TSC Act).

3.1 What does biodiversity certification mean?

'Biodiversity certification' is an approval granted by the Environment Minister for an environmental planning instrument (EPI), such as the Growth Centres SEPP. Certification remains in force for a period determined by the Minister. If no period is specified then it will remain in force for ten years unless suspended or revoked.

The primary effect of granting certification is that it removes the need to undertake threatened species assessments or prepare species impacts statements at the development application stage. Hence, if certification is granted to land covered by the Growth Centres SEPP, or parts of it, this will mean that developments within those areas do not need to further assess the impacts on threatened species.

The Minister may grant certification if he or she is satisfied that the implementation of the plan (and associated measures) will result in overall improvement or maintenance of biodiversity values.

3.2 What are the benefits of biodiversity certification?

There are a number of practical benefits to certification. These include:

- allowing up front strategic assessment of conservation values;
- enable decision makers to assess the cumulative effects of decisions;
- reduce the potential for land use conflict;
- create greater certainty of planning outcomes;
- remove the need to conduct site by site threatened species assessments; and
- save time and cost in planning decisions.

3.3 Improve or Maintain

Before determining whether to grant biodiversity certification, the Minister for the Environment must be satisfied that the environmental planning instrument, and any associated measures, will lead to an **overall improvement or maintenance** of biodiversity values. The Minister must also consider a range of other factors listed in the TSC Act prior to granting certification (see Appendix 1).

The approach used to assess whether an Improve or Maintain outcome will be delivered by the Growth Centres SEPP and planning package is detailed in Appendix 2 of this Plan. In summary, the approach involves assessment and identification of the following components:

1. areas of biodiversity value with high management viability – these areas need to be retained to meet the Improve or Maintain test;
2. habitat that supports threatened species populations that cannot withstand or recover from a loss of habitat at a sub-regional level – this also needs to be retained to meet the Improve or Maintain test;

3. areas of biodiversity value that are not within Points 1 and 2 that will be impacted by development; and
4. identification of offsets required to counter-balance the loss of areas identified in Point 3.

In essence, the approach involves identifying areas that must be retained and those that are able to be offset (if suitable offsets can be found).

Application of the "improve or maintain" criterion at the scale of the Growth Centres requires new methodologies. The best available data and science has been used in this analysis. The plan proposes periodic review and adaptation so that future methods, indices and operational experience can be taken into account.

3.4 Where Biodiversity Certification will Apply

Biodiversity certification is being sought for those lands considered developable within the Growth Centres; this includes areas that may be identified for a range of residential, employment and related purposes through precinct planning. This does not include:

- lands identified in the SEPP as environment conservation or public recreation zonings;
- lands identified as offsets to the Western Sydney Orbital (Colebee, Kemps Creek and Rouse Hill);
- lands zoned for regional park or environmentally significant land overlay at Edmondson Park; or
- lands within the Western Sydney Parklands.

Any development proposals that relate to these lands will need to comply with the relevant provisions of the Growth Centres SEPP, and any other applicable Environmental Planning Instruments (EPIs), together with the standard threatened species assessment requirements of s.5A of the EP&A Act. In other words, threatened species assessment requirements will not be "switched-off" in these areas.

3.4.1 Conditional Biodiversity Certification

There will be requirements within the flood-prone and transitional zones for the development of major infrastructure which may affect local biodiversity values as the Indicative Layout Plan (ILP) is developed within a precinct. This infrastructure may include transport and sewer corridors.

Conditional biodiversity certification is being sought for flood-prone lands and transitional lands. This means that at the precinct planning stage, as part of the development of ILP, further analysis will be required within the flood-prone and transitional zones of the precinct.

A positive Improve or Maintain result based on existing biodiversity within the flood-prone or transitional lands within the precinct is required in order to meet the conditions of certification. In practice, this means that any unavoidable impacts from infrastructure projects that affect identified vegetation within the flood-prone and transitional lands will need to be offset by positive actions elsewhere within the precinct (eg. the protection of other vegetation).

3.5 Identifying biodiversity values

For the purpose of the Conservation Plan, the identification and assessment of biodiversity values within the Growth Centres is based on the extent of endangered vegetation existing over the area as well as the reported occurrence and known distributions of threatened flora and fauna species. Using these surrogates for biodiversity value is an accepted, proven and commonly used practice in conservation assessment given that it is not possible to define an absolute or precise measure of biodiversity values. It is also neither feasible nor necessary to have complete knowledge of all biodiversity components prior to making planning decisions.

The use of endangered vegetation as a key surrogate in the Growth Centres is particularly justified, given that virtually all native vegetation remaining within the Growth Centres is listed as endangered.

4. CONSERVATION VALUES

4.1 Endangered Ecological Communities

The North West and South West Growth Centres currently support 7 Endangered Ecological Communities (EECs) covering a total area of 3,868 hectares (ha) or approximately 20% of the known distribution of these EECs within Western Sydney. A breakdown of the communities and their overall reservation status can be seen in Table 1 and is mapped in Figures 2 and 3.

Table 1 - Growth Centres Endangered Ecological Communities**

Endangered Ecological Community**	Area (Ha)	Reservation Status*
Castlereagh Swamp Woodland	36	17.7%
Cooks River Castlereagh Ironbark Forest	173	20.3%
Cumberland Plain Woodland	2001	3.7%
Moist Shale Woodland	1	1%
Shale Sandstone Transition Forest	108	1.7%
Shale/Gravel Transition Forest	623	7.8%
River-flat Eucalypt Forest on Coastal Floodplains	926	1.6%
Total	**3868**	

* % of the remaining area of each ecological community currently protected in reserves in Western Sydney

** Native vegetation communities in good condition, excludes scattered trees where canopy is less than 10%

It is important to note that this habitat across the Growth Centres is highly fragmented in nature. 68% of all habitat remnants are less than 4ha in size but only contribute to 2% of the total area of habitat. The remainder of the remnants range in size from between 4ha and 50ha (20% of remnants covering 14% of the total habitat area), to greater than 50ha (12% of remnants occupying 84% of the habitat).

This level of fragmentation mirrors that which occurs across Western Sydney. In this broader region, there are about 2,500 patches of vegetation remaining. 1,495 of these are less than 4 ha in size, and while they comprise 61% of the total number of remnants they make up only 10% of the total area of remaining vegetation on the Cumberland Plain. Conversely, 81 individual remnants (4% of all remnants) comprise 50% of the remaining vegetation area.

The large number of smaller, dispersed remnants poses significant challenges for long-term conservation. Such remnants are impacted by numerous threats including recreation pressures, inappropriate fire regimes, dumping, vandalism, weed invasion and domination by fauna species with generalist habitat requirements (eg, noisy and aggressive species such as the Noisy Miner and Butcherbird).

Positive long term conservation outcomes will therefore depend on securing the larger areas of vegetation, especially where they are favourably located adjoining compatible land uses.

4.2 Threatened flora species

18 threatened plant species, listed in table 2 below, are likely to be present and are potentially affected by the Growth Centres.

Table 2 – Threatened flora potentially affected by the Growth Centres

Acacia bynoeana	*Acacia pubescens*
Cynanchum elegans	*Darwinia biflora*
Hibbertia superans	*Leucopogon fletcheri*
Allocasuarina glaericola	*Dillwynia tenuifolia*
Epacris purpurascens var purpurascens	*Eucalytpus sp 'Cattai'*
Grevillea juniperina ssp juniperina	*Grevillea parviflora ssp parviflora*
Marsdenia viridiflora ssp viridiflora	*Micromyrtus minutiflora*
Persoonia hirsute	*Persoonia nutans*
Pimelea spicata	*Pultenaea parviflora*

A profile of each species, including descriptions, photographs, distributions, ecology and threats is available from the Department of Environment and Conservation, threatened species web site; at the following internet address:
http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/index.aspx

4.3 Threatened fauna species

22 threatened fauna species, listed in table 3 below, are likely to be present and are potentially affected by the Growth Centres.

Table 3 - Threatened fauna potentially affected by the Growth Centres

Australasian Bittern	Black-chinned Honeyeater (eastern subspecies)
Blue-billed Duck	Brown Treecreeper
Cumberland Plain Land Snail	Eastern Bentwing-bat
Eastern False Pipistrelle	Eastern Freetail-bat
Gang-gang Cockatoo	Glossy-Black Cockatoo
Greater Broad-nosed Bat	Green and Golden Bell Frog
Grey-headed Flying-fox	Koala
Large-eared Pied Bat	Large-footed Myotis
Masked Owl	Powerful Owl
Speckled Warbler	Square-tailed Kite
Swift Parrot	Yellow-bellied Sheathtail-bat

A profile of each species, including descriptions, photographs, distributions, ecology and threats is available from the Department of Environment and Conservation, threatened species web site; at the following internet address:
http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/index.aspx

Recent work on habitat fragmentation suggests that smaller remnants only provide habitat for generalist fauna species, with additional opportunities for species diversity increasing as remnant size increases (for example, see Drinan 2005). This work also suggests that concentrations of forest dependent threatened species tend to be found in larger, well connected remnants. As noted above, the remaining habitat in the Growth Centres (and Western Sydney more broadly) is highly fragmented with many small patches and a lesser number of large remnants.

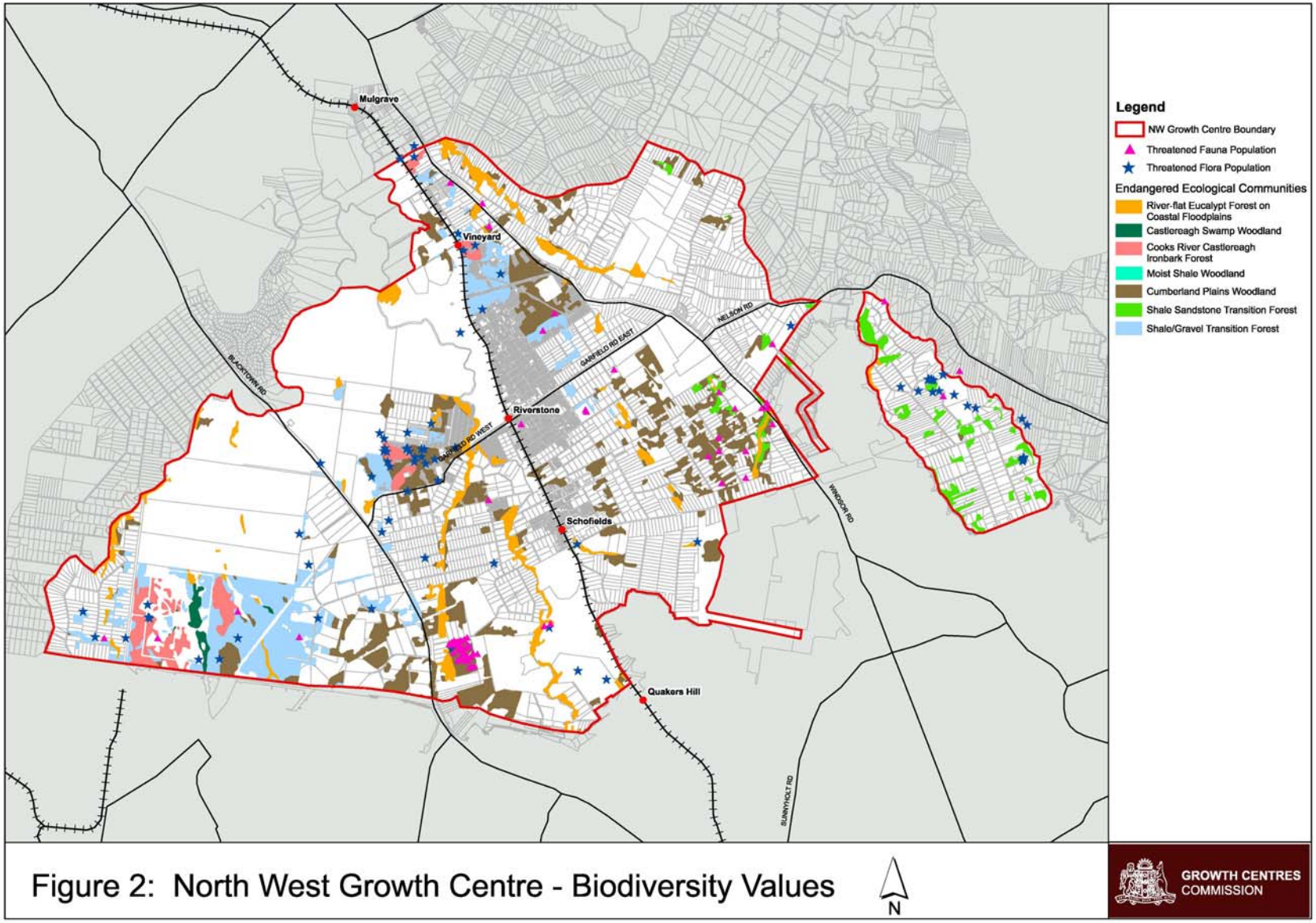


Figure 2: North West Growth Centre - Biodiversity Values

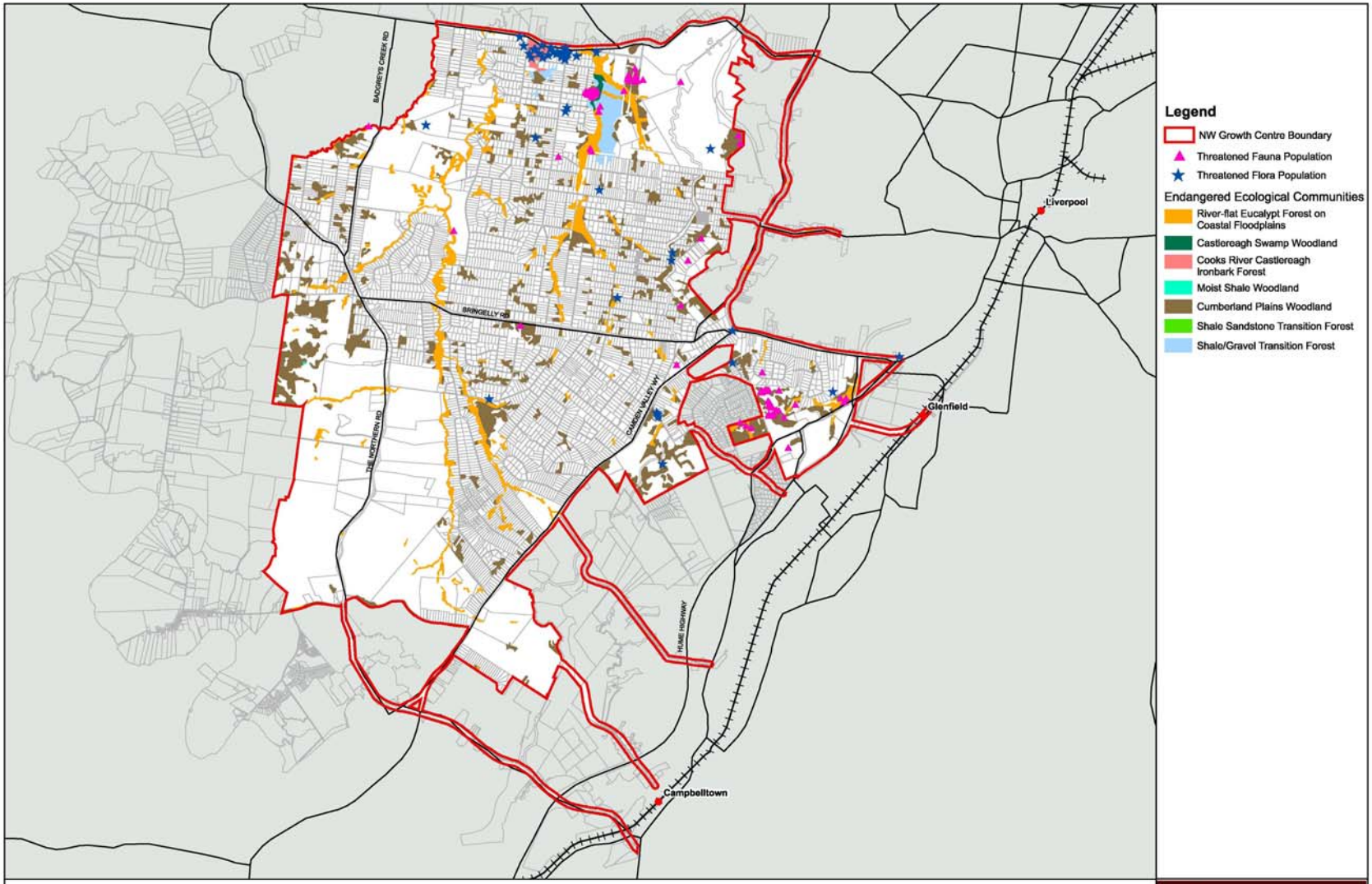


Figure 3: South West Growth Centre - Biodiversity Values

5. GROWTH CENTRES - PROTECTED AND DEVELOPABLE LANDS, OFFSET PROGRAM

5.1 Proposed protected and developable lands

There are lands within the Growth Centres that are either currently in public ownership or have been identified for future public ownership. There are also a number of significant areas of high quality vegetation currently in private ownership that are to be protected by being brought into public ownership, either funded through the special infrastructure contribution, Government facilitated land swapping, or by local contributions. The degree of protection ranges within these lands, from the application of development controls, through to reservation for conservation. The extent of protected lands in the Growth Centres can be seen in Figures 4 and 5. Table 4 summarises the protected lands within the Growth Centres and the extent of vegetation.

Table 4 – Protected lands

Protection Mechanism	Category	Location	Area (ha)	Total High Quality Vegetation (ha)*
Protection through SEPP zoning	Environment Conservation	Marsden Park	49	41
		Riverstone South	35	31
		Shanes Park	550	388
	Public recreation – Regional	Shanes Park East	60	44
		Kemps Creek East	42	27
		Kemps Creek West	40	30
		Rileys Creek	96	64
	Public recreation – Local	Riverstone North	24	18
Development Control through SEPP	Flood Prone and Major Creeks		4,048	754
	Transitional Land	North Kellyville	126	21
		Lowes Creek	249	105
Protected through Existing Reservation or Zoning	South Creek Park	Liverpool Council Park zoned 6b at South Creek	80	4
	Kemps Creek Nature Reserve	Kemps Creek	131	121
	Rouse Hill Regional Park	Rouse Hill	63	15
	M7 / Western Sydney Orbital Offsets**	Colebee	52	41
		Kemps Creek	31	17
		Rouse Hill	2	2
	Edmondson Park	8(b) Zoned Lands in Liverpool & Campbelltown LGAs, including "Environmentally significant lands"	151	103
	SREP31	Western Sydney Parklands	1,508	173
	Total		**7,337**	**1,999**

* Native vegetation communities in good condition, excludes scattered trees where canopy is less than 10%

** Lands to be reserved by DEC to offset native vegetation cleared for development of the M7 / Western Sydney Orbital

The breakdown of Endangered Ecological communities within the protected lands can be seen in Table 5.

Table 5 – Protected Endangered Ecological Communities in the Growth Centres

Endangered Ecological Community**	Area (Ha)	% Protected within Growth Centres*
Castlereagh Swamp Woodland	36	100%
Cooks River Castlereagh Ironbark Forest	140	81%
Cumberland Plain Woodland	672	34%
Moist Shale Woodland	1	100%
Shale Sandstone Transition Forest	38	35%
Shale/Gravel Transition Forest	392	63%
River-flat Eucalypt Forest on Coastal Floodplains	720	78%
Total	**1,999**	

* % of the remaining area of each EEC in the Growth Centres

** Native vegetation communities in good condition, excludes scattered trees where canopy is less than 10%

5.1.1 Existing Reservation or Zoning

These areas provide some of the highest protection for native vegetation as they have been dedicated for reservation, are in public ownership and are managed by government agencies for conservation or recreation objectives.

Any development or clearance of native vegetation within these areas is restricted though statutory instruments.

5.1.2 SEPP Zoning

The Growth Centres SEPP includes a land use zoning for Environment Conservation and Recreation. These lands have been rezoned as part of the SEPP and will be secured into public ownership. They will be wholly managed for conservation or recreation purposes.

Any development within these zones is restricted and native vegetation on these lands is to be retained and protected.

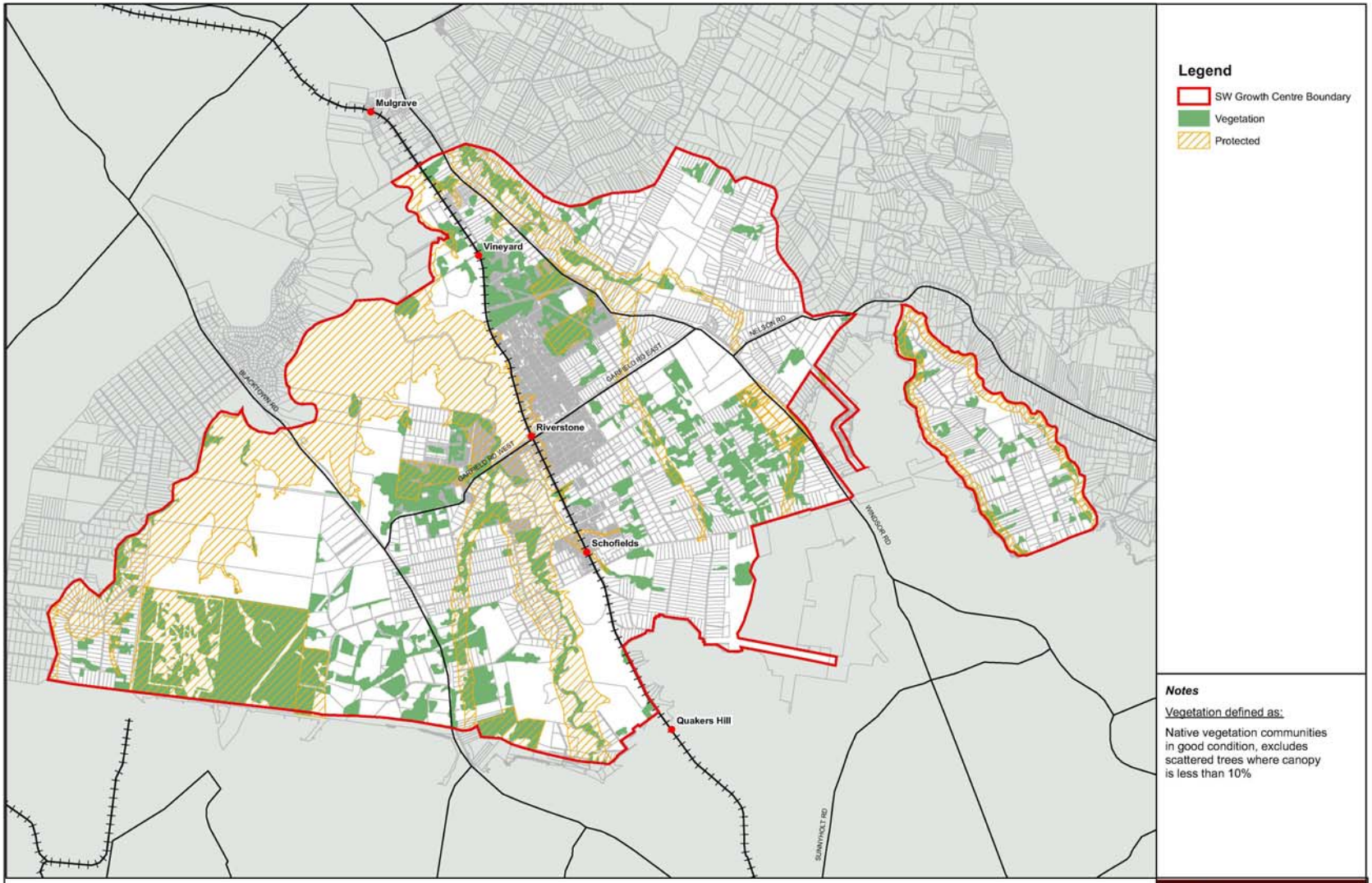


Figure 4: North West Growth Centre - Protected Lands

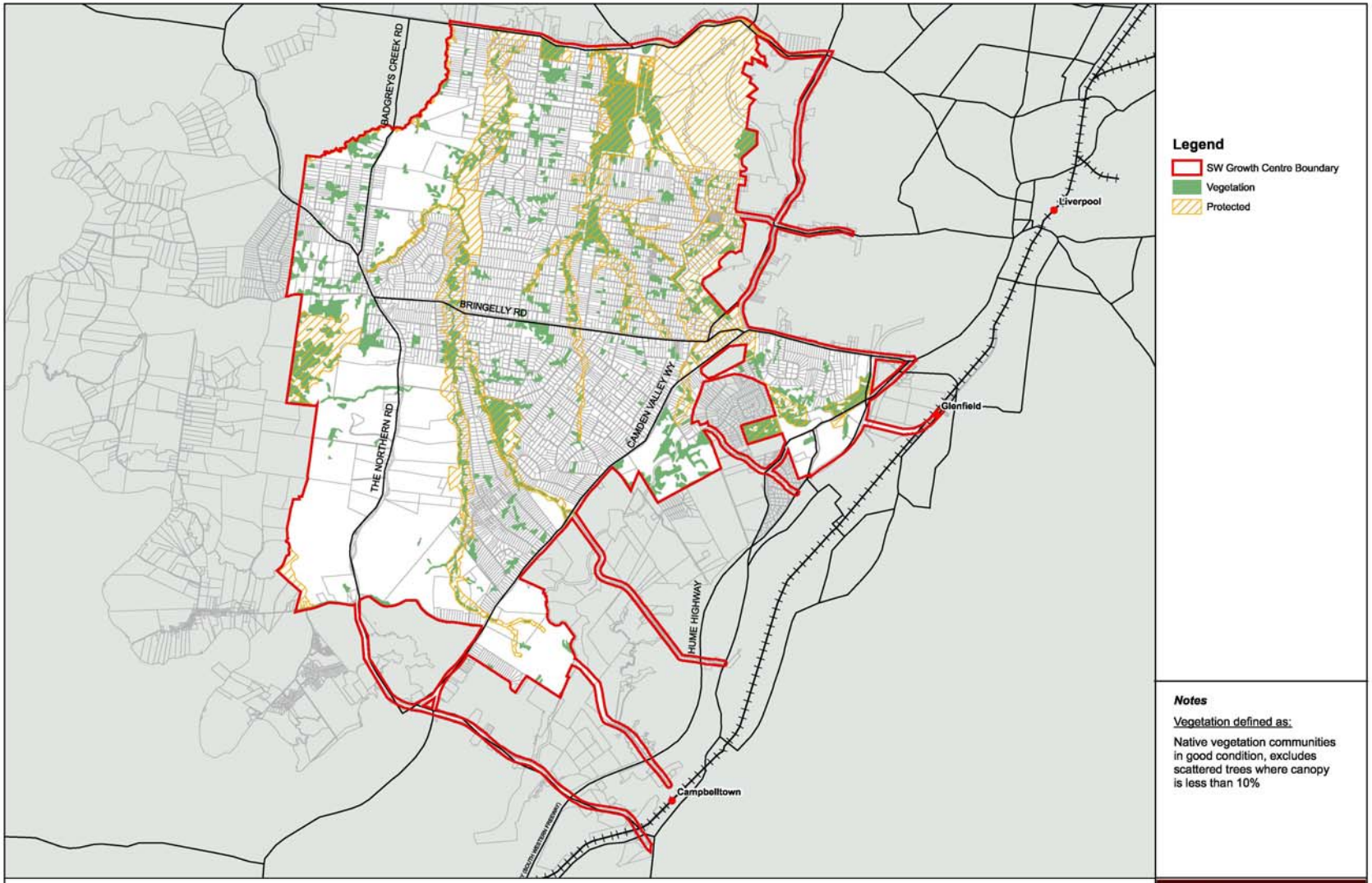


Figure 5: South West Growth Centre - Protected Lands

5.1.3 Flood-Prone Lands

The Growth Centres SEPP includes a "Flood-Prone Lands" overlay. The overlay does not change the zoning of these lands but introduces development controls to retain and protect existing native vegetation within these areas and along important creek and riparian corridors.

The SEPP requires Council approval for the removal of any native vegetation from properties within the flood-prone Lands. Before Council can approve any development in this area, it must be satisfied that the land owner will protect the conservation value of the native vegetation on their property.

In addition, further protection and enhancement of native vegetation within these areas and other creeks and riparian corridors will be addressed during the precinct planning process.

5.1.4 Transitional Lands

The Growth Centres SEPP includes a "Transitional Lands" overlay. These areas are considered to be constrained by environmental factors, including topographical constraints and native vegetation. These areas are not considered suitable for full-scale urban development.

The Transitional Lands overlay does not change the zoning of these lands but introduces development controls to retain and protect existing native vegetation within these areas.

The SEPP requires Council approval for the removal of any native vegetation from properties within the Transitional Lands. Before Council can approve any development in this area, it must be satisfied that the land owner will protect the conservation value of the native vegetation on their property.

In addition, further protection of native vegetation within these areas will be addressed during the precinct planning process, in accordance with the requirements of the Development Code.

5.1.5 Developable lands

The developable areas make up about 20,350ha of the Growth Centres, containing a total of 1,867ha of high quality native vegetation, excluding scattered trees. This area is planned for staged land release over a 30 year period.

The SEPP and the Development Code include objectives and provisions that support the retention of native vegetation through incorporation into land use planning outcomes such as local parks, town centres, schools, and other areas required to be set aside for community uses. Some existing habitat areas of native vegetation may also be incorporated into subdivision patterns and road design without adversely affecting the development yield of areas. These objectives are to prevent widespread land clearing before construction and to create leafy and liveable neighbourhoods.

However, for the purposes of this Plan, it has been assumed that no vegetation in these areas will be retained, as the amount to be retained within development precincts cannot be estimated with any certainty. The Plan therefore assumes a greater level of native vegetation clearance than is likely to occur in practice.

The plan provides for periodic implementation reviews where actual outcomes in developed areas can be assessed and taken into account.

5.2 Conservation Offset Program

Notwithstanding the protective zonings and requirements of the SEPP, and the measures that will be taken in precinct planning and more detailed design, 1,867 ha of high and medium conservation value areas will be impacted by planned development within the Growth Centres staged over a 30 year period. By area, 29% of this will be from patches of less than 4ha.

These losses will be offset by a mixture of voluntary purchase of lands for formal reservation and through the purchase and retirement of Biobanking credits or other permanent private land conservation measures. Biobanking is a new tool made available by recent amendments of the Threatened Species Conservation Act (further explanation is provided below).

Resources for these measures will be generated as part of infrastructure contributions that will be collected as the precinct roll-out occurs. The infrastructure contributions will be collected on an area basis, and are not specifically linked to the amount of biodiversity loss occurring on any particular site.

The purchasing power of future contributions will be maintained by GCC through rate indexation, based on up to date land valuations. The contributions will be used to secure biodiversity offsets as well as some regional open space to a net present value of $530 million (2005/2006 values). 25% will be used to fund purchase of lands identified in the SEPP for acquisitions, and 75% will be used for potentially lower cost offsets outside the Centres. This ratio provides a reasonable balance between the delivery of the SEPP commitments within the Growth Centres and the attainment of an overall positive biodiversity result for the region.

5.2.1 Offset Mechanisms

As stated, offsets will be a mix of conventional government purchase and reservation of lands for conservation, and private land perpetual conservation covenanting using Biobanking Agreements. In the case of reservation, the land would typically be purchased on the open market from willing sellers (or as provided for in the SEPP) and added to the State's network of Parklands, National Parks, Regional Parks, Nature Reserves and Council reserves.

As background, Biobanking Agreements work as follows:

- The landowner enters a binding agreement to forgo future development opportunities, desist from environmentally damaging activities and actively manage their land for conservation. These requirements apply to all or part of their land as agreed.

- The agreement is attached to the property's land title, and binds all current and future landowners to its requirements.
- In exchange, the Minister for the Environment authorises the landowner to generate a specified number of biodiversity credits, which the landowner can sell.
- A specified amount of the sale proceeds are paid into a Trust Fund, and are paid to the landowner each year provided the terms of the agreement have been met.

When used as part of the Growth Centres Offset Program, the Minister for the Environment would buy and then retire BioBanking credits. Retiring the credits means that they cannot be further traded or unwound, locking in the conservation obligations they represent in perpetuity.

As Biobanking is new, it is not yet possible to determine what portion of the offsets will be BioBanking sites. This will be determined over time based on revealed prices, availability, operational experience, conservation management issues and community input.

5.2.2 Locations of Offsets

Offset areas will be selected based on their ecological characteristics and price. Some will be located within the Growth Centres as shown in the SEPP, while others will be located in other areas of Western Sydney and more broadly in the Sydney Basin. The limit of the area available for offsetting will follow the distribution of the ecosystem types and species that will be impacted within the Growth Centres.

Lands to be targeted as offset sites will have the following attributes:

a) large remnants of native vegetation in Western Sydney and the Sydney Basin with the greatest potential for retaining biodiversity values over time;
b) vegetation communities that are under-represented in the protected area network;
c) areas of equivalent or better conservation value to that which are to be cleared within the Growth Centres (consistent with the "like-for-like or better" offset principle);
d) habitat resources for threatened species; and
e) provide the best value for money for biodiversity conservation.

There are likely to be considerable cost and conservation benefits if offsets are located away from existing urban areas or infrastructure. This is because:

- larger areas that support specialised species and which are easier to manage can be secured;
- land prices are lower so more can be secured with available resources; and
- future land-use conflicts will be lesser.

These benefits will be balanced with opportunities to locate offsets adjacent to existing reserves, and to enhance public enjoyment and recreation.

5.2.3 *Ensuring offsets are ultimately sufficient*

The goal of the offset program is to ensure that the total biodiversity losses in the certified Growth Centres areas are fully offset, taking into account the various other protective mechanisms incorporated in the SEPP and the development patterns following completion of precinct planning. The Plan's assessment is that 1,867 hectares of high or medium condition native vegetation will be lost within the Growth Centres and 1,999 hectares of high or medium condition native vegetation will be specifically protected from loss within the Growth Centres by a range of measures (see Table 4 for details).

Methodologies for determining the minimum necessary offset areas and types at the regional scale are currently being developed. In preparing this plan, best available science and data has been used to determine the extent of positive conservation action that will be needed to offset the anticipated extent of losses.

In the analysis, possible offset packages must be considered as scenarios, as market forces and landowner willingness will drive their implementation. In other words, various scenarios can be considered and analysed as possible offset packages. These can be modelled to determine their adequacy; however the final offset package will be based on suitable sites being available for purchase or protection. The approach taken in the analysis has been to identify the most suitable lands, estimate their cost, and compare how much could be secured with anticipated available funds. While broad estimates of freehold acquisition cost have been obtained, costs of acquiring Biobanking sites can only be estimated prior to commencement of the Biobanking Scheme.

One possible offset scenario suggests that securing perpetual conservation of a set of areas totalling 2,300 hectares outside the Growth Centres in Western Sydney in addition to the areas nominated within the Growth Centres in this Plan, would be sufficient to offset any anticipated losses. This is considered affordable with available resources, subject to the availability of Biobank sites at anticipated prices.

5.2.4 *Assessing offsetting progress*

While this Plan presents a set of actions that current analysis suggests will meet the improve or maintain test (and hence merit Biodiversity Certification); it will be essential to provide practical measures to verify satisfactory interim progress, and mechanisms to incorporate anticipated improvements to assessment methodologies and tools. It is therefore proposed that Certification, if granted, should be subject to regular review. The review will be associated with existing processes associated with the gazettal of SEPP amendments and is expected to occur every four years.

The purpose of the review would be to:

- assess the success of securing conservation values in areas protected by the SEPP and associated measures;
- assess the area of biodiversity impact that has occurred or will occur as part of approved development or finalised precinct plans;
- assess the ecological value and areas of offsets that have been secured or that can be secured by funding received and provided through infrastructure contributions;

- assess whether the conditions attached to certification have been met; and
- provide advice to the Minister for the Environment on whether progress is sufficient to warrant continuation of Certification and of any changes or additions to the conditions attached to it.

It will be important to recognise that offsetting progress in early years may not match the rate of impacts. Development will take 30 years and realisation of impacts will not occur on a linear basis. It may be that early precincts might result in above or below 'average' biodiversity impacts compared to the whole. If early precincts are more 'impact intensive', successful offsetting will take time to catch up.

In addition, the timing of purchases inside or outside the Growth Centres will affect progress when measured in ecological terms. If purchases within the Growth Centres occur early in the program, progress will be slower than if they occur in later years. This is because the identified areas within the Growth Centres are more expensive per hectare, hence less funding would be available for the relatively cheaper land outside the Growth Centres.

The following attainment criteria is proposed as a suitable basis for Certification:

- The ecological benefits of offsets secured by the Growth Centres Commission's actions equal or exceed the ecological value of conservation losses that have or will arise in areas where precinct planning has been finalised. This would be assessed using the methodologies approved by the Minister for the Environment for the purpose (these will be based on the Biobanking and other regional assessment methodologies).

Under this approach, the Minister could set a condition of Certification that required the attainment of criteria to be achieved at all times. These criteria will be reassessed within each regular review.

6. OUTCOMES OF IMPROVE OR MAINTAIN ASSESSMENT

Improve or Maintain assessments have been carried out within the Growth Centres to identify the potential impacts and benefits of development on biodiversity values. Three assessments were carried out on:

1. Endangered Ecological Communities;
2. Threatened Flora Species; and
3. Threatened Fauna Species.

The methodology for each of these assessments is detailed at Appendix 2. These were developed in consultation with the DEC and using the Working Draft Guidelines for Biodiversity Certification (DEC, in prep), and are tailored to suit the specific and unique circumstances of Western Sydney.

The outcomes for each assessment, considering impact of development, protected lands and investment options, are detailed in the following sections.

6.1 Endangered Ecological Communities

Figures 6 and 7 show the biodiversity value breakdown of EECs within the Growth Centres which have been identified to be of:

a) Higher Long Term Management Viability (HMV) – areas to be retained and protected; or
b) Lower Long Term Management Viability (LMV) – areas where impacts may be accepted if offset.

To meet the Improve or Maintain test, the Growth Centres and investment package must protect all areas of HMV and provide a suitable offset for vegetation identified as able to be cleared. It should also be noted that while the Improve or Maintain test provides a common basis for analysis, it can and should be supplemented by other relevant considerations. Hence, although the analysis identifies areas of LMV and considers these available for offsetting, there will be cases where the retention of LMV is also a priority.

A clear example of this is the Air Services site at Shanes Park, which is shown as containing large areas of HMV and smaller areas of LMV. On its own, this analysis under-states the conservation value of the site, which is known to contain areas that are either naturally regenerating or are likely to contain mostly native grasses (which are not captured by the current analysis). The value of the Air Services site, therefore, is not confined to the HMV vegetation but relates also to the size of the property, its resilience and regeneration capacity, its current integrity and overall condition, and its proximity to other key areas such as the former ADI site.

When these matters are taken into account, together with the broader context for the Growth Centres, protection of this site in its entirety becomes an essential component of delivering an Improve or Maintain outcome.

6.1.1 Protection of HMV

The results of the management viability assessment show that 584ha of HMV and 3,284ha of LMV is present within the Growth Centres. Of this, 557ha of HMV and 1,443ha of LMV are found within the identified protected lands.

The assessment indicates that there are 27 ha of HMV which exists outside the protected lands. These consist of small areas of vegetation adjoining the environmental conservation zoned land at the Air Services site, Shanes Park. The identification of some of these areas as HMV may simply be the result of digital error. As an example, the vegetation polygons used in the assessment extend beyond the boundaries of the Air Services site, probably due to the canopy doing so, but aerial photos suggest the vegetation is actually within the site.

Nevertheless, consistent with the precautionary principle, it is recommended that the values of these residual areas be further examined and addressed at the precinct plan stage. If they are found to be contiguous with the Air Services site vegetation, of comparable quality, and of suitable shape and boundary configuration, then they should be considered for retention. This can be achieved through the provisions of the precinct plan.

Outcome: 27ha of HMV is to be addressed for protection through the precinct planning process.

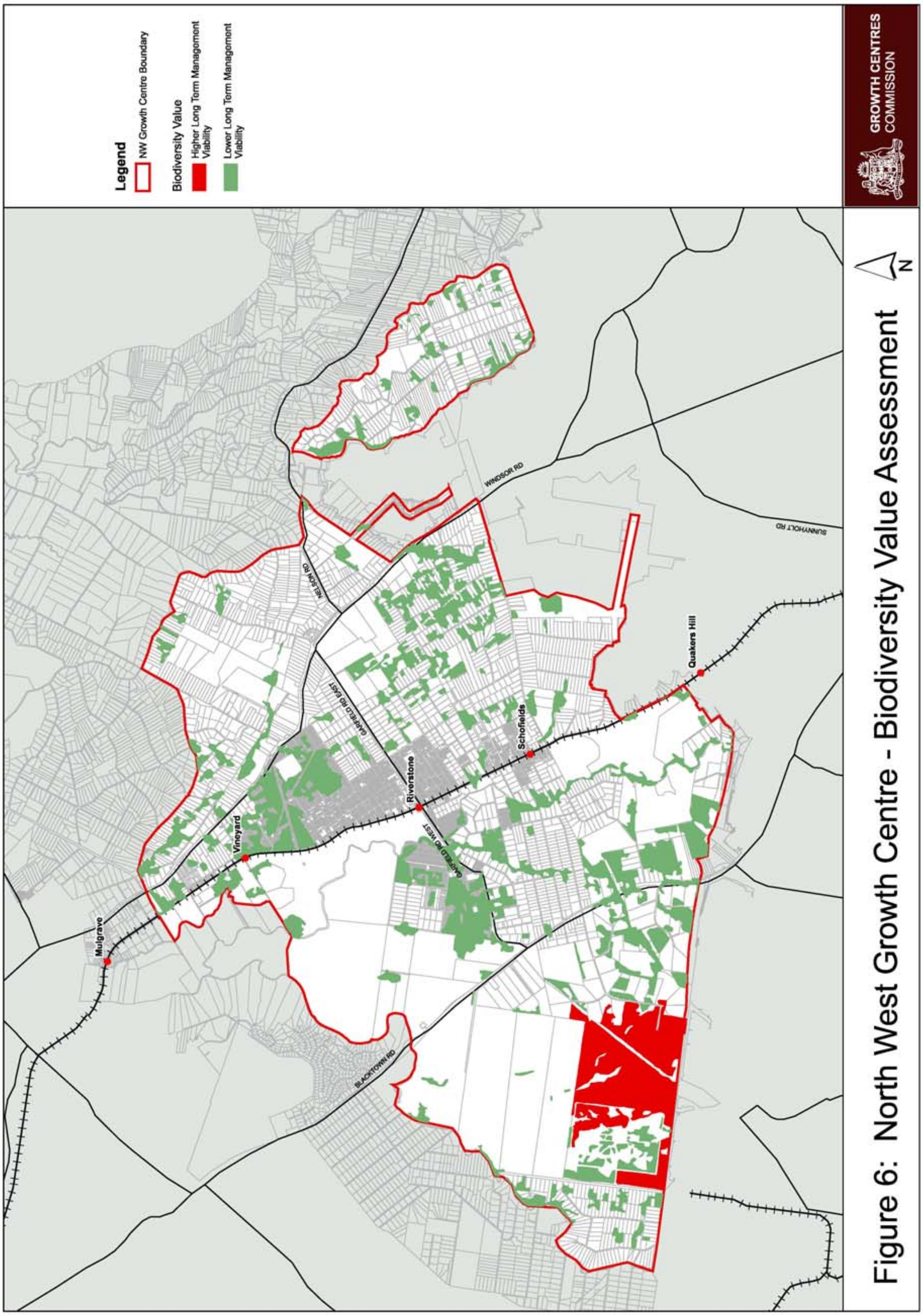


Figure 6: North West Growth Centre - Biodiversity Value Assessment

Figure 7: South West Growth Centre - Biodiversity Value Assessment

6.1.2 Offsets for clearing of vegetation

For areas of LMV habitat that are not protected within the Growth Centres, a suitable offset will be required to mitigate the loss in biodiversity value. In the identification of areas for offset, there are a number of general principles to be considered, which include:

- offsetting should result in a net improvement in regional biodiversity over time;
- offsets should be based on ecological values (lost or gained). This will ensure conserved areas will generally be larger than development areas that they offset;
- the primary objective of an offset activity should be to improve or maintain ecologically viable habitat for locally endemic species, in the same broad region; considering the structure, function and compositional elements of biodiversity, including threatened species;
- the conservation status of ecological communities providing offset must be similar or better than the community to be impacted; that is "like for like" or better ("better" meaning of a type which is more threatened and/or less secured);
- areas to be considered as offsets should be identified and selected in accordance with conservation priorities and identified vegetation targets;
- the offset implementation mechanism must ensure the long term viability and functionality of biodiversity;
- the offset should be agreed to prior to the impact occurring;
- conservation actions must offset the impact of the development for the period that impact occurs;
- the impact must be offset in the same broad region, in this case within Western Sydney and adjoining areas which share the ecological characteristics to be impacted within the Growth Centres. Note that areas furthest from the Growth Centres may be more economically effective to protect, but areas closest to the Growth Centres will show the closest ecological similarities; and
- the offset action must be supplementary to existing requirements and not already funded under another scheme or required under other legislation.

6.1.3 Vegetation Conservation Value

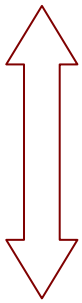
Of the native vegetation that has been identified as available for offset, a further analysis has been carried out to support the offset principles described above. A conservation value of high, medium or low has been assigned to each endangered ecological community to enable a comparison of native vegetation with the same values across western Sydney. This helps to compare the biodiversity values of native vegetation planned to be improved or maintained through offset, with what will be lost through planned development.

The vegetation conservation value is determined through an analysis combining reservation status of an Endangered Ecological Community, its historical clearing rate across western Sydney and its natural rarity within western Sydney. The methods used to determine conservation value priority have been provided at Appendix 3.

Note: As part of the analysis of conservation value, some native vegetation communities which have not been listed as EEC have also been included which occur in the Cumberland

Plain. These communities were selected for inclusion due to their rarity, low reservation status and the likelihood of eventual listing as EECs.

The range in conservation value can be broadly described as:



High — *Those native vegetation communities which are not well represented in formal reserves, have been highly cleared in the landscape and are naturally rare*

Low — *Those native vegetation communities which have been widely represented in formal reserves, are not widely cleared in the landscape and are naturally prevalent in western Sydney*

Table 6 below, describes the protection and loss of high and medium conservation vegetation within the Growth Centres. No native vegetation within the Growth Centres was found to fall into the Low Conservation value.

Table 6 – Protection and Loss of Conservation Value

Conservation Value	Total Area lost in Growth Centres (Ha)	Area to be protected in Growth Centres (Ha)*	Protection through potential investment area (Ha)	Total Protected (Ha)
High Conservation Value	**1605**	1429	1110	**2539**
Medium Conservation Value	**262**	570	1190	**1760**
Low Conservation Value	**-**	-	-	**-**
Total vegetation	**1867**	**1999**	**2300**	**4299**

* See Table 4 for definition of areas to be protected

Outcome: The total area of EECs to be protected, both within the Growth Centres as well as lands secured under conservation management outside the Growth Centres, provide a positive overall area of biodiversity habitat with similar conservation values to be protected than lost from development of the Growth Centres. This outcome generally supports the offset principles outlined above.

6.2 Threatened flora species

As noted in section 4.2, a number of threatened plant species have been identified as potentially affected by the development of the Growth Centres. An Improve or Maintain assessment was undertaken for each species (Appendix 2), based on the principles identified in section 3.3 of this report.

Of the 18 species identified, the conservation of 9 will be supported through the Growth Centre protected lands and the investment package. The remaining species will require additional management consideration and actions to meet the Improve or Maintain test, as described in Table 7.

Table 7 – Additional requirements to meet Improve or Maintain outcome for flora species

Species	Comments and Recommendations
Acacia pubescens	**1. School site, Kemps Creek** • Confirm presence of species at site. • If present, confirm adequacy of current protection and management arrangements. • If measures not adequate, either address in precinct plan or provide support to improve protection and management. **2. Sydney Water site, Kemps Creek** • Confirm presence of species at site. • If present, confirm adequacy of current protection and management arrangements. • If measures not adequate, either address in precinct plan or provide support to improve protection and management.
Cynanchum elegans	Ensure inclusion of known populations or habitat in the offset areas to be secured.
Darwinia biflora *Hibbertia superans* *Epacris purpurascens var purpurascens* *Eucalyptus sp "Cattai"*	**Heath Road Reserve, North Kellyville** • All species have been confirmed as present in this location. • Protection should occur through one, or more, of the following options: ⇒ inclusion of these lands in the Environment Conservation zone; ⇒ inclusion of these lands in the Transitional Land overlay; ⇒ protection of these lands via the precinct plan; ⇒ provision of funding to support management lands at Heath Road and a conservation agreement over the privately owned lands; ⇒ provision of funding to support a lease-back arrangement for the privately owned lands. It is considered that there may be scope for some limited development of these lands, if protection for the majority of the

Species	Comments and Recommendations
	area is provided.
Leucopogon fletcheri	**Heath Road (east of Heath Road Reserve)** • Confirm extent of population during precinct planning for area east of Reserve. • If species confirmed present, protection of populations via precinct plan.
Persoonia hirsuta	**Vicinity of Heath Road Reserve** • Previous record within Heath Road Reserve has been removed by fire. • Targeted search for species during planning for precincts adjoining Heath Road Reserve. • If species confirmed present, protection of populations via precinct plan.
Pimelea spicata	**Denham Road site** • Confirm presence of species at site. • If present, protection of populations via precinct plan.

Outcome: provide protection and management of the species identified in Table 7 as recommended.

6.3 Threatened Fauna

As noted in section 4.3, a number of threatened fauna species have been identified as potentially affected by the development of the Growth Centres. An Improve or Maintain assessment was undertaken for each species (Appendix 2), based on the principles identified in section 3.3 of this report.

Of the 22 species identified, the conservation of all but one will be supported through the Growth Centre protected land and offset package. The remaining species, a potential population of Green and Golden Bell Frog at Riverstone, will require additional management consideration and actions to meet the Maintain or Improve test, as follows:

1. Investigate the potential Riverstone population during precinct planning;
2. If the species or suitable habitat is confirmed, then either:
    a. protect the habitat via the precinct plan; and/or
    b. support management of any habitat or population that is on public land at Riverstone (e.g. school grounds), and/or on private land via conservation agreements; and/or
    c. seek to confirm the presence of the species or suitable habitat within the Growth Centres protected lands (e.g. Air Services site).

Outcome: implement the above recommendations to ensure an Improve or Maintain outcome for the Green and Golden Bell Frog.

7. CONCLUSION AND FINAL JUSTIFICATION

The Conservation Plan identifies the existing biodiversity values within the Growth Centres as well as the identified mechanisms to Improve or Maintain biodiversity value within Western Sydney and the Sydney Basin.

A number of actions, in conjunction with protected lands currently in public ownership within the North West and South West Growth Centres will contribute to the protection of about 4,299ha of biodiversity habitat to offset the loss of 1,867ha of habitat from the development over a 30 year period in the Growth Centres.

The key actions are:

1. Protection of 976ha of land containing 643ha of high quality native vegetation through Environment Conservation and Recreation Zones identified by the SEPP.
2. Protection of a further 881ha of native vegetation through development controls identified by the SEPP and associated Development Code.
3. Implementation of a conservation offsets program to secure the protection of at least 2,300ha of priority, high quality vegetation in Western Sydney and the Sydney Basin.

These actions provide the fundamental basis for achieving an Improve or Maintain outcome for biodiversity values in the Growth Centres. However, this report has also identified a number of further supporting actions and recommendations that need to be undertaken to achieve this outcome. These include:

- further assessment and consideration of the 27ha of Higher Long Term Management vegetation adjoining the Air Services site during precinct planning (section 6.1);
- management and protection of specific threatened flora species within the Growth Centres through the protection of the area in proximity to Heath Rd reserve near Cattai creek (section 6.2);
- management and protection of *Pimelia spicata* at the Denham road site through precinct planning (section 6.2);
- confirmation of presence, and (if located) management and protection of *Acacia pubescens* at a School site and Sydney Water site in the South West Growth Centre through precinct planning (section 6.2);
- management and protection of *Cynanchum elegans* through the selection of areas through the conservation offsets program with known populations or habitat (section 6.2); and
- investigation of the threatened population of Green and Golden Bell frog to provide for its management and protection within the Growth Centres (section 6.3)

On the basis of the assessment undertaken in this report and the package of conservation actions proposed, it is recommended that the Minister for the Environment grant biodiversity certification to the Growth Centres SEPP in accordance with s.126G of the TSC Act. As indicated earlier in this report, certification is being sought within the SEPP for the developable lands within the Growth Centres.

Conditional certification is being sought within the SEPP for the flood-prone lands and transitional lands within the Growth Centres. This means that further analysis is required at the precinct planning stage, and a positive Improve or Maintain result is to be achieved for the existing biodiversity of the precinct.

Certification is not being sought for:

- lands identified in the SEPP as environment conservation or public recreation zonings;
- lands identified as offsets to the Western Sydney Orbital (Colebee, Kemps Creek and Rouse Hill);
- lands zoned for regional park or environmentally significant land at Edmondson Park; or
- lands within Western Sydney Parklands.

The protection of vegetation in these areas is an essential part of the conservation package for the Growth Centres and any proposed impacts will therefore be subject to detailed scrutiny in accordance with the provisions of the SEPP and the requirements of s.5A of the EP&A Act.

In examining this proposal, it is expected that the DEC and Minister for the Environment will consider this package , the requirements of s.126G (including public submissions received) and the necessity to apply specific conditions to the granting of certification to ensure its practical operation over time.

8. USEFUL REFERENCES

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APPENDIX 1 – MATTERS FOR CONSIDERATION

There are a number of matters for consideration that need to be addressed when seeking 'Biodiversity Certification' of the Western Sydney Growth Centres SEPP in accordance with s.126G and 126N of the Threatened Species Conservation Act. Below is a summary of these considerations.

1. Likely social and economic consequences of implementation of the Western Sydney Growth Centres

In order to cope with the expanding nature of the greater Sydney metropolitan area, recent state government initiatives identified future land releases in the North West and South West of Sydney. It will see the development of an estimated $7.5 billion of infrastructure, including roads, rail, bus networks, educational and health services, linked to the staged release of land for new homes over the next 30 years. This development plan is a strategic response to the demands of Sydney's projected population growth.

2. The most efficient and effective use of available resources for the conservation of threatened species, populations and ecological communities

The provision of conservation objectives within the Western Sydney Growth Centres SEPP relies on a range of conservation responsibilities which will see a combination of planning outcomes involving:

- Developer contributions – through a special infrastructure contribution associated with the release of development precincts and the consideration of planning controls in the development of lands.
- State Government responsibilities – a commitment to offset biodiversity losses identified as part of the Growth Centres development through the purchase of lands both within and outside of the Growth Centres, purchase and retirement of biobanking credits and voluntary private landowner conservation measures; with the majority of expenditure occurring outside the Growth Centres, but within western Sydney and the broader Sydney Basin, where these funds can maximise land area purchases and biodiversity outcomes.
- Local Council contributions – protection of native vegetation and threatened species through the precinct planning process, provision of open space and local Council reserve system.

3. The principles of ecologically sustainable development

Ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes.

The Growth Centres SEPP provides an opportunity for consolidated economic development within Western Sydney while allowing for the consolidation and protection of threatened species, populations and communities.

The following principles are recognised as part of the development:

a) The precautionary principle – the Conservation Plan for the Growth Centres has identified requirements for offset the impact to biodiversity values. The offset requirement has assumed that no vegetation in development precincts

will be retained, as the amount to be retained cannot be estimated with any certainty. The Plan therefore follows the precautionary principle in the assumption of a greater level of vegetation clearance than is likely to occur in practice.

b) Inter generational equity – provision has been made as part of the SEPP and Conservation Plan for the protection of biodiversity values within the Growth Centres as well as investing in the protection of potential areas of biodiversity value outside of the Growth Centres within Western Sydney.
c) Conservation of biological diversity and ecological integrity – areas of highest long term management vegetation support the greatest consolidation of biological diversity and integrity within the Growth Centres have been protected.
d) Improved valuation, pricing and incentive mechanisms – as part of the development of the Growth Centres, a special infrastructure contribution has been identified and a State Government commitment has been made which will contribute to the funding source for protection of biodiversity values.

4. Conservation outcomes resulting from any reservation or proposed reservation of land under Part 4 of the National Parks and Wildlife Act 1974 or the entering into of a conservation agreement relating to the land under the Act, or resulting from any other action to secure the protection of land for conservation purposes

The SEPP provides for the protection of lands for conservation within western Sydney through the zoning of lands for environmental conservation and the provision of development control within flood prone lands, transitional lands, cultural heritage landscape areas and lands identified for development through a Development Code.

As part of the Growth Centres development a funding commitment has been allocated for investment in the purchase of potential lands for protection through reservation and development of private land incentives.

5. Conservation outcomes resulting from the operation outside the area of operation of the Western Sydney Growth Centres SEPP of strategies, plans, agreements and other instruments

The conservation outcomes of the SEPP allow for the Improve or Maintain test to be met for biodiversity values through investment in the purchase of potential lands for protection and reservation outside the Growth Centres in western Sydney.

6. The objects of the TSC Act

The objects of the TSC Act are as follows:

a) to conserve biological diversity and promote ecologically sustainable development, and
b) to prevent the extinction and promote the recovery of threatened species, populations and ecological communities, and
c) to protect the critical habitat of those threatened species, populations and ecological communities that are endangered, and

d) to eliminate or manage certain processes that threaten the survival or evolutionary development of threatened species, populations and ecological communities, and
e) to ensure that the impact of any action affecting threatened species, populations and ecological communities is properly assessed, and
f) to encourage the conservation of threatened species, populations and ecological communities by the adoption of measures involving co-operative management

The SEPP and Conservation Plan support the objectives of the Act through:

- Protection of lands for biodiversity conservation through zoning and development controls
- Protection of consolidated, higher long term management viability vegetation to support the protection of endangered ecological communities and threatened species habitat
- Investment in the purchase of potential areas outside the Growth Centres to offset impacts of development
- Provision of development controls to support the sustainable development of release areas, including:
    - Open space planning – the location and design of parks to best retain existing vegetation to protect biodiversity
    - Water sensitive urban design – integration of existing vegetation and natural drainage lines within subdivision and road design
    - Road design – tree retention through sensitive design
    - Retention of existing vegetation in areas where lower density is appropriate
    - Retention of existing stands of vegetation where possible, to be associated with passive recreation
- Protection of lands for biodiversity conservation through the application of biobanking agreements and other voluntary private land conservation measures.

APPENDIX 2 – IMPROVE OR MAINTAIN ASSESSMENTS

VEGETATION IMPROVE OR MAINTAIN ASSESSMENT

Objective:

To assess the value of native vegetation within the Growth Centres; and to compare to values in the potential investment areas[1] in order to test whether an Improve or Maintain outcome can be achieved.

Where native vegetation is lost in the Growth Centres, Improve or Maintain is achieved if positive actions are undertaken to balance the loss of vegetation from clearing. That is, if vegetation that is "like-for-like" or better is secured through the potential investment areas or in the Growth Centres protected lands[2].

Method:

1. Identify all areas of "Biodiversity Value – Higher Long Term Management Viability" (HMV). This includes native vegetation that meets all of the following criteria:

- **Status** – vegetation that is within an EEC. This will ensure the focus is on the shale and alluvial woodland vegetation communities, which occur throughout the Growth Centres and contain a very different and distinct set of fauna and flora that are rarely found in adjoining sandstone communities;
- **Condition** – good quality vegetation based on existing mapping (ie. A, B and C quality vegetation from the Cumberland Plain vegetation maps);
- **Size** – vegetation remnants that are equal to or greater than 4 ha. This threshold has been chosen after taking into account the fragmented nature of the remaining vegetation on the Cumberland Plain (61% of remnants are less than 4 ha in size, but make up only 10% of the total remaining vegetation), the relative biodiversity values of larger patches compared to smaller patches in Western Sydney, and the likely pressures on small remnants within the Growth Centres once they are surrounded by intensive urban development;
- **Landscape context (connectivity)** – based on an analysis of the proportion of vegetation cover at the regional and local scale using the Biometric methodology (Gibbons et al 2005). A remnant is considered to have good connectivity if there is 30% or greater vegetation cover (EECs) within both a 0.55 km and 1.75 km radius of the patch. The 30% threshold has been chosen given the fragmented nature of Cumberland Plain vegetation and given the available evidence that suggests significant declines in biodiversity values occur once 70% of the landscape has been cleared;
- **Threats** – the influence of future surrounding land use was taken into consideration by:

[1] potential investment areas are those lands outside the Growth Centres that contain appropriate ecological attributes (vegetation and threatened species habitat) that could counter-balance any losses within the Growth Centres.

[2] Growth Centre protected lands include lands in the following categories: Public Recreation – Regional, Public Recreation – Local, Environment Conservation, Flood Prone and Major Creeks, Transitional Land, Cultural Heritage Landscape Area, lands identified as offsets to the Western Sydney Orbital (Colebee, Kemps Creek & Rouse Hill), lands zoned for regional park or environmentally significant land (cross-hatching) at Edmondson Park, and lands within the Western Sydney Parklands.

- identifying all remnants with high edge to area ratios (long thin strips of vegetation) as having a lower management viability. This was determined if the P:A (perimeter:area) ratio of a remnant was greater than the P:A ratio of a 100 m wide polygon equivalent;
- applying a 50 m disturbance buffer within the edge of remnant patches where they bordered future development areas identified by the SEPP. If the buffering reduced the overall size of the patch below the 4 ha threshold it was then excluded.

In summary, an area of vegetation was considered to fall within the "Biodiversity Value – Higher Long Term Management Viability" category if it was an EEC, in good condition, greater than 4 ha, with good connectivity and less likely to be impacted by surrounding land use threats.

Protection of HMV vegetation is the main priority to satisfy the Improve or Maintain test.

Notes:

(a) the above headings are consistent with the management viability criteria proposed in the DEC Working Draft Guidelines for Biodiversity Certification (in prep). However, the specific measures for each criteria (e.g. the 4 ha size threshold) have been chosen with particular reference to the unique circumstances of the Cumberland Plain and the Growth Centres. They are not, therefore, to be interpreted as state-wide standards that should be applied in the assessment of other EPIs for certification. Until any consistent standards are developed, it will be necessary to define suitable measures for the criteria that relate to the particular context of the region and sub-region within which each EPI is located; and

(b) before spatial analysis was undertaken any long thin "fingers" of vegetation that were joined to larger remnants were digitised into separate polygons. This was undertaken because edge effects would have a significantly negative impact on these portions of remnant vegetation. Separating them would allow these effects to be assessed separate to the larger portions.

2. Identify all areas of "Biodiversity Value – Lower Long Term Management Viability" (LMV).

This includes all vegetation that does not meet the requirements for Step 1.

Results for Steps 1 and 2:
See figures 6 and 7 in the body of this report for the extent of Biodiversity Value – Lower Long Term Management Viability and Biodiversity Value – Higher Long Term Management Viability.

3. Determine how much:

- HMV and LMV lands will be retained in the Growth Centre protected lands; and
- how much will be cleared in the Growth Centres.

4. For areas of HMV that are not included in the Growth Centre protected lands, identify recommended actions in the Conservation Plan to address these (or present a rationale as to why no further action is required).

5. Areas of LMV may be offset if suitable offsets can be found. The following steps should be followed to determine whether sufficient suitable offsets are available in the Growth Centre protected lands and potential areas in Western Sydney or broader Sydney Basin:

- calculate the overall Conservation Value Priority of vegetation within the Growth Centres and the potential areas in Western Sydney or broader Sydney Basin. This is achieved by assigning an overall value to each vegetation community, using the rule set in Appendix 3. The rule set uses measures of reservation status, historical clearing and natural rarity to assign a value to each vegetation community. This allows losses and gains to be compared at a regional scale by converting the communities into a common or equivalent "currency" (consistent with the "like-for-like or better" offset principle);
- calculate the loss of High, Medium and Low Conservation Value vegetation in the Growth Centres (which will equal the amount of LMV identified in Step 2) and compare to the amount of High, Medium and Low Conservation Value vegetation to be secured / protected in the Growth Centre protected lands and potential areas in Western Sydney or broader Sydney Basin.

The proposed offsets will be considered suitable if they secure areas of equal or greater size **and** of like-for-like or better conservation value. This is summarised in the tables below.

The Conservation Plan will also need to address the other offset principles identified in the DEC Working Draft Biodiversity Certification guidelines (in prep).

Summary of Higher and Lower Management Viability vegetation

HMV in Growth Centres (ha)	HMV in Growth Centre protected lands (ha)	HMV in Growth Centre requiring further action* (ha)	LMV in Growth Centres (ha)	LMV in Growth Centre protected lands (ha)	LMV to be cleared (ha) (available for offsetting)
584	557	27	3284	1443	1841

*__Note:__ as stated above, any areas of HMV not included on the Growth Centre protected lands will need to be addressed in the Conservation Plan.

Comparison of Conservation Values of lands to be cleared in Growth Centres to lands to be secured in Growth Centre protected lands or potential areas in Western Sydney or broader Sydney Basin (ha)

	To be cleared (ha)	To be secured (ha)	Result (+/-)
High Value	1,605	2,539	+934
Medium Value	262	1,760	+1,498
Low Value	0	0	0

FLORA IMPROVE OR MAINTAIN ASSESSMENT

Objective:

To assess habitat value for all threatened flora within the Growth Centres and to compare to values in any potential investment areas[3] in order to test whether an Improve or Maintain outcome can be achieved.

For species where habitat is lost in the Growth Centres, Improve or Maintain is achieved if the species is likely to persist at the sub-regional level, i.e. habitat is secured through the potential investment areas or in the Growth Centres protected lands[4].

Method:

1. Using Atlas records and expert opinion list all threatened flora species known or likely to occur in this part of Western Sydney.

Results:

Acacia bynoeana	*Acacia pubescens*
Cynanchum elegans	*Darwinia biflora*
Hibbertia superans	*Leucopogon fletcheri*
Allocasuarina glaericola	*Dillwynia tenuifolia*
Epacris purpurascens var purpurascens	*Eucalytpus sp 'Cattai'*
Grevillea juniperina ssp juniperina	*Grevillea parviflora ssp parviflora*
Marsdenia viridiflora ssp viridiflora	*Micromyrtus minutiflora*
Persoonia hirsuta	*Persoonia nutans*
Pimelea spicata	*Pultenaea parviflora*
Pultenaea pedunculata	*Callistemon linearifolius*
Diuris aequalis	*Ecualyptus bethamii*
Grammitis stenophylla	*Gyrostemon thesioides*
Haloragis exalata	*Pimelea curviflora*
Pomaderris brunnea	*Pterostylis saxicola*
Tetratheca glandulosa	*Thesium australe*

2. Cull the above list on the basis of lack of known records and low potential to be present (i.e. lack of suitable habitat) within the Growth Centres

[3] potential investment areas are those lands outside the Growth Centres within the greater Western Sydney / Sydney Basin area that contain appropriate ecological attributes (vegetation and threatened species habitat) that could counter-balance any losses within the Growth Centres.

[4] Growth Centre protected lands include lands in the following categories: Public Recreation – Regional, Public Recreation – Local, Environment Conservation, Flood Prone and Major Creeks, Transitional Land, Cultural Heritage Landscape Area, lands identified as offsets to the Western Sydney Orbital (Colebee, Kemps Creek & Rouse Hill), lands zoned for regional park or environmentally significant land (cross-hatching) at Edmondson Park, and lands within the Western Sydney Parklands

Results:

Remaining species (to be assessed in Conservation Plan)	Culled species (no further assessment)
Acacia bynoeana	*Callistemon linearifolius*
Acacia pubescens	*Diuris aequalis*
Cynanchum elegans	*Ecualyptus bethamii*
Darwinia biflora	*Grammitis stenophylla*
Hibbertia superans	*Gyrostemon thesioides*
Leucopogon fletcheri	*Haloragis exalata*
Allocasuarina glaericola	*Pimelea curviflora*
Dillwynia tenuifolia	*Pomaderris brunnea*
Epacris purpurascens var purpurascens	*Pterostylis saxicola*
Eucalytpus sp 'Cattai'	*Pultenaea pedunculata*
Grevillea juniperina ssp juniperina	*Tetratheca glandulosa*
Grevillea parviflora ssp parviflora	*Thesium australe*
Marsdenia viridiflora ssp viridiflora	
Micromyrtus minutiflora	
Persoonia hirsuta	
Persoonia nutans	
Pimelea spicata	
Pultenaea parviflora	

3. Using existing information and expert knowledge identify population locations and habitat potential for each remaining species (as per above table)

4. Using the outcomes of Step 3, identify those populations that will be either included within the Growth Centre protected areas or can be secured in the potential investment areas.

Improve or Maintain is met if the loss of habitat for species is offset by securing habitat in the Growth Centre protected areas or potential investment areas.

Results of Steps 3 & 4:
See attached table

5. Based on the results of Step 4 identify any remaining species that have not achieved a Improve or Maintain outcome.

Results:

See attached table

6. Options for additional actions that could deliver a Improve or Maintain outcome for the species identified at Step 5 should be identified in the Conservation Plan and will be considered during the assessment of the certification proposal.

Outcomes of Steps 3 & 4							
Species * = species where MoI can only be met via specific actions	**Status**	**Soil Type**	**Records in Growth Centres**	**Expected losses in Growth Centres**	**Habitat in Growth Centre protected lands?**	**Habitat in potential investment areas?**	**Improve or Maintain achieved?**
*Acacia pubescens**	V	Gravel, Shale and S/ST	3 sites (school, rural res block and Syd Water pipeline). School site population identified in Recovery Plan.	2 sites – school (numbers unknown) and rural res block (25 plants)	Yes – Syd Water lands are within the Flood Prone layer, although future management uncertain	No	Meets MoI if populations at school and Sydney Water site are confirmed present and adequately managed.
*Cynanchum elegans**	E	Rainforest	1 record on large rural property	1 record on large rural property	No	No, but potential investment areas could be revised to include known populations	Meets MoI if final investment areas include known population
*Darwinia biflora**	V	Shale-capped ridges	7 sites, 3 of which are within Heath Road Reserve	4 sites. 1 population of 1000+ plants, size of others unknown	No	No	Meets MoI if populations at Heath Road Reserve are protected.
*Epacris purpurascens var purpurascens**	V	Transitional	2 records, 1 population of 150 in Heath Road Reserve	Depends on outcome for Heath Road Reserve	No	No	Meets MoI if Heath Road Reserve population is protected
*Eucalytpus sp 'Cattai'**	E	SS	4 records, 1 pop at Heath Road	1 site in potential development	No	No	Meets MoI if Heath Road Reserve population is

Outcomes of Steps 3 & 4							
Species * = species where MoI can only be met via specific actions	**Status**	**Soil Type**	**Records in Growth Centres**	**Expected losses in Growth Centres**	**Habitat in Growth Centre protected lands?**	**Habitat in potential investment areas?**	**Improve or Maintain achieved?**
			Reserve (20), 1 pop in potential development area (30)	area (30). Future for other population depends on outcome for Heath Road Reserve			protected
*Hibbertia superans**	E	Shale-capped ridges	2 sites, 1 on rural res block, 1 at Heath Road Reserve	1 site on rural res block (11 plants). Future for other population depends on outcome for Heath Road Reserve	No	No	Meets MoI given low size of population to be lost and if Heath Road Reserve population is protected.
*Leucopogon fletcheri**	E	Shale-capped ridges	2 sites on private land	2 sites on private land, >40 plants at 1 site, other site unknown	No	No	Meets MoI given expected low size of populations to be lost and if population to the east of Heath Road Reserve is protected during precinct planning.
*Persoonia hirsuta**	E	SS	3 records, however previous record at Heath Road Reservehas been lost due to fire	Some losses likely but not able to be quantified. Also depends on outcome for Heath Road Reserve	No	No	Meets MoI if species confirmed present during precinct planning adjoining Heath Road Reserve and if populations protected by precinct plan
*Pimelea spicata**	E	Shale	5 records, 4 of which are for a	Depends on outcome for	Not known	No	Meets MoI if population at Denham Road is confirmed

Outcomes of Steps 3 & 4							
Species * = species where MoI can only be met via specific actions	**Status**	**Soil Type**	**Records in Growth Centres**	**Expected losses in Growth Centres**	**Habitat in Growth Centre protected lands?**	**Habitat in potential investment areas?**	**Improve or Maintain achieved?**
			large and significant population at Denham Court Road.	Denham Court Road population			as present and protected
Acacia bynoeana	E	Shale and SS	0 records, but limited potential	0 records	Not known	5-6 records	Meets MoI given protection opportunities in potential investment areas
Allocasuarina glaericola			0 records, but potentially occurs in Air Services site and adjoining lands at Shanes Park	0 known	Not known, but any population at the Air Services site would be retained via SEPP Environment Conservation zoning	2 records	Meets MoI given zoning of potential habitat at the Air Services site and protection opportunities in potential investment areas
Dillwynia tenuifolia			34 records (including one site with 1,000s)	21 records	Yes – including lands within Environment Conservation and Open Space zones, and Flood Prone lands. One site contains	21 records	Meets MoI given inclusion in Growth Centre protected lands and protection opportunities in potential investment areas

Outcomes of Steps 3 & 4							
Species * = species where MoI can only be met via specific actions	**Status**	**Soil Type**	**Records in Growth Centres**	**Expected losses in Growth Centres**	**Habitat in Growth Centre protected lands?**	**Habitat in potential investment areas?**	**Improve or Maintain achieved?**
					10,000+ and Air Services site likely to contain large areas of habitat.		
Grevillea juniperina ssp juniperina			23 records, including four of 50+ individuals and one of 27. All in NW.	Losses will occur but not quantifiable with any precision.	Yes. Records occur in Flood Prone lands and all four populations occur in Environment Conservation zoned lands (Air Services site).	Yes – including populations containing hundreds of individuals	Meets MoI given inclusion in Growth Centre protected lands and protection opportunities in potential investment areas
Grevillea parviflora ssp parviflora	V	Sandy / Gravelly Shale	2 records, one population of 40 at Kemps Creek within school grounds (bounded by another school and playing fields).	Loss of part of Kemps Creek population	Yes – moderate size population in Public Recreation zone at Kemps Creek To be confirmed by targeted	No	Meets MoI given protection of remained of population at Kemps Creek.

Outcomes of Steps 3 & 4							
Species * = species where MoI can only be met via specific actions	**Status**	**Soil Type**	**Records in Growth Centres**	**Expected losses in Growth Centres**	**Habitat in Growth Centre protected lands?**	**Habitat in potential investment areas?**	**Improve or Maintain achieved?**
					survey		
Marsdenia viridiflora ssp viridiflora	E pop	Shale / RF	1 record, already subject to separate road proposal	None known (apart from existing road proposal)	Yes – probable population within Environment Conservation zoning (Air Services)	No	Meets MoI given protection of likely habitat via zoning of Air Services site and that if population subject to road proposal is protected this is unlikely to be reversed by Growth Centres development.
Micromyrtus minutiflora			6 records, but no significant populations	Some losses likely but not able to be quantified	Yes – 4 populations and potential habitat protected in Public Recreation and Environment Conservation zoned lands	Yes – including populations containing hundreds of individuals and sites with potential habitat	Meets MoI given inclusion in Growth Centre protected lands and protection opportunities in potential investment areas
Persoonia nutans			4 records, including 30+ individuals in potential development area at Kemps Creek. Potential similar habitat to P parviflora, G juinperina and M	Losses likely at Kemps Creek	Yes – potentially protected in Flood prone lands and at Air Service site.	14 records	Meets MoI given potential inclusion in Growth Centre protected lands and protection opportunities in potential investment areas

Outcomes of Steps 3 & 4							
Species * = species where MoI can only be met via specific actions	**Status**	**Soil Type**	**Records in Growth Centres**	**Expected losses in Growth Centres**	**Habitat in Growth Centre protected lands?**	**Habitat in potential investment areas?**	**Improve or Maintain achieved?**
			Minutiflora				
Pultenaea parviflora			28 records, totalling several hundred known individuals	Losses will occur but not quantifiable with any precision.	Yes – 12 records, including lands within the Public Recreation and Envrionment Protection zones. Air Services site supports large are of potential habitat.	Yes – including populations containing 1,000s of individuals and extensive areas of potential habitat	Meets MoI given inclusion in Growth Centre protected lands and protection opportunities in potential investment areas

Outcomes of Step 5 – species requiring further actions to meet MoI test

Species	Location / Option
Acacia pubescens	Confirm presence of species at school site and Sydney Water site and if present, provide adequate management
Cynanchum elegans	Ensure inclusion in final investment areas
Darwinia biflora	Ensure protection of the species in Heath Road Reserve vicinity
Hibbertia superans	Ensure protection of the species in Heath Road Reserve vicinity
Leucopogon fletcheri	Ensure protection of the population to the east of the Heath Road Reserve
Epacris purpurascens var purpurascens	Ensure protection of the species in Heath Road Reserve vicinity
Eucalytpus sp 'Cattai'	Ensure protection of the species in Heath Road Reserve vicinity
Persoonia hirsuta	Confirm species presence of the species in the Heath Road Reserve vicinity and if present, provide protection
Pimelea spicata	Confirm population presence at Denham Court Road and if so provide protection

Fauna Improve or Maintain Assessment

Objective:

To assess habitat value for all threatened fauna within the Growth Centres and to compare to values in the potential investment areas[5] in order to test whether an Improve or Maintain outcome can be achieved.

For species where habitat is lost in the Growth Centres, Improve or Maintain is achieved if the species is likely to persist at the sub-regional level, ie. habitat is secured through the potential investment areas or in the Growth Centres protected lands[6].

Method:

1. Using Atlas records and expert opinion list all threatened fauna species known or likely to occur within the Growth Centres and assign species into the following categories:

    - species most impacted by fragmentation;
    - species least impacted by fragmentation (utilise modified habitats / mobile); or
    - species occupying specialised habitats (eg wetlands).

2. Cull the above list for vagrants, suspect and old records (pre-1980).

Results for Steps 1 & 2:

See attached table.

3. Measuring the total amount of habitat that is present in the Growth Centres

(a) For the fragmentation sensitive species in Table 1:

- all forest and woodland vegetation communities found on the shales or the Tertiary and Quaternary alluviums of the Cumberland Plain are assumed to have some habitat value for these species;

- measure the area of habitat that satisfies the following connectivity thresholds, which are based on the Biometric method:

[5] potential investment areas are those lands outside the Growth Centres within the greater Western Sydney / Sydney Basin area that contain appropriate ecological attributes (vegetation and threatened species habitat) that could counter-balance any losses within the Growth Centres.

[6] Growth Centre protected lands include lands in the following categories: Public Recreation – Regional, Public Recreation – Local, Environment Conservation, Flood Prone and Major Creeks, Transitional Land, lands identified as offsets to the Western Sydney Orbital (Colebee, Kemps Creek & Rouse Hill), lands zoned for regional park or environmentally significant land (cross-hatching) at Edmondson Park, and lands within the Western Sydney Parklands.

► a minimum of 24% vegetated within 100ha and a minimum of 17% vegetated within 1000ha. Only vegetation with a canopy cover of greater than 10% is included in this analysis, ie no Tx (scattered trees).

These thresholds were derived by measuring the connectivity of sites that still contain populations of fauna species that have declined on the Cumberland Plain. The level of connectivity of these sites was estimated by measuring the amount of surrounding vegetation within two circles with an area of 100ha and 1000ha. The thresholds of 24% and 17% vegetated represent the minimum connectivity values of sites that continue to support declining Cumberland Plain fauna.

Only vegetation with a canopy cover greater than 10% is included as available evidence indicates that the species in Table 1 are absent from small, fragmented patches of vegetation.

(b) For the species less sensitive to fragmentation in Table 2:

- all forest and woodland vegetation communities on the shales or the Tertiary and Quaternary alluviums of the Cumberland Plain are assumed to have some habitat value for these species;
- given their mobility or ability to utilise highly modified habitats, this estimate includes all vegetation present, ie Tx should be included. That is, all vegetation condition classes will be considered as habitat for these species.

(c) For species with specialised habitat requirements listed in Table 3:

- in most cases, this will involve measuring the amount of a specific vegetation type(s) in a specified geographic area;
- for the Green and Golden Bell Frog estimate the amount of potential habitat based on the known record at Riverstone (map attached).

4. Measuring the amount of habitat that is present in the potential investment areas and the Growth Centre protected areas

- the estimates for habitat specialists (except for Green and Golden Bell Frog), fragmentation sensitive and resistant species, will be carried out using the same approach in Step 3;
- the estimates for the Green and Golden Bell Frog will be based on known populations (refer to the Atlas and draft Recovery Plan) in the Growth Centre protected areas[7] and potential investment areas;
- a second connectivity grid, based on vegetation left after development, will be required for the Growth Centres.

[7] Note also that the recent fauna survey conducted for the DEC identified potential habitat in the Shanes Park Air Services site

5. Determine how much habitat for fragmentation sensitive, fragmentation resistant and specialised species will be lost in the Growth Centres by:

- deducting the habitat in the Growth Centre protected areas (step 4) from the total habitat in the Growth Centres (step 3)

6. Improve or Maintain is met if the loss of habitat for impacted species is secured in the investment areas and Growth Centre protected areas, summarised as follows:

	List species in each category	**Total habitat in Growth Centres**	**Total habitat lost in GC**	**Habitat secured in GC**	**Habitat secured in IA**	**Total habitat secured**
	(Steps 1 & 2)	**(Step 3)**	**(Step 5)**	**(Step 4)**	**(Step 4)**	
Species most impacted by fragmentation	Birds, etc	1,976*	1,270	706	2,143	2,849
Species least impacted by fragmentation	Bats, owls etc	8,453**	5,395	3,059	3,024	6,082
Species occupying specialised habitats	Australasian Bittern, Blue-billed Duck, Glossy-Black Cockatoo	1,770***	659	1,111	402	1,513

Notes:
* all forest and woodland vegetation communities found on the shales or the Tertiary and Quaternary alluviums of the Cumberland Plain (not just EECs), excluding scattered trees
** all forest and woodland vegetation communities found on the shales or the Tertiary and Quaternary alluviums of the Cumberland Plain (not just EECs), including scattered trees
*** specific vegetation communities only

Steps 1/2 – Threatened Fauna list, based on Atlas records, recent survey data and expert opinion (combined for NW & SW and pre-1980s / suspect records culled)

Table 1 - Fragmentation sensitive species (known to be absent from small vegetation patches)
Brown Treecreeper
Square-tailed Kite
Black-chinned Honeyeater (eastern subspecies)
Cumberland Plain Land Snail
Koala
Speckled Warbler

Table 2 - Species that are mobile or less sensitive to fragmentation (potentially utilise all remaining vegetation patches)

Gang-gang Cockatoo
Swift Parrot
Powerful Owl
Masked Owl
Large-eared Pied Bat
Eastern False Pipistrelle
Eastern Bentwing-bat
Eastern Freetail-bat
Large-footed Myotis
Grey-headed Flying-fox
Yellow-bellied Sheathtail-bat
Greater Broad-nosed Bat

Table 3 - Species with specialised habitat requirements (potentially use all remaining vegetation in the following specific categories)

Australasian Bittern (vegetated freshwater wetlands, MU36)
Blue-billed Duck (deep vegetated freshwater wetlands, MU36)
Green and Golden Bell Frog – potential habitat associated with record at Riverstone
Glossy-Black Cockatoo (feed on Casuarina cones; Casuarinas are reasonably common in MU1 & MU2 Shale Sandstone transition forest, MU11 Alluvial Woodland and MU5 Riparian Woodland but are uncommon in the shale and gravel communities)

Other species
Giant Burrowing Frog – culled from final list as only record was in an existing urban area at Riverstone and due to lack of generally suitable habitat across most of the Growth Centres.

APPENDIX 3 – CONSERVATION VALUE PRIORITY

The rule set used to determine the conservation value priority of a vegetation community includes the following criteria for the assessment of values. The determination of conservation value for each vegetation community allows a like for like comparison at a regional scale.

The following criteria have been developed in conjunction with the DEC and are used to assess each vegetation community.

1. Priority for protection

Score		Criteria
1	High	Less than 15% of current extant vegetation in formal reserves and other public lands that are managed in a manner compatible with conservation
2	Medium	Between 15-70% of current extant vegetation in formal reserves and other public lands that are managed in a manner compatible with conservation
3	Low	More than 70% of extant protected in formal reserves and other public lands that are managed in a manner compatible with conservation

2. Historical clearing rate

Score		Criteria
A	High	Over 70% of pre-1750 distribution of this EEC has been cleared
B	Medium	Between 15-70% of pre 1750 distribution of the EEC has been cleared
C	Low	Less than 15% of the pre-1750 distribution of this EEC has been cleared

Nationally agreed criteria for the protection of forest biodiversity, known as "JANIS criteria" identify that a 30% reservation threshold should apply for the adequate protection of biodiversity. However, due to the fragmented nature of the native vegetation landscape within Western Sydney, leading to difficulties in reserving large consolidated remnants, this threshold has been modified for regional conditions to 15%.

3. Rarity

Score		Criteria
X	High	Less 1000ha of vegetation community extant
Y	Medium	Between 1000-10000ha of vegetation community extant
Z	Low	Over 10,000ha of vegetation community extant

Determination matrix of community conservation value

Priority for Protection Score	Clearing Rate Score, Natural Rarity Score		
1	A,X	A,Y	A,Z
	B,X	B,Y	B,Z
	C,X	C,Y	C,Z
2	A,X	A,Y	A,Z
	B,X	B,Y	B,Z
	C,X	C,Y	C,Z
3	A,X	A,Y	A,Z
	B,X	B,Y	B,Z
	C,X	C,Y	C,Z

Determination Legend

Overall high conservation value priority
Overall medium conservation value priority
Overall low conservation value priority