



DEPARTMENT OF PLANNING AND ENVIRONMENT

Biodiversity certification of land (strategic application):

Recommendation Report for the Minister for Environment and Heritage, for conferring or refusing to confer biodiversity certification of land under Part 8 of the *Biodiversity Conservation Act 2016*

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1. Purpose of document

This report provides a recommendation to the Minister on whether to confer or not confer biodiversity certification under section 8.2 of the *Biodiversity Conservation Act 2016* (BC Act). It documents the Department's review of the application against the requirements of the BC Act and the Biodiversity Assessment Method (BAM).

Name of recommending officer:	Louisa Clark, A/ Director Greater Sydney Branch, Biodiversity & Conservation Division, Department of Planning and Environment
CM9 container and record numbers:	EF21/14266, DOC22/422355
Name of applicant/s (planning authority or Local Land Services):	The Minister for Planning & Public Spaces (now the Minister for Planning and Homes)
Date application received:	27 October 2021
Dates of public notification under section 8.6(3):	26 August 2020 - 2 November 2020

2. Documents before the Minister

2.1 Documents attached to this report

Tab	Document
1	Completed application form
2	Minister's declaration that the CPCP is a strategic application
3	Biodiversity Certification Assessment Report (Cumberland Plain Assessment Report)
4	Cumberland Plain Conservation Plan
5	Sub-Plan A: Conservation Program & Implementation
6	Sub-Plan B: Koalas
7	Applicant's response to public submissions

2.2 Other documents considered by the recommending officer

Supporting documents submitted include the following:

- Conservation Lands Implementation Strategy
- Risk Management Plan
- Change Management Plan
- Land Purchase Strategy
- Memoranda of Understanding with delivery partners:
 - National Parks & Wildlife Service (NPWS)
 - Transport for NSW (TfNSW)
 - Biodiversity Conservation Trust (BCT)
 - Office of Strategic Lands (OSL)
- Final NSW Office of Chief Scientist & Engineer advice – Response to questions about ‘Advice on the protection of the Campbelltown koala population’ (Feb 2021)
- Final NSW Office of Chief Scientist & Engineer advice – ‘Advice regarding the protection of koala populations associated with the Cumberland Plain Conservation Plan (May 2021)
- Final Response to May 2021 advice from OCSE – Koalas
- Functional Koala Corridors – Technical Report (Biosis, 2021)
- Final Cumberland Plain Conservation Plan (CPCP) Funding Arrangements
- Final Draft Ecological Restoration Strategy
- Response to Growth Centres recommendation and lessons learnt
- Adequacy of the CPCP Conservation Program
- Planning policy package:
 - Draft *State Environmental Planning Policy (Strategic Conservation Planning) 2021* (SEPP)
 - DCP Template
 - Guidelines for Infrastructure Development
 - Draft s9.1 Ministerial Direction – Strategic Conservation Planning Draft EP&A Regulation amendment
 - Mitigation Measures Guideline
- Evidence of public exhibition notices
- “Reverse BAM” detailed spreadsheet
- Glossary for strategic conservation planning
- CPCP Spatial Viewer

3. Overview of application

3.1 Background

3.1.1 History of proposal

Reason for strategic declaration

Under Section 8.5(2) of the BC Act, the Minister for the Environment can declare an application or proposed application for biodiversity certification to be ‘strategic’ at the request of the Minister administering the *Environmental Planning and Assessment Act 1979* (now Minister for Planning and Homes).

Clause 8.3 of the Biodiversity Conservation Regulation 2017 (BC Regulation) specifies that when making a declaration the Minister must consider:

- (a) *the size of the area of the land,*
- (b) *any regional or district strategic plan under the Environmental Planning and Assessment Act 1979 (EP&A Act) that applies to the area in which the land is situated,*
- (c) *advice provided by the Minister for Planning regarding the proposed biodiversity certification,*
- (d) *the economic, social or environmental outcomes that the proposed biodiversity certification could facilitate.*

In January 2019, the Minister for Energy and Environment (at the time) declared the Proposed Certification as strategic, based on the criteria for strategic declarations under clause 8.3 of the BC Regulation. The Proposed Certification also supports delivery of the Western Sydney City Deal signed between the NSW and Commonwealth Governments in 2018.

3.1.2 NSW Biodiversity Assessment Method (BAM) 2017

The Proposed Certification has been assessed under BAM 2017. BAM 2020 commenced on 22 October 2020, however under Clause 6.31(2)(d) of the BC Reg 2017 the transitional period for strategic biodiversity certifications is *“12 months or such longer period as the Minister approves in a particular case”*. The Minister approved the transitional period for the Proposed Certification to be extended for a further 6 months until 22 April 2022, and the CPCP application was lodged on 27 October 2021.

3.1.3 Proposal Summary

The Proposed Certification is the first strategic biodiversity certification under the BC Act to be assessed by the Environment and Heritage Group (EHG).

The Proposed Certification (including conservation lands) covers an area of approximately 200,000 hectares, and includes numerous threatened ecological communities, threatened flora, habitat for threatened species and a vulnerable koala population in south western Sydney. The Proposed Certification covers entities listed under both NSW and Commonwealth legislation, such as the critically endangered Shale Sandstone Transition Forest and Cumberland Plain Woodland, and a number of entities identified as being at risk of Serious and Irreversible Impacts (SAIL) under section 6.5 and 8.8 of the BC Act.

The Proposed Certification proposes to certify 11,164 hectares of land in four “nominated areas” at Wilton, Greater Macarthur, Western Sydney Aerotropolis and Greater Penrith-

Eastern Creek. Within the four nominated areas, the Proposed Certification has avoided 4513ha with biodiversity values (avoided land for biodiversity purposes). Strategic conservation lands comprising approximately 27,200 ha are also identified for sourcing of suitable offsets in the Cumberland Plain, mostly located outside of the four nominated areas, over the 35-year period of the Plan's life.

26 Commitments in total are proposed as part of the Plan, these range from avoidance to mitigation measures to conservation measures to offset the impacts of development on certified land. These measures include establishment of new private reserves such as Biodiversity Stewardship Agreement sites, NPWS reserves, koala mitigation measures, planning provisions including a *State Environmental Planning Policy*, and non-land based measures. The Plan's Commitments are detailed at Section 5.

Strategic assessment approval is also being sought from the Commonwealth Government under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* for the CPCP. The Cumberland Plain Assessment Report submitted includes both a Biodiversity Certification Assessment Report (BCAR) seeking biodiversity certification under NSW legislation, and a Strategic Assessment seeking approval under Commonwealth legislation.

3.1.4 Relevant planning instruments

There is a planning package supporting the Proposed Certification. This includes the proposed new *State Environmental Planning Policy (Strategic Conservation Planning) 2021*.

In addition, the following planning instruments apply across the Proposed Certification area:

- SEPP (Sydney Region Growth Centres) 2006
- SEPP (Western Sydney Aerotropolis) 2020
- SEPP (Major Infrastructure Corridors) 2020
- SEPP (Western Sydney Employment Area) 2009
- Local Environmental Plans (Camden, Wollondilly, Fairfield, Campbelltown, Liverpool, Penrith, Hawkesbury)

3.1.5 Relevant strategic planning documents or processes

- *Western Sydney City Deal*

The Western Sydney City Deal is a strategic document that outlines a partnership agreement between the Commonwealth Government, the NSW Government and each of the eight local councils in Western Sydney to deliver commitments that create opportunities in education, business and employment in the region.

The key objectives of the City Deal are to:

- Deliver the North South Rail Link
- Create 200,000 jobs with the Aerotropolis agribusiness district as catalyst
- Upskill local residents & create an Aerospace Institute
- Enhance local character through a \$150 million Liveability Program
- Encourage innovation through a Planning Partnership
- Deliver the Western Parkland City across all three levels of government

- *Regional Plan*

The relevant regional strategic plan is the *Greater Sydney Region Plan: A Metropolis of Three Cities* prepared by the Greater Sydney Commission (GSC).

The Greater Sydney Region Plan sets a vision to 2056 that intends to rebalance growth and

deliver benefits more equally and equitably to residents across Greater Sydney. The plan aligns land use, transport and infrastructure planning to reshape Greater Sydney as three unique cities. The vision is for three cities where most residents live within 30 minutes of their jobs, education and health facilities, services and great places.

The following sustainability objectives from the Greater Sydney Region Plan include:

- Objective 26 - A cool and green parkland city in the South Creek corridor
- Objective 27 - Biodiversity is protected, urban bushland and remnant vegetation is enhanced
- Objective 32 – That the Green Grid links parks, open spaces, bushland and walking and cycling paths

- *District Plans*

The relevant district plan is the *Western City District Plan*.

The Western City District Plan is a 20-year plan to implement the vision for three cities with quicker and easier access to a wider range of jobs, housing types and activities, with improved lifestyle and environmental assets.

The relevant planning priorities for the Western City District Plan include:

- W13 - Creating a Parkland City urban structure and identity, with South Creek as a defining spatial element
- W14 - Protecting and enhancing bushland and biodiversity
- W16 - Protecting and enhancing scenic and cultural landscapes

3.2 The biodiversity certification assessment area

The biodiversity certification assessment area (BCAA) is shown on Figure 3.1.

The BCAA is broken down into four “nominated areas”:

- Wilton
- Greater Macarthur
- Western Sydney Aerotropolis
- Greater Penrith-Eastern Creek

The land proposed for biodiversity certification (i.e. impacted land) totals 11,164 ha and is currently comprised of 1,758 ha of native vegetation.

Table 1 Proposed land use

Proposed land use	Area (ha)	Native vegetation extent (ha)
Biodiversity certification assessment area (BCAA)	39,810	9,730
Wilton	4,070	2,347
Greater Macarthur	10,960	3,254
Western Sydney Aerotropolis	6,160	876
Greater Penrith-Eastern Creek	18,620	3,254
Land proposed for biodiversity certification	11,164	1,758

Wilton	1,720	629
Greater Macarthur	2,874	345
Western Sydney Aerotropolis	4,305	412
Greater Penrith-Eastern Creek	2,265	368
Avoided land - biodiversity (land within the BCAA that is avoided for biodiversity reasons)	4,513	3,672
Avoided land – other (land within the BCAA that is avoided for reasons other than biodiversity eg steep land)	1,124	0
Land proposed for conservation measures within the BCAA	TBD*	9,730
Land proposed for conservation measures outside the BCAA	TBD*	N/A
Retained land (land not certified, where conservation measures are not applied to avoided land – these lands become ‘retained land’ and are subject to usual assessment processes under the EP&A Act)	24,128	9,730

**Note – a total of at least 5,325 ha of native vegetation is targeted for conservation lands (refer to Section 4.3).*

3.2.1 Land proposed to be certified

The proposed land to be certified includes a range of land use zones, and certified land is proposed for either “urban capable” or “transport corridors” purposes. For the purposes of biodiversity certification, these are treated as one category of “certified land”. The total area of proposed certified land is presented at Table 1 above.

3.2.2 Land proposed to be avoided

Land proposed to be avoided within the BCAA includes land with high biodiversity values, as determined by a criterion developed in accordance with the BAM, as well as land avoided for “other” purposes which is not considered to avoid impacts to biodiversity values.

Avoided land is described in further detail at Section 4.2 below.

3.2.3 Land proposed to be retained

Land proposed to be “retained” is land excluded from the Proposed Certification, for which certification is not sought and which is not described as “avoided land”. Retained land is described in further detail at Section 4.4 below.

3.2.4 Land within the Strategic Conservation Area

The proposed Strategic Conservation Area (SCA) is located within the Proposed Certification area, and includes land outside of the four nominated areas forming the BCAA (see Figure 3-6). The SCA comprises approximately 27,200 ha of land selected due to its intrinsic biodiversity value, and has been identified as the area of greatest long-term strategic and connectivity value from which conservation lands will be sourced.

A strategic conservation priorities method was developed by the applicant and used to identify the SCA lands. While the majority of SCA is located outside of the BCAA, it also includes all of the avoided lands within the four nominated areas.

3.2.5 Proposed planning measures

The Plan comprises a planning package which includes a range of policy documents and legislation designed to enable delivery of the Plan's outcomes over a 35-year period. The planning package includes the following:

- Draft SEPP (Strategic Conservation Planning) 2021
- Development Control Plan (DCP) Template
- Guidelines for Infrastructure Development
- Draft s9.1 Ministerial Direction – Strategic Conservation Planning Draft EP&A Regulation amendment
- Mitigation Measures Guideline

3.2.6 Existing land uses

The existing land uses for land proposed to be certified include the following:

- Agricultural lands
- Rural residential development
- Environmental lands, particularly isolated or fragmented patches where susceptible to land use changes or edge effects

3.2.7 Proposed land uses

The land proposed to be certified is subject to a range of future land uses. In relation to the proposed “urban capable” certified land, these include:

- Residential land, including low/medium/high density
- Mixed use town centres
- Industrial, agribusiness, logistics and warehousing development
- Health and emergency facilities
- Transport infrastructure
- Green & open space, public recreation parks & associated activities
- Essential infrastructure development, including gas/electricity pipelines
- Social infrastructure including schools, childcare, entertainment, places of public worship & libraries
- Roads & associated infrastructure

In relation to the proposed “transport corridor” certified land, these include:

- Outer Sydney Orbital major transport corridor (Greater Penrith- Eastern Creek & Western Sydney Aerotropolis nominated areas)
- M7/Ropes Crossing Link Road (Greater Penrith-Eastern Creek nominated area)
- Western Sydney Freight Line (Western Sydney Aerotropolis nominated area)
- Metro Rail future extension tunnel connection (Greater Macarthur nominated area)

3.3 Maps

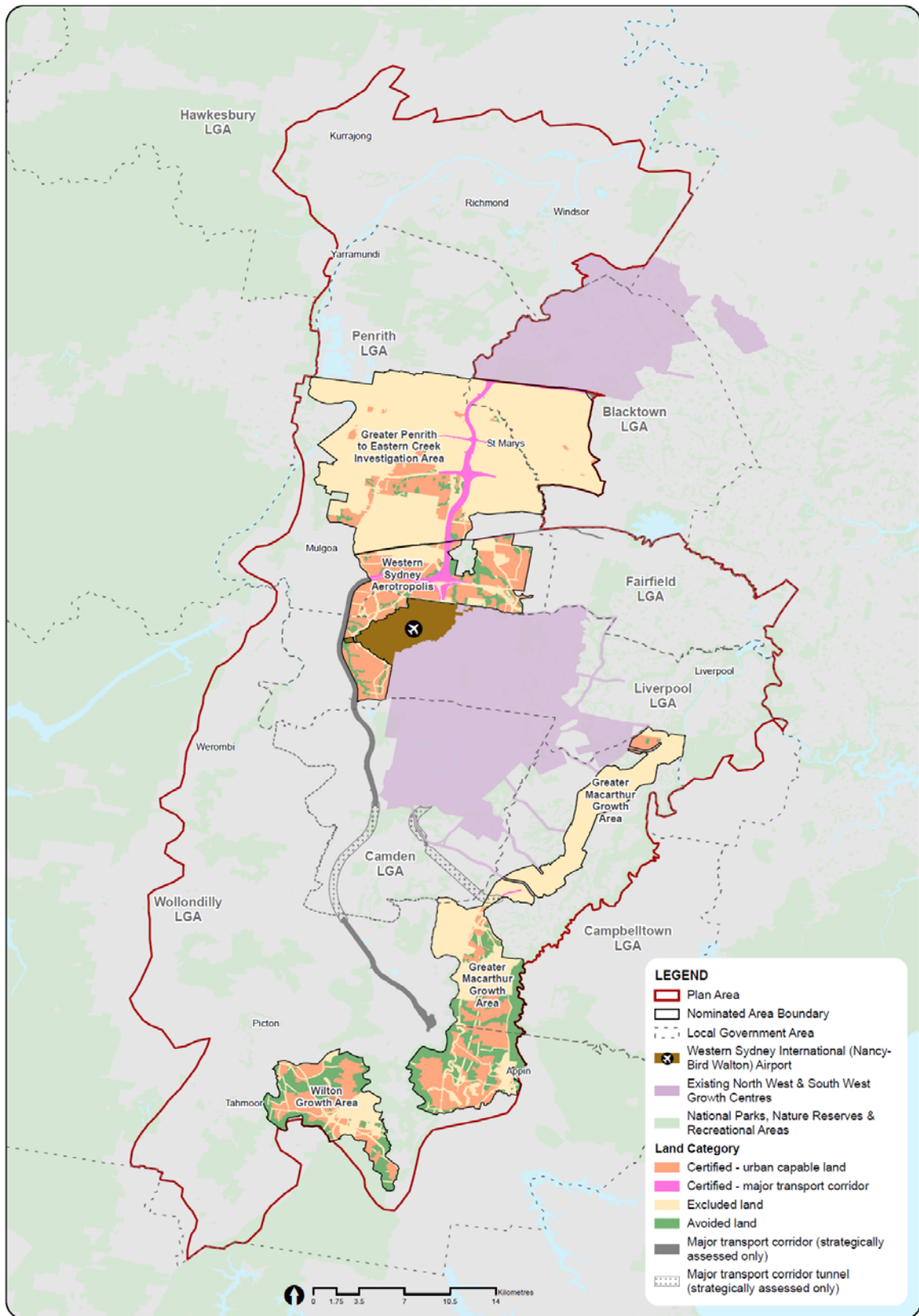


Figure 3-1 CPCP Biodiversity certification assessment area (BCAA)

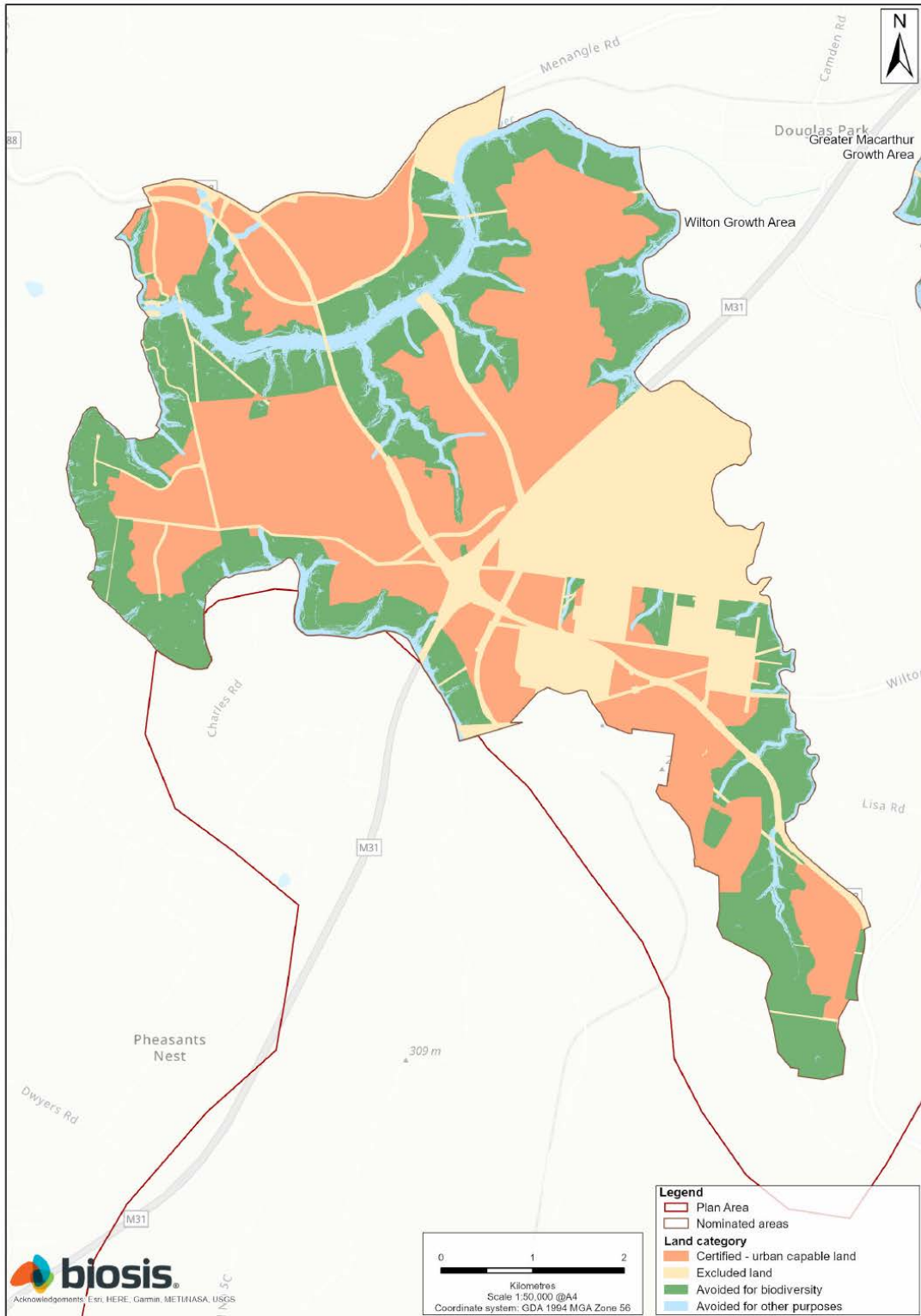


Figure 3-2 Wilton nominated area

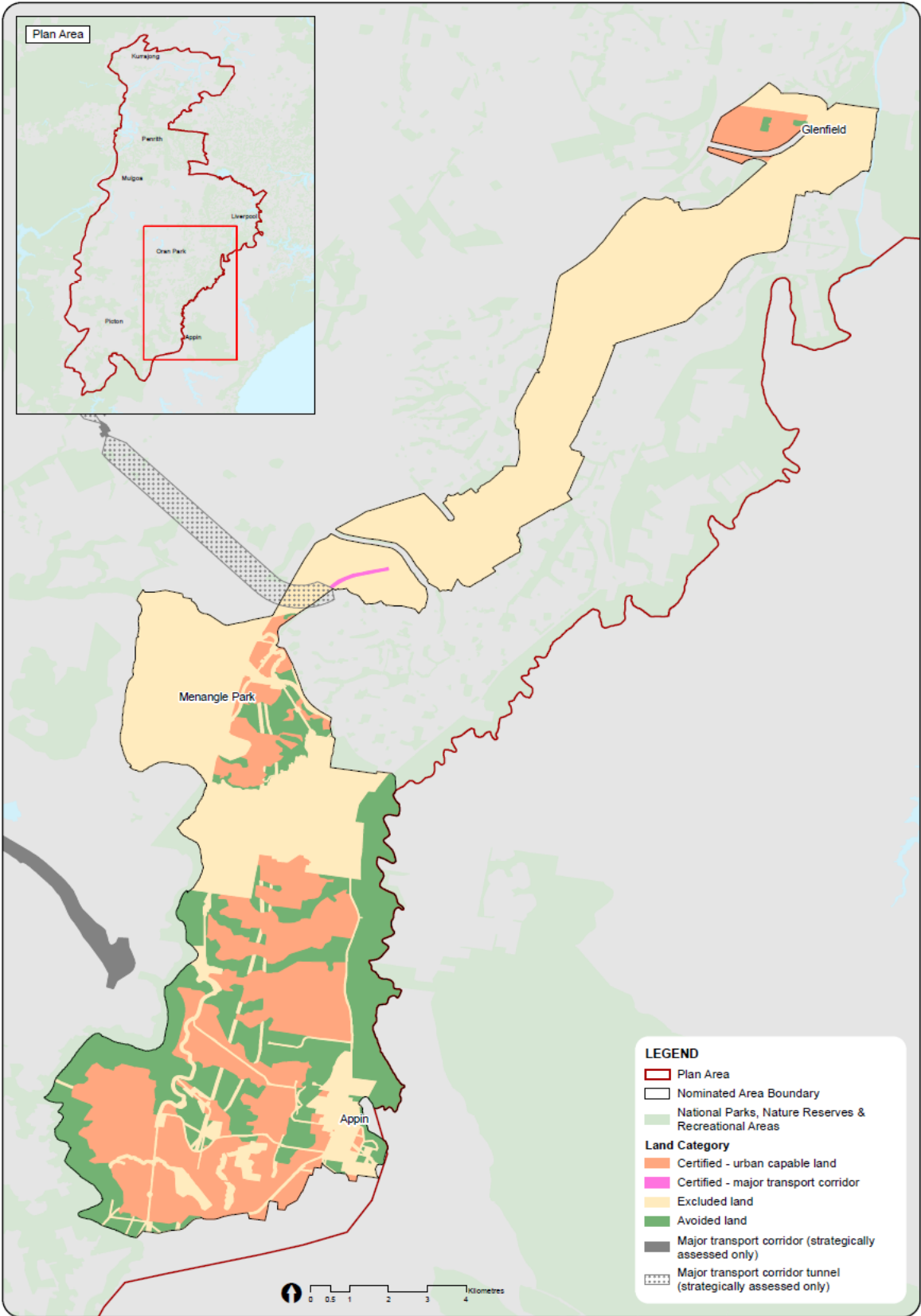


Figure 3-3 Greater Macarthur nominated area

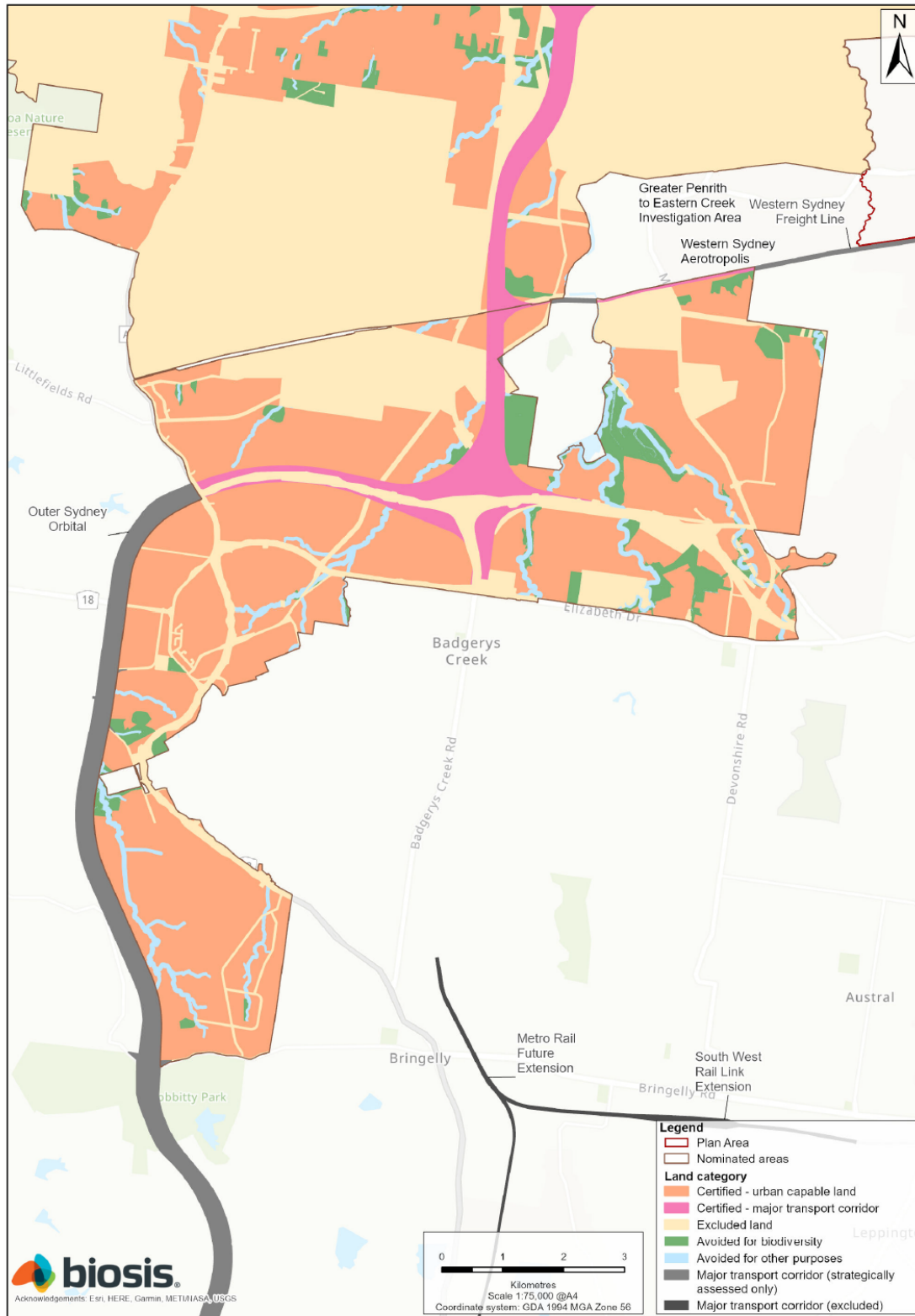


Figure 3-4 Western Sydney Aerotropolis nominated area

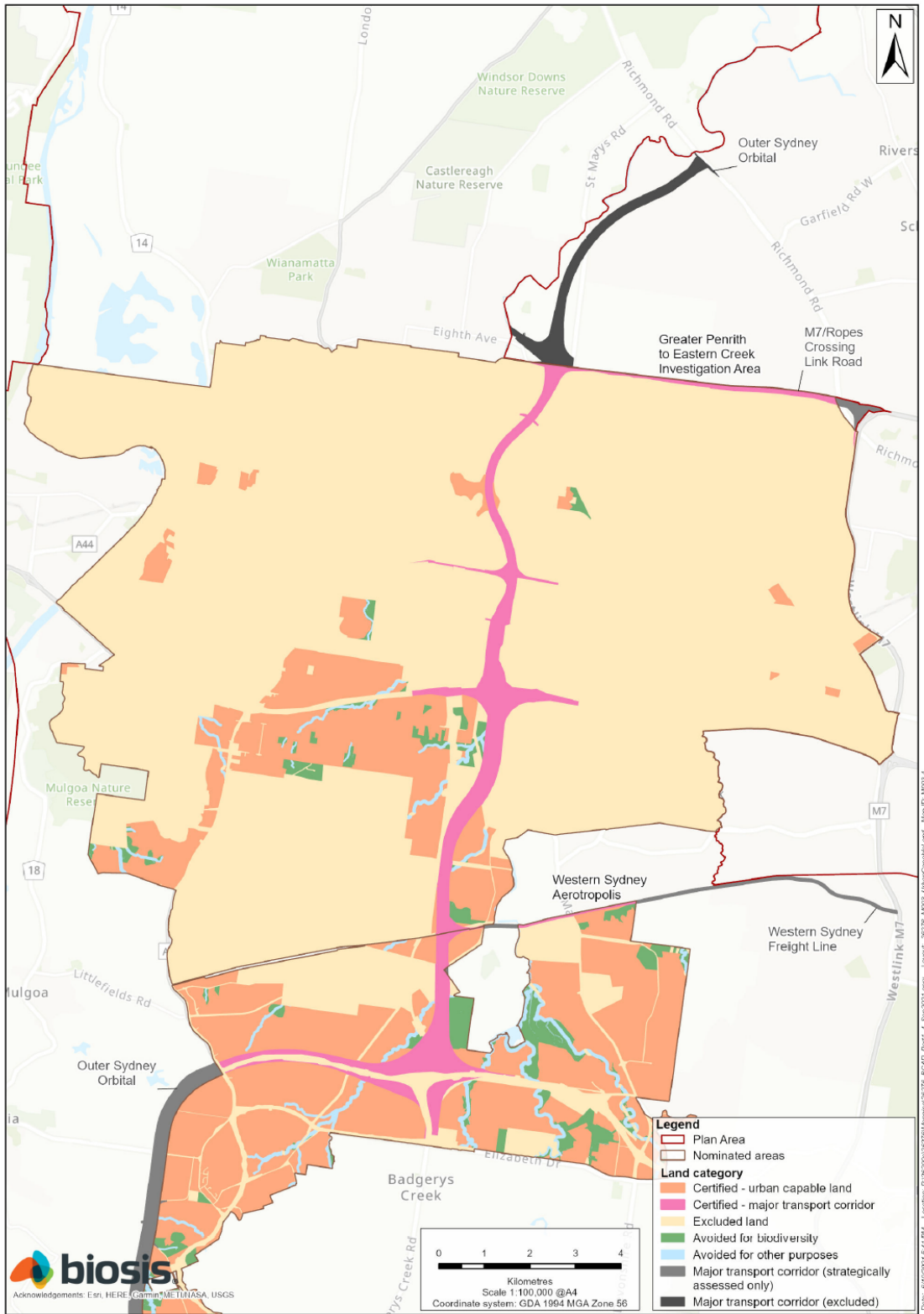


Figure 3-5 Greater Penrith-Eastern Creek nominated area

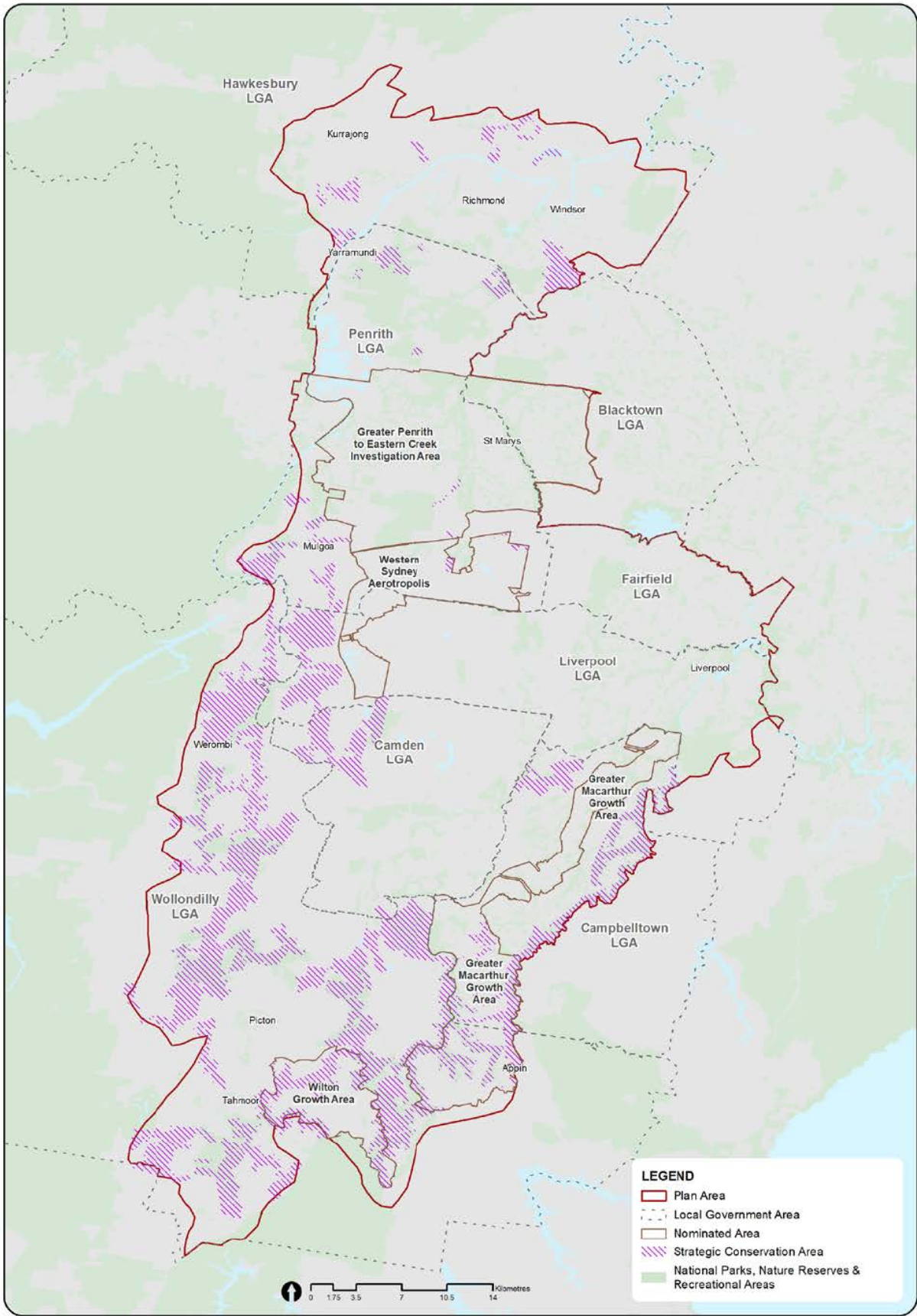


Figure 3-6 Proposed Strategic Conservation Area

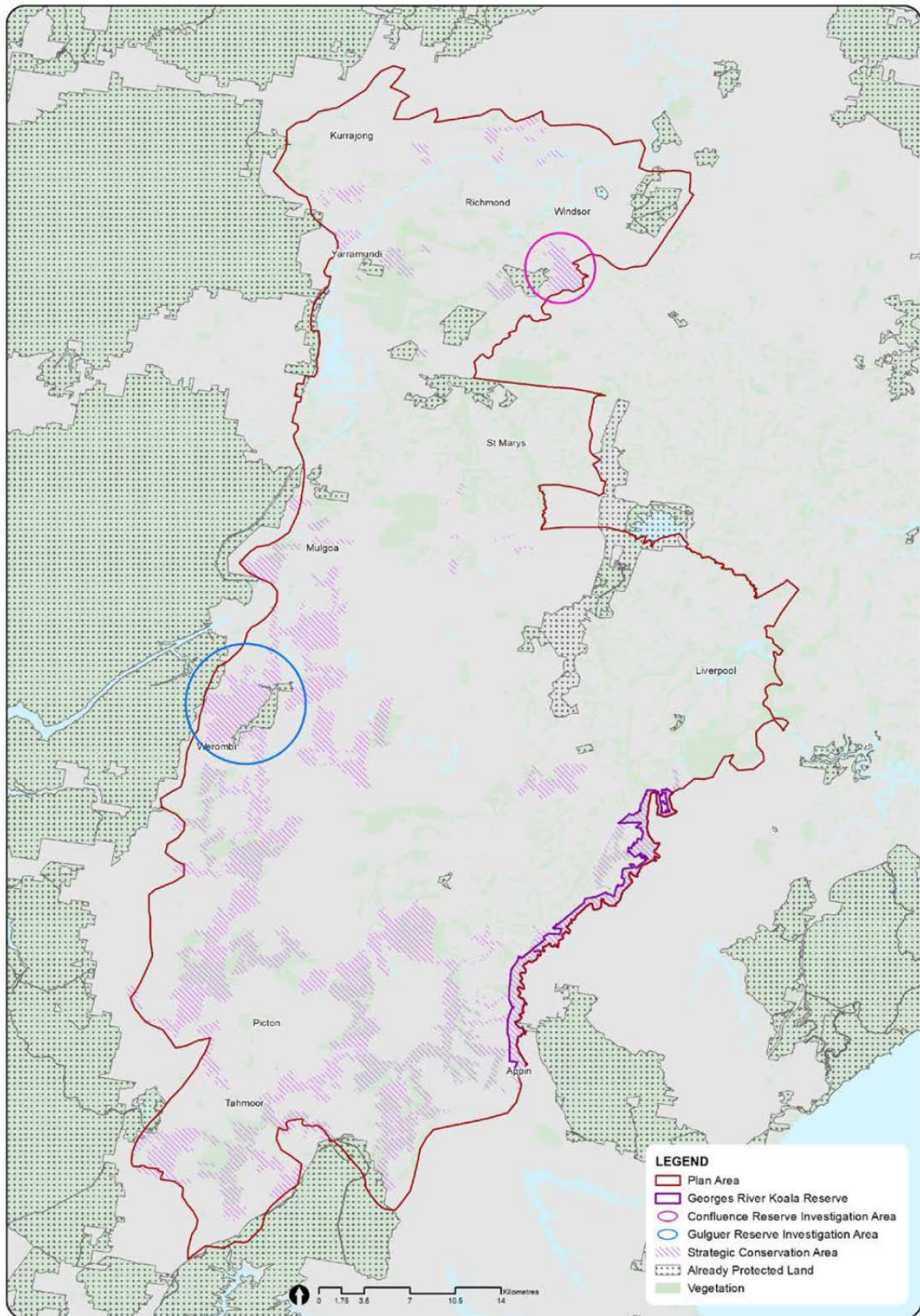


Figure 3-7 Proposed future NPWS reserves & reserve investigation areas

3.4 Land ownership

The majority of land in the Plan Area (identified in the maps above) is in private ownership.

There are however significant NSW and Commonwealth Government landholdings, including lands owned by Defence, Office of Strategic Lands, NPWS and local councils, throughout the Plan area.

3.5 Parties to the application

The following person/s or body/s are proposed parties to the application for biodiversity certification:

Party Name (ABN/I if relevant)	Contact
The Minister for Planning	Steve Hartley, Executive Director
	DPE Green & Resilient Places
	Steve.Hartley@planning.nsw.gov.au
	02 8289 6689

3.6 Biodiversity certification agreements

8.16 Biodiversity certification agreements

(1) The Minister may enter into an agreement (a biodiversity certification agreement) with a person in connection with biodiversity certification (including a proposal to confer, modify or extend biodiversity certification).

No biodiversity certification agreements under s8.16 of the BC Act are proposed in connection with the Proposed Certification

4. Description of proposal

4.1 The Plan's Commitments

The Plan's Commitments 1-26 are detailed at Appendix 1, and notably include the following:

- Reservation of land under the *National Parks and Wildlife Act 1974* (NPW Act) for Georges River Koala Reserve and two other reserves (Gulguer and Confluence Reserve are being investigated)
- Private land conservation program with a target of 5,325 ha of offset lands for establishment as biodiversity stewardship sites and retirement of credits
- Koala mitigation measures, in accordance with the NSW Office of Chief Scientist & Engineer recommendations
- Planning package including the Draft *State Environmental Planning Policy (Strategic Conservation Planning) 2021* (NSW), associated planning policies & guidelines
- Land management measures such as weed/fire/pest/disease management, and
- Education, research and an Aboriginal Engagement Strategy.

4.2 Measures to avoid or minimise impacts

Section 7 of the BAM sets out strategies and actions to be taken to avoid or minimise impacts on biodiversity values. The proposal should avoid or minimise impacts to land with existing biodiversity values before offsets are proposed to compensate for any residual impacts.

4.2.1 Land that is avoided

Avoidance is detailed at Chapter 14 of the BCAR.

Certified land - Urban capable

Land proposed to be avoided includes land that has high biodiversity values, having regard to the following criteria:

- Presence of threatened ecological communities and plant community types (PCT's), including condition, connectivity and percentage remaining
- Presence of entities at risk of serious and irreversible impacts (SAIL)
- Known habitat for threatened species including primary or secondary koala habitat
- Ecological processes, including lands identified as priority conservation lands, BIO Map core areas or areas on the NSW Biodiversity Values Map

Avoided land within the BCAA has also been identified as SCA land to be targeted for private land offsets or establishment as future NPWS reserves. It will also be mapped as Strategic Conservation Area under the proposed SEPP (Strategic Conservation Planning) 2021. The BCAR states that 67% of intact vegetation has been avoided, including 95% of "high (intact condition)" native vegetation and 72% of NSW-listed TEC's.

Land has also been avoided for purposes other than biodiversity and could not be otherwise reasonably developed, including steep slopes and riparian land with a Strahler order 3 stream (30-40m buffers on each side) or above. In accordance with the BAM, land meeting this criterion has not been treated as avoided land and is instead excluded land. Avoided order 1 and 2 streams (10m and 20m buffers on each side respectively) and land with vegetation connectivity value has been considered as land avoided for biodiversity purposes.

Certified land - Transport corridors

The avoidance criteria for transport corridors within proposed certified land, most notably the Outer Sydney Orbital, differs from the "urban capable" land and can be summarised as follows:

- Appraisal of site constraints as an initial step, namely environmental, engineering, social and existing land use factors
- Avoidance of gazetted reserves and priority conservation lands
- Evaluation of route options having regard to the above criteria
- Refinement of preferred route alignment having regard to presence of known threatened ecological communities and species
- Where impacts to reserves are considered unavoidable (e.g. Wianamatta Regional Park), impacts limited to areas of lowest biodiversity value
- Commitment to further avoidance and mitigation of impacts throughout the detailed design process

Commitment 1 of the Plan describes how development occurring within the BCAA must be undertaken in accordance with the approved biodiversity certification layout and any conditions of conferral, as follows:

- Commitment 1: Development will be undertaken in accordance with the Plan and any conditions of approval. This applies to the following classes of actions:

- urban and industrial
- infrastructure
- intensive plant agriculture
- major transport corridors.

Commitments 2, 2.1, 2.2, 3, 4, 4.1, 4.2 and 4.3 of the Plan relate to avoiding and minimising impacts, as follows:

- Commitment 2: Avoid and minimise impacts of up to 4,505 hectares of high biodiversity value area (the avoided land) through strategic conservation planning in the nominated areas
 - Commitment 2.1: Limit cumulative direct impacts over the life of the Plan from essential infrastructure to the following EPBC Act-listed threatened ecological community in the avoided land:
 - Shale Sandstone Transition Forest
 - Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest
 - River-Flat Eucalypt Forest
 - Coastal Swamp Oak (*Casuarina glauca*) Forest
 - Cooks River Castlereagh Ironbark Forest Western Sydney Dry Rainforest and Moist Woodland on Shale
 - Commitment 2.2: Prioritise the avoidance of impacts from essential infrastructure on the avoided land to:
 - known populations of the following threatened flora species:
 - *Grevillea parviflora* subsp. *parviflora* (small-flower grevillea)
 - *Persoonia bargoensis* (Bargo geebung)
 - *Persoonia nutans* (nodding geebung)
 - *Genoplesium baueri* (yellow gnat-orchid)
 - *Pimelea spicata* (spiked rice-flower)
 - *Pultanea parviflora*
 - protected koala habitat within the Wilton and Greater Macarthur growth areas to maintain the function of koala movement corridors.
- Commitment 3: Avoid and minimise impacts to threatened ecological communities, species and their habitat within certified - major transport corridors through detailed planning and design. This includes:
 - avoiding areas of potential habitat connectivity within riparian corridors where possible, particularly for the following species:
 - eastern pygmy possum
 - green and golden bell-frog
 - spotted-tailed quoll
 - squirrel glider
 - yellow-bellied glider
 - avoiding known flora populations within the Outer Sydney Orbital and M7/Ropes Crossing Link Road corridors where possible, particularly:
 - *Dillwynia tenuifolia*
 - *Grevillea juniperina* subs. *juniperina*
 - *Pultanea parviflora*

- *Persoonia nutans*
 - for the Outer Sydney Orbital, minimising where possible the placement of waterway crossing structures within riparian corridors, changes to waterway alignments, and bulk earthworks on adjacent floodplain areas.
- Commitment 4: Avoid and minimise impacts on threatened ecological communities, species and their habitat within major transport corridors (strategically assessed only), including the Outer Sydney Orbital and Metro Rail Future Extension tunnel sections, in accordance with the:
 - major transport corridors class of action description, including the NSW state-significant infrastructure (or equivalent) approvals process
 - Biodiversity Assessment Method (BC Act) (or equivalent).
- Commitment 4.1: Avoid and minimise impacts to known flora populations within the Outer Sydney Orbital and M7/Ropes Crossing Link Road corridors, including:
 - *Dilwynia tenuifolia*
 - *Grevillea juniperina* subs. *Juniperina*
 - *Pultanea parviflora*
 - *Cynanchum elegans*.
- Commitment 4.2: Avoid and minimise impacts where possible within and adjacent to the tunnel sections, including:
 1. known populations and habitat of:
 - *Eucalyptus benthamii*
 - *Pomaderris brunnea*
 - *Pimelea spicata*
 - Cumberland Plain Land Snail
 2. known populations and habitat, and threatened ecological communities within:
 - Mater Dei BioBank site within the Outer Sydney Orbital footprint near Camden
 - registered property agreement site within the Outer Sydney Orbital footprint at Camden Airport
 - Metro offset site within the footprints for the Outer Sydney Orbital and Metro Rail Future Extension near Harrington Park
 - Nepean River and associated riparian corridor within the Outer Sydney Orbital footprint
 - Camden Golf Club at Narellan adjacent to the footprint for the Metro Rail Future Extension
 - Mount Annan Botanic Gardens within the footprint for the Metro Rail Future Extension.
- Commitment 4.3: Avoid and minimise impacts where possible to environmental values within Commonwealth land sites, including known populations and habitat and threatened ecological communities, and existing infrastructure and services, at:
 - Camden Airport
 - Western Sydney University (Campbelltown Campus)
 - 12 Werombi Road, Grasmere NSW.

4.2.2 Entities at risk of a serious and irreversible impact

Section 8.8(2) of the BC Act provides that:

“If the Minister is of the opinion that the clearing of native vegetation and loss of habitat on land proposed for biodiversity certification is likely to have serious and irreversible impacts on biodiversity values, the Minister—

(a) is required to take those impacts into consideration in determining the application for biodiversity certification, and

(b) is required to determine whether there are any additional and appropriate measures that will minimise those impacts”.

Clause 6.7(2) of the BC Regulation identifies principles for determining when a serious and irreversible impact (SAII) will occur:

“An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct because—

(a) it will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline, or

(b) it will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size, or

(c) it is an impact on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution, or

(d) the impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.”

Section 10.2 of the BAM addresses the impact assessment of entities at risk of SAII, with additional assessment provisions for ecological communities (section 10.2.2) and threatened species or populations (section 10.2.3). Decision-makers can use the *Guidance to assist a decision-maker to determine a serious and irreversible impact* (DPIE, 2019) to help them decide whether a proposed impact will be a SAII.

The following entities are impacted by the Proposed Certification and are at risk of SAII:

Threatened Ecological Communities (TEC's)

- Cooks River/Castlereagh Ironbark Forest
- Cumberland Plain Woodland
- Shale Sandstone Transition Forest

Flora

- *Allocasuarina glareicola*
- *Hibbertia fumana*
- *Melaleuca deanei*
- *Micromyrtus minutiflora*

Fauna

- *Litoria aurea* (Green and Golden Bell Frog)

- *Chalinolobus dwyeri* (Large-eared Pied Bat)
- *Hieraetus morphnoides* (Little Eagle)
- *Pseudophryne australis* (Red-crowned Toadlet)
- *Lophoictinia isura* (Square-tailed Kite)
- *Lathamus discolor* (Swift Parrot)
- *Haliaeetus leucogaster* (White-bellied Sea-Eagle)

Discussion on whether the proposal will result in a SAI for these entities is at Section 5.5 below.

SAI is detailed in Appendix 5 and Chapter 25 of the BCAR.

The Proposed Certification would impact on a number of entities identified as being at risk of SAI. As listed above, these include three TEC's, four threatened flora species and seven fauna species. The avoidance process undertaken by the applicant for entities at risk of SAI can be summarised as follows:

- all occurrences of SAI TEC's added to Category 1 for avoidance criteria
- all occurrences of known habitat for SAI species added to Category 1 for avoidance criteria
- focus on avoidance of intact and/or longer-term viable patches of TEC's, including SAI entities.

For some SAI entities, 50% or less of the TEC or species habitat was avoided. This includes:

- Cumberland Plain Woodland
- Cooks River Castlereagh Ironbark Forest
- *Allocasuarina glareicola*
- *Micromyrtus minutiflora*
- Green and Golden Bell Frog
- Swift Parrot

For these SAI TEC's (Cumberland Plain Woodland, Cooks River Castlereagh Ironbark Forest), this level of avoidance has been justified given:

1. the extent of the TECs remaining is limited
2. the extent of TECs remaining is of lower condition

For these SAI species and habitats (*Allocasuarina glareicola*, *Micromyrtus minutiflora*, Green and Golden Bell Frog and Swift Parrot), the level of avoidance has been justified due to low levels of impact and the range of mitigations and offsets proposed for these SAI species and habitats.

4.2.3 Avoiding and minimising indirect impacts

Indirect impacts are those under Section 9 of the BAM requiring consideration that are in addition to direct impacts of clearing. Relevant indirect impacts are identified as:

- Changes to soils and hydrology
- Spread of weeds and pathogens
- Increased predation from pests and domestic fauna
- Altered fire regimes
- Increased disturbance from public access

- Increased fauna mortality
- Fauna disturbance due to light, noise and dust

Mitigation of indirect impacts is proposed by the applicant as follows:

- For urban/industrial/intensive plant agriculture development:
 - indirect impacts will be mitigated by specific controls in development control plans or mitigation measures imposed at development application stage under the NSW planning system
 - a set of “general mitigation measures” will be implemented.
- Specifically, for infrastructure and transport corridor development, mitigation measures will be imposed through future planning processes applied at the time approval for those projects, including major project consents and application of infrastructure mitigation measures under Part 5 of the *Environmental Planning & Assessment Act 1979*.

Commitments 5, 6 and 7 relate to mitigation of indirect and prescribed impacts, as follows:

- Commitment 5: Mitigate indirect and prescribed impacts from urban and industrial development; infrastructure; and intensive plant agriculture on threatened ecological communities, species and their habitat. This includes meeting specific mitigation requirements for threatened ecological communities, species and their habitat in accordance with Appendix E of the Plan.
- Commitment 6: Mitigate indirect and prescribed impacts on threatened ecological communities, species and their habitat within major transport corridors, including the Outer Sydney Orbital and Metro Rail Future Extension tunnel sections, in accordance with the:
 - major transport corridors class of action description, including the NSW state-significant infrastructure (or equivalent) approval for certified-major transport corridors
 - major transport corridors class of action description and the Biodiversity Assessment Method (BC Act) (or equivalent) for major transport corridors (strategically assessed only)
 - specific mitigation measures to address impacts on biodiversity values prescribed in Appendix E.
- Commitment 7: Mitigate indirect and prescribed impacts from urban, industrial, infrastructure development on the Southern Sydney koala population to best-practice standards and in line with advice from the Office of the NSW Chief Scientist & Engineer, and in accordance with Appendix E of the Plan.

Indirect impacts are detailed in Chapter 15 of the BCAR.

4.2.4 Avoiding and minimising prescribed impacts

Prescribed impacts include those which do not comprise direct clearing of native vegetation and are discussed at clause 6.1 of the BC Regulation. Prescribed impact types relevant to the proposal include:

- Karst, caves, crevices, cliffs, and other geological features of significance
- Rocks
- Human-made structures
- Non-native vegetation
- Habitat connectivity and movement

- Water bodies and hydrological processes
- Vehicle strikes

In response, the Plan proposes the following avoidance measures for prescribed impacts:

- Areas of cliffs, karsts and geological features are located outside of the proposed certified land
- Areas that are rocky tend to be exposed sandstone and steep areas, notably within Wilton and Greater Macarthur nominated areas, which are already unsuitable for development and have been avoided
- Avoidance of human-made structures has not been determined across the BCAA, however specific measures to avoid and minimise impacts on microbat species are proposed
- The Plan's avoidance criteria include areas of known threatened species, including non-native habitat
- Land proposed to be certified largely avoids riparian corridors and by extension impacts on hydrological processes
- Specific mitigation measures for vehicle strike, most notably for Koala, are proposed in the Plan's commitments including traffic calming, fauna underpasses and fencing
- Bio Map core areas and corridors were used as a surrogate to determine habitat connectivity, and largely avoided under the Plan's criteria. Intact corridors providing connectivity have also been prioritised for inclusion in the SCA.

Commitments 5, 6 and 7 of the Plan relate to mitigation of indirect and prescribed impacts, as follows:

- Commitment 5: Mitigate indirect and prescribed impacts from urban and industrial development; infrastructure; and intensive plant agriculture on threatened ecological communities, species and their habitat. This includes meeting specific mitigation requirements for threatened ecological communities, species and their habitat in accordance with Appendix E of the Plan.
- Commitment 6: Mitigate indirect and prescribed impacts on threatened ecological communities, species and their habitat within major transport corridors, including the Outer Sydney Orbital and Metro Rail Future Extension tunnel sections, in accordance with the:
 - major transport corridors class of action description, including the NSW state-significant infrastructure (or equivalent) approval for certified-major transport corridors
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 - specific mitigation measures to address impacts on biodiversity values prescribed in Appendix E.
- Commitment 7: Mitigate indirect and prescribed impacts from urban, industrial, infrastructure development on the Southern Sydney koala population to best-practice standards and in line with advice from the Office of the NSW Chief Scientist & Engineer, and in accordance with Appendix E of the Plan.

Prescribed impacts are detailed in Chapters 14 and 24 of the BCAR.

4.2.5 Justification for impacts that are not avoided

The BCAR provides the following justification for impacts to existing biodiversity values that are not avoided:

- Land proposed to be certified as “urban capable” went through an iterative process to determine the areas of highest biodiversity value and prioritised them for avoidance
- Alternatives were explored where land use precinct planning processes in the BCAA resulted in conflicts between areas of high biodiversity value and urban development priorities
- Identifying where isolated or small patches or patches subject to future edge effects occur in determining the “urban capable” land
- Land proposed to be certified as “transport corridors” went through an avoidance process led by Transport for NSW, from an initial constraints analysis through to an options selection and preferred corridor refinement, based on conservation priorities.

Avoidance is also considered as part of the assessment of the BCAR at section 5.4.1 of this report.

4.3 Impacts that are uncertain

Section 9.4 of the BAM requires an adaptive management strategy to accompany the BCAR proposed to monitor and respond to impacts on biodiversity values that are uncertain.

Vehicle strikes have been identified as an uncertain impact

The BCAR concludes that impacts that are uncertain related to damage to karsts, caves, crevices, cliffs and other geological features of significance will not occur within the BCAA.

The Plan’s proposed adaptive management approach (including to vehicle strikes) is discussed further at Section 5.2 below.

Uncertain impacts and adaptive management are detailed in Chapter 16 of the BCAR.

4.4 Biodiversity impacts and credit requirements

4.4.1 Impacts on native vegetation and habitat

The BCAA totals 39,810 ha and comprises 28,046 ha of cleared land and 9,730 ha of native vegetation.

The land proposed to be biodiversity certified (i.e., impacted) totals 11,164 ha and comprises 1,758 ha of native vegetation.

Ecosystem credit requirements

Ecosystem credits are used to offset the impacts on, threatened ecological communities, threatened species habitat for species that can be reliably predicted to occur on the subject land, and other plant community types (PCTs).

Development of the land for biodiversity certification would require a total of 40,223 ecosystem credits to be retired to offset the impacts to native vegetation and associated habitat for ecosystem credit species.

Table A-1 in Appendix 2 shows the credits required per impacted vegetation type in each of the four nominated areas. Impacts to PCTs/TEC are detailed at Chapter 23 of the BCAR.

The Plan does not impose credit retirement obligations for PCTs/TECs. Instead, the Plan proposes targets for impacted PCTs/TECs in hectares. These targets were developed having

regard to the estimated ecosystem credit requirements in the BCAR. The targets for PCTs/TECs are set out in Commitments 8.1 and 8.2 of the Plan.

Species credit requirements

Species credits are used to offset the residual impacts on threatened species that cannot be reliably predicted to occur on the SCA. Presence is determined by important habitat maps, survey, or an expert report. Where an expert report is used, the Department requires evidence of Departmental approval of expert status.

The land proposed for biodiversity certification (i.e., impacted land) contains habitat for 49 species credit species. Development of the land would require a total of 165,107 species credits to be retired in order to offset the residual impacts. Table A-2 in Appendix 3 shows the credits required per impacted species in each of the four nominated areas.

Impacts to threatened species are detailed at Chapter 21 of the BCAR.

The Plan does not impose credit retirement obligations for threatened species. Instead, the Plan proposes targets for threatened species to protect known *locations* for the species. These targets were developed having regard to the estimated species credit requirements in the BCAR. The targets for threatened species are set out at Commitment 9 of the Plan.

Prescribed impacts

A credit offset liability for prescribed impacts is optional and not required under the BAM and has not been provided.

Section 9.3.3 of the BAM requires mitigation measures to be identified for prescribed impacts. The Plan proposes mitigation measures addressing prescribed impacts, namely Commitments 5, 6 and 7 as follows:

- Commitment 5: Mitigate indirect and prescribed impacts from urban and industrial development; infrastructure; and intensive plant agriculture on threatened ecological communities, species and their habitat. This includes meeting specific mitigation requirements for threatened ecological communities, species and their habitat in accordance with Appendix E of the Plan.
- Commitment 6: Mitigate indirect and prescribed impacts on threatened ecological communities, species and their habitat within major transport corridors, including the Outer Sydney Orbital and Metro Rail Future Extension tunnel sections, in accordance with the:
 - major transport corridors class of action description, including the NSW state-significant infrastructure (or equivalent) approval for certified-major transport corridors
 - major transport corridors class of action description and the Biodiversity Assessment Method (BC Act) (or equivalent) for major transport corridors (strategically assessed only)
 - specific mitigation measures to address impacts on biodiversity values prescribed in Appendix E.
- Commitment 7: Mitigate indirect and prescribed impacts from urban, industrial, infrastructure development on the Southern Sydney koala population to best-practice standards and in line with advice from the Office of the NSW Chief Scientist & Engineer, and in accordance with Appendix E of the Plan.

Prescribed impacts are detailed in Chapters 15 and 24 of the BCAR.

Indirect impacts

Section 9.3.2 of the BAM requires measures for mitigating indirect impacts to be identified.

The Plan proposes mitigation measures addressing indirect impacts at Commitments 5, 6 and 7. These measures are included in the certification order.

The Plan also proposes to develop a Development Control Plan to mitigate indirect impacts. The planning package supporting the Plan is addressed in further detail at Section 5.4.2 (Principle 6) below.

Indirect impacts are detailed in Chapter 15 of the BCAR.

4.5 Proposed conservation measures

In accordance with section 8.3(2) of the BC Act, the measures that may be specified as approved conservation measures are the following measures to offset the impacts on biodiversity values of the clearing of native vegetation and the loss of habitat on the biodiversity certified land—

- (a) in any case—the retirement of biodiversity credits,
- (b) **in the case of a strategic application for biodiversity certification**—the reservation of land under the PW Act, the adoption of development controls (or State infrastructure contributions) under *the Environmental Planning and Assessment Act 1979* that conserve or enhance the natural environment or **any other measure determined by the Minister**,
- (c) any other measures declared by the regulations to be approved conservation measures.

The BCAR and Plan package identifies the following in relation to the proposed conservation measures:

- Land proposed for biodiversity conservation
- Proposed conservation measures
- Legal mechanisms for securing delivery of proposed conservation measures
- Parties to the biodiversity certification and responsibilities
- Timing for delivery of conservation measures
- Funding sources for delivery of conservation measures
- Framework for monitoring, reporting or auditing implementation of conservation measures.

Conservation measures are proposed to protect 3,672 ha of native vegetation within the BCAA, and at least 5,325 ha of native vegetation (yet to be identified) from a total of approximately 27,200 ha of SCA land.

The full package of Commitments proposed as conservation measures are provided at Appendix 1.

4.5.1 Land conservation program

The Plan includes a conservation program which will target private land in the SCA (see Map 3-6) for establishment of biodiversity stewardship sites. The SCA was developed using a conservation priorities method which aims at delivering ecological connectivity, by spatially analysing biodiversity values and land use data across the Cumberland Plain. In total, 27,200 ha of the Plan area has been identified in the SCA. It is noted that while the proposed SEPP

will apply to land mapped in the SCA, the SEPP is imposed as an interim measure to protect land in the SCA before the conservation land is secured, not as an approved conservation measure to offset the impacts of certification.

The conservation priorities method is detailed in *Sub-Plan A: Conservation Program and Implementation* of the Plan.

Threatened ecological communities

An offset liability for the total impact of development on proposed certified land in the BCAA was estimated in the BCAR (40,223 ecosystem credits in total). As access to the SCA was not available, the applicant has used a robust process to determine offset targets for native vegetation to offset the impact of the Plan. Using this process, an estimate of the credits that would be available within the SCA was also generated. Although using the best available information, the limitations of this process are noted given that it was based on a desktop analysis.

A total of 5,920 ha was determined as the overarching offset target for impacted PCT's. Ninety per cent of the total, equating to 5,325 ha, is proposed to be secured as conservation lands. Ten per cent of this total is proposed to be comprised by non-land based measures (see Section 4.5.9 below).

A breakdown of the PCT's impacted by development in the proposed certified area and offset targets are set out below:

PCT no.	PCT name	TEC name	BC Act status	Total impact (ha)	Total offset target (ha)
724	Broad-leaved Ironbark - Grey Box - <i>Melaleuca decora</i> grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin bioregion	<i>Shale Gravel Transition Forest</i>	Endangered	108.3	285
725	Broad-leaved Ironbark - <i>Melaleuca decora</i> shrubby open forest on clay soils of the Cumberland Plain, Sydney Basin bioregion	<i>Cooks River/Castlereagh Ironbark Forest</i>	Endangered	37.6	115
781	Coastal freshwater lagoons of the Sydney Basin Bioregion and South East corner bioregion	<i>Freshwater Wetlands on Coastal Floodplains</i>	Endangered	4.2	10
830	Forest Red Gum - Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin bioregion	<i>Moist Shale Woodland</i>	Endangered	0.0	0.2
835	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin bioregion	<i>River-Flat Eucalypt Forest</i>	Endangered	185.9	505
849	Grey Box - Forest Red Gum grassy woodland on flats of	<i>Cumberland Plain Woodland</i>	Critically Endangered	677.2	2,150

PCT no.	PCT name	TEC name	BC Act status	Total impact (ha)	Total offset target (ha)
	the Cumberland Plain, Sydney Basin bioregion				
850	Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin bioregion	<i>Cumberland Plain Woodland</i>	Critically Endangered	254.3	735
1395	Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin bioregion	<i>Shale Sandstone Transition Forest</i>	Critically Endangered	459.8	1,455
1800	Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter Valley	<i>Swamp Oak Floodplain Forest</i>	Endangered	26.2	70
Total:				1,753.6	5,325

Commitment 8 of the Plan summarises the offset targets for native vegetation, as follows:

- Commitment 8: Protect a minimum of 5,325 hectares of native vegetation in the Cumberland subregion to conserve biodiversity values in perpetuity in accordance with the conservation land selection steps, which may require up to 11,900 hectares of conservation land.
 - Commitment 8.1: This target includes minimum areas of the following EPBC Act-listed threatened ecological communities:
 - 675 hectares of Shale Sandstone Transition Forest
 - 665 hectares of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest
 - 570 hectares of River-flat eucalypt forest of eastern Australia
 - 125 hectares of Cooks River Castlereagh Ironbark Forest
 - 20 hectares of Coastal Swamp Oak Forest
 - 0.2 hectares of Western Sydney Dry Rainforest and Moist Woodland on Shale.
 - Commitment 8.2: This target includes minimum areas of the following BC Act-listed threatened ecological communities:
 - 2,885 hectares of Cumberland Plain Woodland
 - 1,455 hectares of Shale Sandstone Transition Forest
 - 505 hectares of River-Flat Eucalypt Forest
 - 285 hectares of Shale Gravel Transition Forest
 - 115 hectares of Cooks River Castlereagh Ironbark Forest
 - 70 hectares of Swamp Oak Floodplain Forest
 - 10 hectares of Freshwater Wetlands on Coastal Floodplains
 - 0.2 hectares of Moist Shale Woodland.

Up to 25% of targeted offsets for native vegetation are proposed to be secured via ecological reconstruction and/or restoration, as per Commitment 13 of the Plan which is as follows:

- Commitment 13: Deliver and support ecological restoration activities in conservation land including ecological reconstruction of up to a maximum of 25% of the Plan's offset target for native vegetation (Commitment 8).

This is discussed further at Section 5.4.

Threatened species

An offset liability was estimated for the total impact of development on proposed certified land in the BCAA (165,107 species credits in total).

Commitment 9 of the Plan identifies the following targets for threatened species offsets:

- Commitment 9: Protect threatened species likely to be at risk of residual adverse impacts from development under the Plan (target species) in accordance with the Plan's conservation land selection steps.

This includes securing offsets to protect known locations for the following target threatened species.

Flora species:

- 2 offset locations for *Cynanchum elegans*
- 3 offset locations for *Dillwynia tenuifolia*
- 3 offset locations for *Grevillea juniperina* subsp. *juniperina*
- 1 offset location for *Hibbertia fumana*
- 1 offset location for *Hibbertia puberola*
- 2 offset locations for *Marsdenia viridiflora* subsp. *viridiflora*
- 2 offset locations for *Persoonia nutans*
- 3 offset locations for *Pimelea spicata*
- 2 offset locations for *Pultenaea parviflora*
- 2 offset locations for *Pultenaea pedunculata*
- Fauna species:
- 1 offset location for *Haliaeetus leucogaster*
- 1 offset location for *Hieraaetus morphnoides*
- 1 offset location for *Lophoictinia isura*
- 3 offset locations for *Meridolum corneovirens*
- 1 offset location for *Myotis macropus*

This includes securing habitat for the following target threatened fauna species:

- 4,410 hectares of potential foraging habitat for *Lathamus discolor* (including 100 hectares of *Lathamus discolor* important habitat as defined under the BAM)
- 570 hectares of important habitat for *Phascolarctos cinereus* as defined in the Cumberland Plain Assessment Report.

The proposed offset locations are to be located on land in the SCA.

4.5.2 Retirement of biodiversity credits

The Plan includes retirement of the following credits, which have been held by the NSW Biodiversity Conservation Trust and will be retired on the applicant's behalf following conferral:

Table 4-1 – Proposed retirement of biodiversity credits

Name of credit	BAM credit ¹	Number of credits	Current credit holder/ proposed BSA/ BCF payment ²	Timing of purchase/ retirement of credits
Ecosystem credits				
PCT 849	Yes	171	NSW BCT	Purchased in 2019, retirement on applicant's behalf upon Plan approval

All other credits generated through Biodiversity Stewardship Agreement sites to meet offset targets will be retired to satisfy offsets targeted under the Plan. See Section 4.3.2 above.

¹ Where credits are proposed to be retired from a biobanking agreement under the former *Threatened Species Conservation Act 1995* (i.e. biodiversity banking assessment methodology (BBAM) credits, a statement of reasonable equivalence from the Environment Agency Head is required to determine the equivalent number of BAM credits under the BC Act.

² Strategic applications are only required to have regard to the offset rules in the BC Act as if they applied (see clause 6.9 of the BC Regulation).

4.5.3 Reservation of land under the NPW Act

The Plan includes reservation and establishment of the Georges River Koala Reserve, as a priority within the first five years. Two other additional reserve areas are also under investigation for feasibility, the Gulguer Reserve Investigation Area and the Confluence Reserve Investigation Area.

Table 4-2 - Reservation of land under the NPW Act

Party responsible for implementing the conservation measure (include name, contact details and ACN or ABN if corporation)	The Minister for Planning
Timing of implementation	Georges River Koala Reserve – 1-5 years (Stage 1a), 5-20 years (Stages 1b, 2 & 3) Gulguer Reserve Investigation Area – 5-20 years Confluence Reserve Investigation Area – 5-20 years
Number of hectares on which proposed conservation measure will apply	Georges River Koala Reserve – Up to 1,830 ha Gulguer Reserve Investigation Area – Up to 1,850 ha Confluence Reserve Investigation Area – Up to 580 ha
Location of land (eg lot and DP numbers)	Refer to Figure 3-7
Is a biodiversity certification agreement proposed to secure the conservation measure?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No - an interim Memorandum of Understanding between the applicant and National Parks & Wildlife Service (NPWS) for transfer of land into the NPWS estate has been agreed

Commitments 10 and 11 of the Plan relate to establishment of new reserves within the NPWS estate, as follows:

- Commitment 10: Establish a reserve to protect the north–south koala movement corridor along the Georges River between Appin and Long Point.
- Commitment 11: Establish at least 2 new reserves in addition to the Georges River Koala Reserve that will protect threatened communities, species and habitats that are targeted for protection through the Plan.

4.5.4 Adoption of development controls under the EP&A Act that conserve or enhance the natural environment

The Plan includes a package of planning controls, comprising:

- Draft SEPP (Strategic Conservation Planning) 2021 – aimed at providing development controls for avoided land, including a biodiversity overlay & requirements for developments to assess the impact of clearing with regard to regionally significant biodiversity, landscape connectivity and restoration potential
- Draft s 9.1 Ministerial Direction (Strategic Conservation Planning) – aimed at protecting avoided land and preventing rezoning to future land uses incompatible with environmental conservation
- Guidelines for Infrastructure Development – planning measures for essential infrastructure activities under Part 5 of the EP&A Act impacting on avoided land
- Mitigation Measures Guideline – aimed at providing development controls to mitigate indirect and prescribed impacts in the BCAA, including specific koala mitigation measures.

Table 4-3 - Adoption of development controls under the EP&A Act

Party responsible for implementing the conservation measure (include name, contact details and ACN or ABN if corporation)	The Minister for Planning
Timing of implementation	Years 1-5
Number and type of credits that conservation measure is equivalent to	TBC
Number of hectares on which proposed conservation measure will apply	Unknown
Location of land	The Plan area (Figure 3-1)
Is a biodiversity certification agreement proposed to secure the conservation measure?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Commitments 1, 2, 5 and 14 of the Plan relate to proposed planning measures, as follows:

- Commitment 1: Development will be undertaken in accordance with the Plan and any conditions of approval. This applies to the following classes of actions:
 - urban and industrial
 - infrastructure
 - intensive plant agriculture
 - major transport corridors.
- Commitment 2: Avoid and minimise impacts of up to 4,505 hectares of high biodiversity value area (the avoided land) through strategic conservation planning in the nominated areas.
 - Commitment 2.1: Limit cumulative direct impacts over the life of the Plan from essential infrastructure to the following EPBC Act-listed threatened ecological community in the avoided land:
 - Shale Sandstone Transition Forest

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest
 - River-Flat Eucalypt Forest
 - Coastal Swamp Oak (*Casuarina glauca*) Forest
 - Cooks River Castlereagh Ironbark Forest Western Sydney Dry Rainforest and Moist Woodland on Shale.
- Commitment 2.2: Prioritise the avoidance of impacts from essential infrastructure on the avoided land to:
 - known populations of the following threatened flora species:
 - *Grevillea parviflora* subsp. *parviflora* (small-flower grevillea)
 - *Persoonia bargoensis* (Bargo geebung)
 - *Persoonia nutans* (nodding geebung)
 - *Genoplesium baueri* (yellow gnat-orchid)
 - *Pimelea spicata* (spiked rice-flower)
 - *Pultanea parviflora*

protected koala habitat within the Wilton and Greater Macarthur growth areas to maintain the function of koala movement corridors.
- Commitment 5: Mitigate indirect and prescribed impacts from urban and industrial development; infrastructure; and intensive plant agriculture on threatened ecological communities, species and their habitat. This includes meeting specific mitigation requirements for threatened ecological communities, species and their habitat in accordance with Appendix E of the Plan.
- Commitment 14: Minimise impacts from development on biodiversity values in the strategic conservation area.

4.5.5 Koala mitigation measures

The Plan includes a package of koala mitigation measures, which are summarised as follows:

- Avoiding and minimising impacts, notably through avoidance of impacts to at least 2,910 ha of koala habitat in the Wilton and Greater Macarthur nominated areas
- Protection of up to 1,830 ha of koala habitat in the Georges River Koala Reserve, protecting koala movements in the Georges River corridor
- Secure at least one east-west koala movement corridor at Ousedale Creek and one other north-south corridor at the Nepean River
- Secure additional areas of priority koala habitat within the SCA in private land conservation, including ecological restoration, via the conservation program
- Install koala exclusion fencing and fauna crossings in the Wilton and Greater Macarthur nominated areas to provide for safe koala movement. These include safe crossings along Appin Road, underpasses at Ousedale Creek and Kings Fall Bridge and a safe crossing of the WaterNSW heritage canal
- Mitigate indirect impacts on koalas via development controls and mitigation guidelines, including domestic dog and pest management
- Monitoring of the koala population within the Plan area, including disease management measures such as chlamydia vaccination, to measure ongoing effectiveness of the Plan's measures on the koala population

- Education and research measures including stakeholder and community engagement program, priority research programs under the NSW Koala Strategy and training resources for wildlife carers
- Amendments to the Plan footprint to align with the recommendations of the NSW Office of the Chief Scientist and Engineer.

Commitments 5, 7, 10, 12, 20 and 23 of the Plan relate to proposed mitigation measures for koalas, as follows:

- Commitment 5: Mitigate indirect and prescribed impacts from urban and industrial development; infrastructure; and intensive plant agriculture on threatened ecological communities, species and their habitat. This includes meeting specific mitigation requirements for threatened ecological communities, species and their habitat in accordance with Appendix E of the Plan.
- Commitment 7: Mitigate indirect and prescribed impacts from urban, industrial, infrastructure development on the Southern Sydney koala population to best-practice standards and in line with advice from the Office of the NSW Chief Scientist & Engineer, and in accordance with Appendix E of the Plan.
- Commitment 10: Establish a reserve to protect the north–south koala movement corridor along the Georges River between Appin and Long Point.
- Commitment 12: Protect koala corridors in the Cumberland subregion, including those along the Nepean River, Georges River, Cataract River and Ousedale Creek.
- Commitment 20: Provide opportunities for the residents of Western Sydney to learn about and actively participate in biodiversity conservation including koala conservation.
- Commitment 23: Support rehabilitation measures to help maintain koala health and welfare.

4.5.6 Management of landscape threats

Additional actions are proposed to manage landscape threats across the Plan area, including:

- Weed management program
- Fire management program
- Pest management program
- Disease management program
- Support for new and climate change adaptation programs

Commitments 15,16, 17, and 18 of the Plan relate to proposed landscape threat measures, as follows:

- Commitment 15: Manage priority weeds in strategic locations in the Cumberland subregion to reduce threats to land secured within the strategic conservation area.
- Commitment 16: Manage priority pest animals in strategic locations in the Cumberland subregion to reduce threats to land protected within the strategic conservation area.
- Commitment 17: Manage fire in strategic locations in the Cumberland subregion to support the maintenance of biodiversity values on conservation land.
- Commitment 18: Support new or existing programs to control key diseases affecting threatened species and ecological communities in the Cumberland subregion.

4.5.7 Additional measures

Additional measures proposed to build knowledge and understanding include:

- Research, development and delivery of a 10-year Aboriginal Engagement and Implementation Strategy
- Build capacity in Local Aboriginal Land Councils
- Extension services, otherwise known as transfer of knowledge, information and skills, for property owners and land managers
- Investment in threatened species research, including species ecology and distribution, restoration and climate change response as priorities
- Community engagement programs and partnering with local Councils and residents to build awareness
- Build capacity in Local Aboriginal Land Councils
- Support for new or existing programs to help threatened species and ecological communities adapt to climate change in the Plan area.

Commitments 19, 20, 21 and 22 of the Plan relate to additional measures, as follows:

- Commitment 19: Support existing or new programs to help threatened species and ecological communities adapt to the impacts of climate change in the plan area.
- Commitment 20: Provide opportunities for the residents of Western Sydney to learn about and actively participate in biodiversity conservation including koala conservation.
- Commitment 21: Partner with Aboriginal groups and community to help maintain a distinctive cultural, spiritual, physical and economic relationships with their land and waters in Western Sydney.
- Commitment 22: Invest in research priorities that will support the implementation of the Plan and help to deliver the Plan's outcomes.

4.5.8 Special infrastructure contributions that conserve or enhance the natural environment

No Special Infrastructure Contributions (SIC's) are proposed as conservation measures.

The Plan relies on funding from both existing SIC's and proposed contributions under the forthcoming NSW infrastructure contributions framework.

Funding of the Plan is discussed in Section 5.4.

4.6 Retained land

A total of 24,190 ha of native vegetation in the BCAA lies in retained lands that are neither proposed to be biodiversity certified, nor subject to conservation measures. Development proposals in these areas will continue to be regulated under the BC Act and the EP&A Act.

A total of 24,190 ha of native vegetation in the BCAA lies in retained lands that are neither proposed to be biodiversity certified, nor subject to conservation measures.

Areas of retained land include:

- Sites subject to separate planning and/or biodiversity certification processes, or which are already substantially underway. This includes the Figtree Hill Lend Lease development lands at Appin, and Bingara Gorge at Wilton and Menangle Park
- Commonwealth land, such as the Defence Establishment Orchard Hills site
- Sites owned and managed by local councils zoned environmental or recreation
- Existing reserves and protected land
- Lands already developed.

Retained lands are referred to as “excluded” lands in the Plan.

5. Matters for the Minister to consider

An application for biodiversity certification must follow the requirements under Part 8 of the BC Act including submitting a biodiversity certification assessment report (BCAR).

The BCAR (prepared using the BAM) and a package of proposed conservation measures have been reviewed by the Department of Planning and Environment (Environment and Heritage Group, EHG) as documented in this Recommendation Report. For lands to be biodiversity certified, the Minister for Environment and Heritage must be satisfied in relation to certain matters outlined in Part 8 of the BC Act. These matters have been assessed by EHG and are documented in section 5 of this Recommendation Report.

Table 5-1 – Matters for the minister to consider

BC Act section	Minister's decision	Report Section
8.3(2)(b)	Determination of approved conservation measures being "other" proposed measures determined by the Minister	5.1
8.6(3)	Public notification requirements	5.2
8.6(2)	Consultation with Minister for Planning	5.3
8.7	Biodiversity certification to be conferred only if, having regard to the biodiversity certification assessment report, the approved conservation measures adequately address the likely impacts on biodiversity values of the biodiversity certification of the land.	5.4
6.5, 8.8	Impacts likely to have serious and irreversible impacts on biodiversity values	5.5
	Determination of serious and irreversible impacts on biodiversity values must be made in accordance with the principles at clause 6.7 of the Biodiversity Conservation Regulation 2017.	

5.1 Determination of approved conservation measures

Section 8.3(1) of the BC Act provides that the order conferring biodiversity certification is to specify the measures that are approved conservation measures under the biodiversity certification.

The *Cumberland Plain Conservation Plan*, inclusive of *Sub-Plan A: Conservation Program* and *Implementation* and *Sub-Plan B: Koalas* (collectively the 'Plan package') is an approved conservation measure. The proposed conservation measures are described in Section 4.

The Plan package comprises 26 Commitments and 131 Actions (see Appendix 1) over the life of the Plan including:

- Reservation of land under the NPW Act for Georges River Koala Reserve and two other reserves (Gulguer and Confluence Reserve Investigation Areas are under investigation for suitability)
- Securing conservation lands comprising a minimum of 5,325 hectares of land to meet offset targets for 8 threatened ecological communities (being 90% of the total offset requirement as calculated in hectares) by establishing as biodiversity stewardship sites and retiring related credits.

- Securing 4,410 hectares of potential foraging habitat for the Swift Parrot, 570 hectares of important Koala habitat and offset locations for 15 other threatened species.
- Koala mitigation measures, in accordance with the NSW Office of Chief Scientist and Engineer recommendations (see Appendix 8)
- A planning controls package including the *Draft State Environmental Planning Policy (Strategic Conservation Planning) 2021* (which will become the new Chapter 13 of the recently consolidated *State Environmental Planning Policy (Biodiversity & Conservation) 2021*), associated planning policies and guidelines
- Non-land based measures, comprising 10% of total funding and including landscape management measures (weed/fire/pest/disease management), education, research and an Aboriginal Engagement Strategy.

Recommendation

That the Minister be **satisfied** that the proposed Plan package be determined as approved conservation measures for the purposes of strategic biodiversity certification, in accordance with section 8.3(1) of the *Biodiversity Conservation Act 2016*.

5.2 Public notification requirements

Section 8.6 of the BC Act sets out the requirements for public notification of the application.

(3) *The Minister is not to confer biodiversity certification unless—*

(a) *the applicant for biodiversity certification publishes notice of the application in a newspaper circulating generally throughout the State and on a website approved by the Minister (and specifies in the notice where the application will be exhibited), and*

(b) *the notice invites the public to make submissions relating to the application before a closing date for submissions specified in the notice (being a date that is not less than 30 days after the date the notice is first published in a newspaper under this section), and*

(c) *the applicant causes copies of the application to be exhibited on its website and such other places that the Minister requires (until the closing date for submissions), and*

(d) *the applicant provides a report to the Minister that indicates the applicant's response to any submissions relating to the application that were received by the applicant before the closing date.*

(4) *An applicant may vary its application for biodiversity certification as a consequence of any submission received following public notification of the application or for any other reason.*

(5) *Further public notification of the application, as varied, is not required unless the Minister otherwise directs.*

Table 5-2 – Public exhibition of the Plan

Details of consultation	Comments
Was consultation under s 8.6 of the BC Act followed?	Yes – copies of the relevant advertisements have been supplied
Time period application was on exhibition	26 August 2020 – 2 November 2020
Number of submissions received	508
Is application varied as a result of submissions?	Yes – see discussion below

Discussion

The *Response To Submissions Report* addresses the submissions received and outlines the applicant’s responses where relevant.

Key issues raised during the public exhibition were:

Removal of proposed environmental zoning

The Plan originally proposed to rezone land avoided for biodiversity purposes within the SCA for “Environmental” (now “Conservation”) zoning under the accompanying SEPP.

A number of submissions raised concerns regarding the Plan’s proposed environmental zoning of conservation lands, particularly that it:

- would reduce property values
- would unfairly impact some landholders over others
- was based on inadequate vegetation mapping
- was not consulted on adequately
- is confusing and applied inconsistently.

In response, the proposal to rezone avoided land and strategic conservation area lands was removed. A biodiversity overlay for conservation lands in the proposed SEPP (Strategic Conservation Planning) is now proposed as an alternative approach, retaining the existing land use zoning for affected properties on avoided and SCA lands.

Impacts to biodiversity values

A number of submissions raised concerns regarding the impacts of future development in the Plan area on biodiversity values, including:

- Development often appeared to be favoured over conservation in the nominated areas
- Impacts to Cumberland Plain Woodland are too high
- Remnant areas of Cumberland Plain Woodland should be protected
- Urban heat effects and climate change should be reflected in the Plan
- Transport corridors result in substantial impacts, including on existing reserves.

Some minor changes were made to vegetation mapping in response to submissions from impacted landholders. It is now proposed to target landholdings for offsets in the Razorback

area over the first five years, which comprises significant occurrences of Cumberland Plain Woodland.

Conservation program

A number of submissions raised concerns with the proposed range of conservation measures, including:

- The conservation program is inadequate and would favour development over conservation outcomes
- The Plan does not protect habitat and proposes offsets which are ineffective
- Impacts of transport corridors are not fully known as detailed route planning and avoidance has not yet been finalised
- Offsets must be prioritised within the Cumberland Plan, as offsets sourced elsewhere are not “like-for-like”
- Not all properties identified for conservation will be suitable for biodiversity stewardship sites
- Existing reserves must not be counted as offsets and the proposed reserves do not deliver connectivity
- The Plan would result in fragmentation and is inadequately funded to deliver the offsets required.

The Plan’s offset targets have been developed to source offsets for entities being impacted and funding for the first five years has been secured. A reconciliation accounting process has also been developed to track offsets against impacts over the Plan’s life and calculates whether offsets obligations are met.

Ecological Restoration

A number of submissions raised concerns with the proposed ecological restoration, which will comprise up to 25% of the Plan’s offset target for threatened ecological communities, including the following:

- Protection of existing bushland should be the Plan’s priority, rather than restoring degraded areas which should only be a last resort
- Further knowledge is required to successfully restore communities such as Cumberland Plain Woodland
- Community education and engagement is required to increase involvement on restoration activities.

The Plan’s target for restoration as a percentage of total offsets remains at 25%, however the Confluence Reserve Investigation Area is now focused on as an early priority due to its restoration potential. Further research was undertaken into how responsive targeted ecological communities are to restoration.

Koala protection

The following issues were raised in relation to koala protection in the submissions:

- East-west koala corridors connecting the Nepean and Georges Rivers need to be considered and protected
- The minimum corridor widths recommended by the NSW Office of the Chief Scientist and Engineer should be incorporated into the Plan, as well as recommendations for asset protection zones and buffers
- More than one crossing and fencing is required along Appin Road

- Both support and concerns regarding the ecological and visual impacts of koala fencing
- Inadequate land has been set aside for koala protection in southwest Sydney
- The proposed Georges River Koala Reserve must be established as soon as possible.

Updated advice from the Office of Chief Scientist and Engineer in relation to the Plan was publicly released in May 2021. In response, the Plan was amended to reflect the May 2021 recommendations, including changes to land use and biodiversity certification footprints. See Appendix 8.

Funding and implementation

The following issues were raised regarding funding and implementation:

- The existing committed funding is inadequate to deliver the offsets required, and there is no certainty beyond the first five years
- Funding must be in place prior to the offsets being delivered
- The role of special infrastructure contributions is unclear
- Further detail on proposed governance arrangements of the Plan is required
- Reliance on planning instruments and policies to deliver conservation measures is problematic given these can be amended over time
- Compliance is challenging given existing limited Council resources.

As discussed above, the Plan has secured funding from the NSW Government for the first five years. Funding will be linked to the proposed infrastructure contributions reforms proposed by the NSW Government over the Plan's life. The governance framework has been spelt out and will be further developed at implementation stage, along with the Plan's compliance framework.

Recommendation

That the Minister be **satisfied** that the public notification requirements in section 8.6 of the *Biodiversity Conservation Act 2016* have been met and that further public notification is not required.

5.3 Consultation with Minister for Planning

Section 8.6 of the BC Act states that:

(2) The Minister is to consult the Minister for Planning before determining an application for biodiversity certification.

Discussion

On 3 March 2022, the Minister for Planning was consulted as required under section 8.6(2) of the BC Act. The Minister's response dated 18 March 2022 noted support for the Plan, refer to Appendix 10.

Recommendation

That the Minister be **satisfied** that he has consulted with the Minister for Planning.

5.4 Biodiversity certification to be conferred only if approved conservation measures adequately address the likely impacts

Section 8.7 of the BC Act provides that:

- (1) The Minister may confer biodiversity certification only if the Minister is satisfied that (having regard to the biodiversity certification assessment report) the approved conservation measures under the biodiversity certification adequately address the likely impacts on biodiversity values of the biodiversity certification of the land.*
- (2) For the purposes of determining the approved conservation measures (including the number of credits that may be required to be retired), the Minister is to have regard to the biodiversity certification assessment report but is not bound by that report.*
- (3) This section applies to the extension or modification of biodiversity certification under this Part in the same way as it applies to the conferral of biodiversity certification.*

Clause 6.2 of the BC Regulation provides that:

- (5) When conferring biodiversity certification on land under Part 8 of the Act, the determination of conservation measures that adequately address the impacts on biodiversity values is subject to the following —*
 - (a) the conservation measures are the approved conservation measures referred to in section 8.3 of the Act,*
 - (b) the offset rules do not apply to biodiversity certification conferred as a result of a strategic application for biodiversity certification.*

5.4.1 Biodiversity Certification Assessment Report prepared using BAM 2017

Section 6.13 of the BC Act provides that:

For the purposes of the biodiversity offsets scheme, a biodiversity certification assessment report is a report prepared by an accredited person in relation to the proposed biodiversity certification of land under Part 8 that—

- (a) assesses in accordance with the biodiversity assessment method the biodiversity values of the land proposed for biodiversity certification, and*
- (b) assesses in accordance with that method the impacts on biodiversity values of the actions to which the biodiversity offsets scheme applies on the land proposed for biodiversity certification, and specifies the number and class of biodiversity credits to be retired to offset those impacts as determined in accordance with that method, and*
- (c) that specifies other proposed conservation measures on or in respect of other land to offset those impacts on biodiversity values and their value (in terms of biodiversity credits) determined in accordance with that method.*

5.4.1.1 Overview

The Cumberland Plain Assessment Report is the BCAR submitted with the Proposed Certification. The Report was prepared by Jane Raithby-Veall of Biosis Pty Ltd, BAM Assessor Accreditation No. BAAS18134, an accredited person in accordance with s 6.10 of the BC Act.

The Cumberland Plain Assessment Report assesses the impacts of biodiversity certification on biodiversity values and has been prepared using BAM 2017.

Appendix 2 and Appendix 3 of the Recommendation Report provides a summary of the biodiversity credits required for the land where biodiversity certification is proposed and the credits to be retired or the credits that the proposed conservation measure is equivalent to, if the offset rules had applied.

A detailed review of the outcomes of the BAM assessment is provided at Appendix 4.

The area proposed for certification exceeds 11,000 hectares across four nominated growth areas and transport corridors. The Cumberland Plain Assessment Report is the first time that the BAM has been applied to a proposal of this scale. Note also that permission to access land for survey was not secured across the entire assessment area.

5.4.1.2 Mapping of native vegetation, PCTs and condition states

The mapping methods were generally consistent with the requirements for mapping of native vegetation, PCTs and condition states under the BAM.

The BAM requires the assessor to map native vegetation extent using digital aerial photography or best available at a scale of not greater than 1:10,000 (section 5.1). In the BCAR, most available contemporary data and imagery was used. Although BAM does not require the decisions made in this process to be documented, confidence in the mapping could have been improved if more detail was provided on the criterion and thresholds applied to the mapping of woody/non woody and native and non-native cover.

The BAM requires an assessor to map the threatened ecological communities (TECs) and plant community types (PCTs) according to the NSW PCT classification (section 5.2). The BAM identifies a range of information sources that the assessor should review and use to develop a survey plan. The assessor must undertake a representative plot-based survey to identify TECs/PCTs and justify TEC/PCT selections with evidence.

Private land access constraints made it difficult for the applicant to carry out surveys and ground truthing. It is noted that these constraints could have been reduced or overcome by using BAM compatible BioNet Flora Survey plot data to aid in the selection and mapping of plant community types (PCTs) in areas that were not surveyed.

Appropriate diagnostic tests were reportedly used to select the most appropriate PCT based on plot data. However, the results of these tests were not provided and PCT choice could not be evaluated. Furthermore, the method used to adequately map vegetation communities with largely unknown distributions, small spatial extents and/or which are difficult to detect using aerial imagery could have been improved.

The BAM requires an assessor to map vegetation zones for each TEC/PCT which is vegetation that has a similar broad condition state (section 5.3.1). A vegetation zone may comprise a number of discontinuous patches of vegetation provided the vegetation within the discontinuous areas is the same PCT and in a similar broad condition state. The BAM requires an assessor to determine patch size (section 5.3.2).

Canopy density and age were identified as attributes used to assess and annotate vegetation condition classes through image interpretation and LIDAR data. Although BAM does not specifically require decisions made in this process to be documented, confidence in the condition categorisation process leading to vegetation zone mapping could have been improved with more detail on how condition classes were defined.

Vegetation maps underpin impact assessment and offset processes. Deficiencies can affect avoidance outcomes, impact calculations, offset liabilities and effective mitigation. Due to the scale of the exercise and access limitations, the BCAR relied heavily upon remote sensing and extrapolation to map native vegetation across the assessment area. A range of methods

were applied to the extrapolation process including environmental relationships, imagery patterns, field assessment and expert opinion.

Although generally compliant with BAM, confidence in the assumptions made could be improved. The risk that impacts (and consequently) offsets differ from those determined in the BCAR is addressed by Schedule 3 Condition 4. Species requiring an “offset location” under Commitment 9, where there had been concerns regarding the survey effort, have had their offset targets revised upwards.

For Biodiversity Stewardship Sites established by the Applicant under the Plan, the Applicant must determine whether there is potential habitat present for target species under Commitment 9. If there is potential habitat, the Applicant must generate species credits which can count as an “offset location”. If the final number of “offset locations” secured for each target species exceeds the targets then this number must be secured instead.

Annual reports will also be provided to the Executive Implementation Committee and the Minister setting out the results of the Reconciliation Accounting Process which reconciles the clearing of vegetation and habitat on Specified Land with the impacts on each entity identified in the Cumberland Plain Assessment Report, including the areas of potential habitat for non-target species secured under the conservation program (see Schedule 4 Conditions 2 and 9).

5.4.1.3 Calculation of vegetation integrity scores

The BAM requires an assessor to calculate vegetation integrity (or site condition) for vegetation zones by gathering data on the composition, structure and relevant function attributes (section 5.3.3). Minimum numbers of vegetation plots are prescribed for different vegetation zone sizes (section 5.3.4). Plots and transects must be established to provide a representative assessment of vegetation integrity of the vegetation zone to account for the variation in the broad condition state, including additional plots as required. Plot survey data is used to calculate a vegetation integrity score (section 5.3.5).

In the BCAR, vegetation zones were applied across the assessment area. The assessment report states that *“vegetation zones were not broken down by nominated area. For example, vegetation zone 849 (thinned) occurs across all four nominated areas, and all data collected from within that zone has been pooled to determine the vegetation integrity score, independent of where each plot was collected”*.

This approach is consistent with the BAM and responsive to the scale of the assessment and access limitations. However, it is noted that:

- Condition scores are highly variable for a vegetation zone, both within and across the nominated areas
- In some nominated areas, no plot data has been collected for some Vegetation Zones.
- The sampling of some PCTs is skewed towards certain nominated areas.

There is a risk that these limitations have reduced the accuracy of some vegetation integrity scores and consequently offset calculations. Additional information was provided by the applicant to address this risk, which highlighted:

- The lack of private property access was a major contributing factor to where, and how many, plots were surveyed
- Plots were over-collected wherever possible
- The number of plots collected for each vegetation zone was typically many more than the minimum requirements of the BAM.

On balance, this is considered to be an acceptable approach for a strategic scale assessment and that appropriate actions were taken to minimise the risks to a representative sampling effort.

Also see 'Representative plot data' in Appendix 4 for more details.

5.4.1.4 Assessing habitat suitability for threatened species

The BAM notes that the habitat suitability assessment is supported by information from the TBDC (s 6.1.1.1) and that the habitat suitability assessment requires the assessor to use data in the TBDC (s 6.1.1.3). Importantly, that BAM also allows an assessor to use “*additional information about a threatened species, in BioNet (e.g. the profile of a threatened species) or published, peer reviewed literature, when assessing the habitat suitability of a site*” (s 6.1.1.2).

The BAM outlines processes for identifying species of interest, determining whether species are present and calculating an offset requirement. For 'ecosystem' credits, threatened species survey is not required because these species can be confidently predicted by association with habitat surrogates (section 6.2). For 'species' credit species, this process occurs in a six-step process (section 6.4) to narrow down the list of possible species and identify 'candidate' species with potential to occur before determining whether they are present and quantifying the impact.

The BCAR is consistent with the approach outlined in BAM for assessing ecosystem credit species. The BCAR is consistent with the approach outlined in BAM for assessing species credit species up to Step 3. For Steps 4 – 6, the BCAR applies a process called the 'assumed presence using a knowledge-based method'.

Assumed presence using the knowledge-based method

The knowledge-based method was devised by the applicant to prepare species polygons to quantify impacts and generate credit liabilities for 27 species credit species.

BAM provides three options to accredited assessors to establish whether each species credit species is present, or is likely to use suitable habitat (section 6.4.1.21):

- assuming it is present, or
- undertaking a threatened species survey, or
- obtaining an expert report.

If a species credit species is determined to be present or likely to use the suitable habitat, a species polygon must be prepared (section 6.4.1.26).

The species polygon is created using the results of the species survey or information in the expert report where these are prepared. When presence is assumed, the species polygon can be created using an expert report or by mapping the entire vegetation zones within which the species credit species is predicted to occur (section 6.4.1.30).

The knowledge-based method combines elements of the BAM process in a different sequence:

- Step 1 – collate information on records and potential habitat into species profiles
- Step 2 – map areas of potential habitat on the basis of associations with PCTs and condition classes in BioNet and refine the species polygon using information collated in Step 1, including the rule set for habitat parameters developed under s6.1.1.2 of the BAM (Table B-1 in Part 3 Attachments of the BCAR),
- Step 3 – undertake targeted field surveys in nominated areas and transport corridors where access was available

- Step 4 – change the size of species polygon developed under step 2 or step 3, using the outcomes of targeted surveys (for flora species) and/or surveys of habitat components (for fauna species, and some flora species)
- Step 5 – assume presence in the habitat polygons developed at step 4.

The key factors driving its development and use were:

- the scale of the proposed certification, with nominated areas proposed for development being very large
- much of the land in the nominated areas is in private ownership and landholder access was often not obtained which limited targeted survey opportunities, and
- within these constraints, a reliance on assuming presence for those 27 species generating very large species polygons.

The method relies on the Applicant's interpretation of section 6.1.1.2 of the BAM. The intent of this section is that additional information can be used when assessing habitat suitability, but the information must meet certain requirements i.e. it must be in BioNet or in published, peer reviewed literature.

Additional information under section 6.1.1.2 was used instead of data in the Threatened Biodiversity Data Collection (TBDC) to define habitat constraints that shape species polygons. These constraints often contradicted relevant information in the TBDC. However, this interpretation is available, and this clause has been reworded and relocated in BAM 2020.

The Applicant used the available interpretation of 'published, peer reviewed literature'. In most cases, the habitat constraints applied in the rule set used for the knowledge-based method to map areas of potential habitat were not derived from sources that meet the Department's expectations for 'published, peer reviewed literature'.

See Appendix 6 for a detailed assessment of the knowledge-based method.

Consequently, there is a risk that the species polygons developed from this process are inaccurate. The risk that impacts (and consequently) offsets differ from those determined in the BCAR is addressed by Schedule 3 Condition 4 and Schedule 4 Condition 9.

The risk that the potential area of habitat for species has been underestimated by the knowledge-based method is addressed by Schedule 3 Condition 4 and Schedule 4 Condition 9.

5.4.1.5 Targeted flora surveys

Transect separation distances

The BAM requires species surveys to be undertaken in accordance with the published OEH threatened species survey guidelines, including the NSW Guide to Surveying Threatened Plants (section 6.5.1.3).

Transect separation distances for targeted flora surveys were, in many instances, not in accordance with the recommended distances in the relevant published survey guidelines. Recommended distances may be varied if appropriately justified. Of the 23 species targeted for survey in winter and spring 2019, these distances were:

- less than the recommended distance for one species
- one and a half times the recommended distance for 10 species
- double the recommended distance for seven species
- triple the recommended distance for five species.

Transect separation distances are important because if the appropriate distance is used, they will assist in the detection of a species if it is present at a site. If wider than recommended distances are used, there is a higher risk that a species will be overlooked when it is present. Justification for this variation was provided in the BCAR, including notably that due to the large size of the area assessed that reductions in transect widths would allow greater survey coverage.

The risk that species have been not been detected due to unsuitable transect spacing distances is addressed by Schedule 3 Condition 4 and Schedule 4 Condition 9.

Seasonally appropriate surveys

The BAM requires species surveys to be undertaken during the time period specified for the species in the TBDC (section 6.5.1.2). The published survey guide '*Surveying Threatened Plants and their Habitats*' allows that survey times may be varied if justified.

For many species, some or all surveys carried out during winter and spring 2019 were not done during the time period specified in the TBDC, and it is not known exactly when the initial surveys were carried out for each species between November 2017 and November 2018.

There are also some species that require particular weather conditions, the use of a reference site, and/or a certain number of surveys to be carried out, to ensure that adequate targeted surveys take place. However, this type of information was lacking for those species (see *Hibbertia fumana*, *H. puberula*, *Micromyrtus minutiflora* and *Pimelea spicata* in Appendix 4). It is noted that expert reports were prepared for *Hibbertia fumana*, *H. puberula* and *Pimelea spicata*.

Inadequate surveys cannot confidently determine presence/absence and risks making false-negative conclusions. Such surveys underpinning impact assessments and subsequent avoidance, minimisation, mitigation and offsetting measures, could result in impacts to threatened species and their habitat that are not offset.

To address the potential for species to not have been detected due to incorrect seasonal timing of surveys, it is noted that the CPCP Mitigation Measures Guidelines (see Appendix E of the Plan) and the DCPs in the nominated areas would require that certified land require pre-clearance surveys prior to impacts occurring. See Section 5.4.2.4 for further discussion of planning provisions.

The risk that some individuals of species may not have been detected due to surveys being undertaken outside of seasonal survey times is addressed by Schedule 3 Condition 4 and Schedule 4 Condition 9.

Expert reports

The BAM allows that an expert report may be obtained instead of undertaking a species survey (section 6.5.2.1). Expert reports were prepared for 14 species. However, additional targeted surveys were undertaken to refine species polygons in expert reports. In all but four cases, experts endorsed the changes made to the polygons:

- *Acacia pubescens*
- *Acacia bynoeana*
- *Hibbertia fumana*
- *Hibbertia puberula*

Post-survey amendments to the species polygons for these species were not endorsed by the relevant experts due to changes to native vegetation mapping and evidence of habitat degradation.

This mixing of methods for determining species polygons is an unconventional application of the BAM. There remains some uncertainty as to the accuracy of the species polygons for the four entities that did not receive endorsement for amendments.

The risk that species polygons are inaccurate is addressed by Schedule 3 Condition 4 and Schedule 4 Condition 9.

5.4.1.6 Avoidance outcomes and direct impacts on threatened communities and species

The BAM requires that actions taken to avoid and minimise impacts through selecting the land to be biodiversity certified are documented and justified in the BCAR (section 8.1.1.6).

Urban capable land

Avoidance criteria for land proposed to be certified as “urban capable” were “*developed to identify priorities for avoidance of biodiversity values*” (page 14-7 of the assessment report) based on three main categories: TECs and PCTs, including condition; threatened species; and ecological processes. The avoidance criteria allowed for a process which avoided impacts to threatened species and communities at greatest risk of extinction.

However, the extent to which environmental and biodiversity constraints influenced the design of certified urban capable land is unclear. This includes where future urban development layouts may have pre-determined independently of the avoidance process.

Transport corridors

Unlike “urban capable” land, it is proposed that impacts will be avoided and minimised at the detailed design stage of development in “transport corridor” land (Commitments 3 & 4). The full extent of the impacts within the transport corridors will nonetheless be offset. The BCAR does not detail the extent to which environmental and biodiversity constraints influenced the infrastructure corridor alignments.

The avoidance outcomes for the design of the Outer Sydney Orbital (OSO), notably in the vicinity of Wianamatta Regional Park, have been carried out under a different planning process to certified urban capable land, as it will be subject to a state significant infrastructure (SSI) planning approval, and have not been refined beyond the concept design stage. This will result in impacts on Cooks River/Castlereagh Ironbark Forest TEC, along with other ecological values such as Cumberland Plain Woodland TEC, connectivity and threatened species habitats, the extent of which will be determined by a future process of avoidance.

While the intent of the existing Commitments 3 and 4 to avoid and minimise the impacts of transport corridors through detailed design is supported (see Appendix 1), further measures relating to avoidance outcomes for transport corridors in particular are sought.

To ensure due diligence is applied to the future avoidance process, evidence of avoidance decisions and outcomes is required for all approved transport projects by Schedule 4 Conditions 31 and 32.

Threatened ecological communities

BAM states that ‘*direct impacts on clearing of vegetation can be avoided and minimised by locating a project in areas where the native vegetation is in poorest condition*’ (s8.1.1.3(b)) and by ‘*locating the project in areas that avoid native vegetation that is a critically endangered ecological community of an endangered ecological community*’ (s8.1.1.3(c)).

Avoidance outcomes for threatened ecological communities are listed in Table 14-8 of the BCAR, with avoidance typically being weighted towards the intact condition class, which is in line with the avoidance criteria for urban capable land. It is noted that 50.5% of intact Shale

Gravel Transition Forest is proposed to be avoided, and 64.8% of intact Cumberland Plain Woodland is proposed to be avoided.

Furthermore, page 14-28 of the BCAR indicates that 62.1% of threatened ecological communities are proposed to be avoided.

For critically endangered and endangered ecological communities, Table 14-10 of the assessment report shows the proposed avoidance for each nominated area to be:

- 28.4% for Greater Penrith-Eastern Creek (GPEC)
- 45.9% for Western Sydney Aerotropolis (WSA)
- 61.4% for Wilton
- 79.9% for Greater Macarthur (GMAC)

The proposed avoidance for the following potential entities at risk of serious and irreversible impacts (SAII) in the nominated areas (excluding areas of retained land) are:

- 40.7% for Cooks River Castlereagh Ironbark Forest (CRCIF) (see Table 25-4)
- 25.6% for Cumberland Plain Woodland (CPW) (see Table 25-9)

Positive avoidance outcomes have been achieved for several TECs, including:

- Moist Shale Woodland, where nearly 100% avoidance has been achieved
- River-flat Eucalypt Forest on Coastal Floodplains, where over 70% of Intact condition vegetation and 45% of Thinned condition vegetation has been avoided, reflecting retention of riparian areas
- Shale Sandstone Transition Forest, where 97% of Intact condition vegetation and 80% of Thinned condition vegetation has been avoided
- Swamp Oak Floodplain Forest, where 96% of Intact condition vegetation and 74% of Thinned condition vegetation has been avoided.

Threatened species

The BAM states that *'direct impacts on clearing of vegetation and habitat can be avoided and minimised by locating the project in areas where threatened species habitat is in poorest condition'* (s8.1.1.3(b)) and *'by locating the project in areas that avoid habitat for species that have a high biodiversity risk weighting'* (s8.1.1.3(c)).

Avoidance outcomes for threatened species with high or very high biodiversity risk weightings are listed in Table 14-12 of the BCAR.

Avoidance outcomes for threatened species are as follows:

- *Allocasuarina glareicola* (46.1% avoided)
- *Dillwynia tenuifolia* (36% avoided)
- Tall Knotweed (*Persicaria elatior*) (42% avoided)
- Nodding Geebung (*Persoonia nutans*) (41% avoided)
- *Pimelea curviflora* var. *curviflora* (21% avoided)
- Spiked Riceflower (*Pimelea spicata*) (39.7% avoided)
- *Pultenaea parviflora* (45% avoided)
- Green and Golden Bell Frog (*Litoria aurea*) (45.8% avoided) and
- Swift Parrot (*Lathamus discolor*) (48.2% avoided)

The BCAR states that Commitments 2 and 5 of the Plan (see Appendix 1) will avoid and minimise impacts, with reference to avoiding and minimising *"impacts to 4,505 ha of high biodiversity value area through strategic planning of the nominated areas"* (page 14-10) and to various other actions including the retention of large trees and the introduction of planning

controls and a section 9.1 Ministerial Direction to prevent avoided land being rezoned for more intensive purposes.

5.4.1.7 Impacts on connectivity and biodiversity corridors

Page 14-49 of the BCAR addresses section 8.1.1.3(d) of the BAM, which states “*Direct impacts on clearing of native vegetation and habitat can be avoided and minimised by: ... (d) locating the project such that connectivity enabling movement of species and genetic material between areas of adjacent or nearby habitat is maintained*”. While connectivity was considered in the BCAR under the category of ecological processes, it is unclear how impacts on connectivity were factored into the avoidance process.

The report used the BIO Map core areas and corridors to “*provide a surrogate measure of habitat connectivity and a useful approach to evaluating avoidance outcomes in terms of connectivity*” (page 14-49). However, BIO Map is intended as a guide and not the final determinant for land use planning, as not all significant vegetation is identified.

Impacts to connectivity are described below:

- The Outer Sydney Orbital (OSO) is likely to have significant impacts on connectivity at Wianamatta Regional Park in GPEC, essentially severing the eastern and western portions of the Park. Note that the park was zoned for conservation as part of the planning process for the redevelopment of Commonwealth land at St Marys, and subsequently established as a regional park.
- The OSO will impact the South Creek corridor at numerous locations in GPEC, which may render this corridor essentially ineffective as a biodiversity corridor.
- Urban capable land in GPEC will impact on the upper reaches of Claremont Creek and an unnamed tributary of South Creek; these areas provide connectivity between the Orchard Hills Defence Establishment and avoided areas to be retained.
- The OSO will impact an area immediately east of the Orchard Hills Defence Establishment in GPEC, which provides connectivity between the Defence land and South Creek.
- The OSO will also impact an area east of Luddenham Road in WSA, essentially severing connectivity between Cosgroves Creek and avoided vegetation in this area.
- Urban capable land in WSA will impact biodiversity corridors that link avoided vegetation along Badgerys Creek with possible offset areas and regional parks.
- Urban capable land in the southern part of GMAC will impact a north-south biodiversity corridor linking avoided vegetation along Ousedale and Elladale Creeks.
- Urban capable land in Wilton will reduce the width of a biodiversity corridor in the southern part of the nominated area (although connectivity will be retained through adjacent vegetation).

Some of these impacts are substantial, particularly impacts associated with the OSO, with the potential to sever key linkages across the Cumberland Plain and have long term effects on the species and communities.

Although the intent of the Plan’s Commitment 2 is supported in principle (see Appendix 1), a condition to further demonstrate how transport projects have avoided and minimised the Plan’s impacts are required to address the issues described above (Schedule 4 Conditions 31 and 32). For urban capable land, compliance with the planning framework and mitigation measures at Appendix E of the Plan is required (Schedule 4 Conditions 29 and 30).

5.4.1.8 Indirect and prescribed impacts

Chapter 15 of the BCAR provides a framework for identifying and managing indirect impacts. It is noted that many of the indirect impacts are proposed to be addressed at development application stage by way of development controls in Development Control Plans (DCPs) or development guidelines as per Commitment 5 of the Plan. See Section 5.4.2 for further discussion of proposed planning controls.

Controls outlined in DCPs, whilst required to be considered at development application stage, are not statutory environmental planning instruments and a consent authority may exercise discretion over whether to apply them. It is further noted that, in areas where state-led DCPs are not proposed, these controls will be in development guidelines prepared by the applicant and applied by developers in the certified areas. Planning provisions are discussed further at Section 5.4.2 below.

Prescribed impacts have been assessed, particularly related to connectivity, water quality, waterbodies, hydrology and vehicle strike. It is recognised that given the large strategic scale it is likely that some uncertainties will remain. These will be addressed by way of mitigation measures in planning provisions (Schedule 4 Conditions 29 and 30).

5.4.2 Principles for proposed conservation measures

This section evaluates the proposed conservation measures against the principles in “*Guidance for planning authorities - Conservation measures in strategic applications for biodiversity certification*” (“the Guidance”) as relevant to the proposed conservation measures.

A detailed appraisal of the Plan’s Commitments & Actions against the Guidance is provided at Appendix 7.

Adequacy of conservation measures is discussed in Chapter 41 of the BCAR.

5.4.2.1 Reservation of land under the NPWS Act for Georges River Koala Reserve & two other potential reserves (Gulguer & Confluence Reserve Investigation Areas)

The following Commitments of the Plan relate to establishment of new reserves within the NPWS estate:

- Commitment 10 – Establish a reserve to protect the north–south koala movement corridor along the Georges River between Appin and Long Point
- Commitment 11 - Establish at least 2 new reserves in addition to the Georges River Koala Reserve that will protect threatened communities, species and habitats that are targeted for protection through the Plan

Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised

Koalas are not identified as a species at risk of SAIL. However, both Shale Sandstone Transition Forest and Cumberland Plain Woodland are impacted by proposed development and are targeted for conservation within the Georges River Koala Reserve. SAIL entities are also targeted for conservation in the Gulguer and Confluence Reserve Investigation Areas.

Principle 2 – Conservation measures address the biodiversity values being impacted

Comparison of BCAR credit liability and offset credit proposal

A credit estimate has been provided for the proposed SCA including reservation of land in the Georges River Koala Reserve. It is noted that the SCA, which includes the proposed reserves, would be capable of meeting any offset liability should the offset targets be secured.

How are biodiversity values benefitted by the conservation measures relevant to the impacted biodiversity values?

Koala habitat and movement corridors are proposed to be impacted by the certification. The Georges River Koala Reserve has been identified by the NSW Office of Chief Scientist and Engineer as essential to the persistence of the southwestern Sydney koala population. It is therefore a fundamental aspect of the Plan with regard to koala conservation.

A number of threatened ecological communities and habitats for species impacted by the Plan are present in the proposed Gulguer and Confluence Reserve Investigation Areas. The Gulguer Reserve Investigation Area comprises approximately 1,850 ha in total, and the Confluence Reserve Investigation Area comprises approximately 580 ha. Both Gulguer and Georges River reserves, whilst containing native vegetation, would also require significant areas of restoration. Confluence Reserve would require approximately 370 ha of restoration.

The three proposed reserves would benefit the following TEC's:

- Cumberland Plain Woodland (up to 263 ha available, up to 407 ha with restoration potential)
- River-flat Eucalypt Forest (up to 330 ha with restoration potential).

The three proposed reserves also include habitat for the following species:

- *Marsdenia viridiflora*
- Southern Myotis
- Little Eagle
- Cumberland Land Snail
- Square-tailed kite
- White-bellied sea eagle
- Regent honeyeater
- Grey-headed flying fox.

Are there any impacts to biodiversity values that are not addressed by the conservation measures?

The three proposed reserves aim to protect entities proposed to be impacted under the Plan.

Principle 3 – Conservation measures prioritise important biodiversity values

Are biodiversity values prioritised by the conservation measures in accordance with the guidelines? If not, why not? What are the implications?

The South Western Sydney koala population is recognised as being at threat from urban development. The proposed early establishment of the Georges River Koala Reserve would retain and protect some of the existing connectivity for koalas and is in accordance with minimum corridor widths in the Office recommended by the Chief Scientist and Engineer's recommendations for the CPCP.

The proposed establishment of the Gulguer and Confluence reserves, if acquired and successfully restored, would preserve important biodiversity values within the broader Cumberland Plan area, enhance connectivity and provide linkages to existing reserves.

Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term

- *Is the extent, geometry, ecological function, adjacent land uses and habitat compatible with long term viability?*

- *Is habitat for TECs and threatened species protected?*
- *Are connections in the landscape, habitat corridors and riparian areas protected?*

The proposed Georges River Koala Reserve would ensure a contiguous north-south corridor for koala movement on shale and shale/sandstone transition soils, providing a contiguous landscape connection once complete. The first stage comprises early transfer of lots already acquired by NSW Office of Strategic Lands (see Figure 5-1).

Lands have already been acquired for the first stage of the Georges River Koala Reserve. The success of future stages of this reserve, however, depend on the successful acquisition of properties to ensure landscape connectivity for koala movement is achieved.

Given the narrow form of the proposed reserve, pinch points at critical junctures also pose risks to successful future reserve establishment. Key properties will need to be acquired to ensure connectivity for north-south koala movement.

Should these risks eventuate, adaptive management will be required to enliven compulsory acquisition, as discussed at section 5.4.2.3. Extinguishment of mining licences in consultation with the licence holder is also required for the early stages of this Reserve in the vicinity of Appin.

Existing landscape scale threats within the landscape, including weed invasion, feral animals and pests, illegal dumping, grazing and disturbance from activities, all have the potential to cause ongoing degradation of land in future reserves (once established and in land earmarked for future reserves) over time.

Ongoing degradation over time is a critical risk, particularly given uncertainty around future reserve locations and timing of establishment and acquisition. Securing land early by way of biodiversity stewardship agreements under the conservation program, prior to transfer to NPWS, has the advantage of mitigating these threats and reversing ongoing degradation.

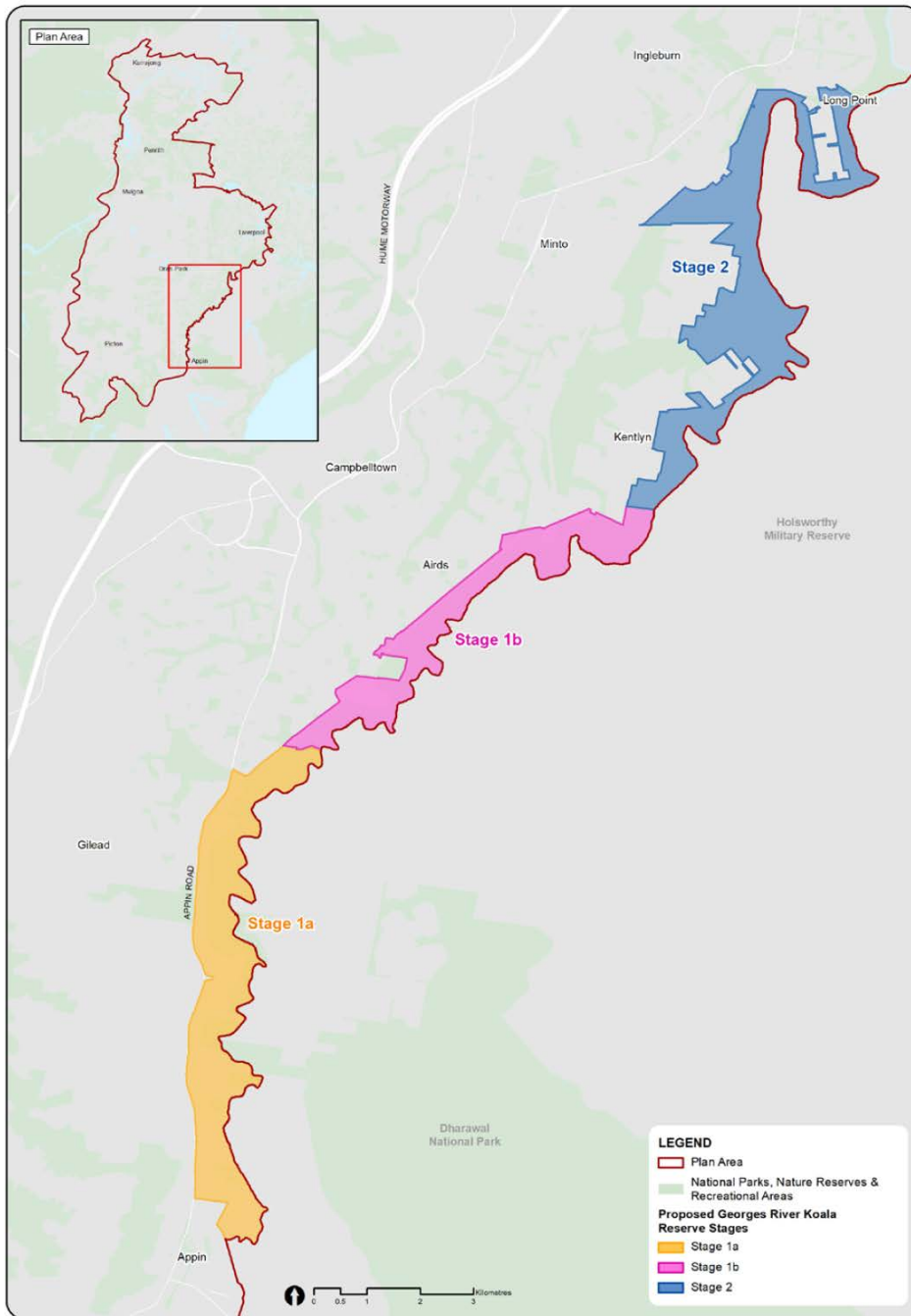


Figure 5-1 Georges River Koala Reserve – proposed staging

The proposed establishment of the Gulguer and Confluence reserves (see Figure 3-6) would protect threatened ecological communities and threatened species habitat. The proposed locations of the two reserve investigation areas have also been selected on the basis of landscape connections to the existing reserve network. NPWS supports the proposed reserves in principle and an interim Reserve Delivery Agreement has been agreed to, which will be amended to a full Agreement in Year 1. See Schedule 4 Condition 3.

The proposed Gulguer Reserve Investigation Area is adjacent to areas of native vegetation in the SCA, and would offer connectivity between Burragorang State Conservation Area, the existing Gulguer Nature Reserve and Bents Basin State Conservation Area. The proposed

Confluence Reserve Investigation Area is adjacent to Windsor Downs Nature Reserve and would offer east-west connectivity to and between existing nearby reserves at Agnes Banks, Wianamatta and Castlereagh.

- *Will key threatening processes in Schedule 4 of the BC Act be managed?*
- *Will landscape scale threats such as weeds and pests be managed?*

Incorporating land into the NPWS reserve system will directly address direct impacts and key threatening processes, by managing the land in accordance with management requirements of the NPW Act. Landscape scale threats, such as weed, pest and fire management, will be undertaken under the NPW Act by the land manager. Funds to carry out such works will be provided as discussed under Principle 8 below.

- *Are areas identified by the government as priorities for conservation protected and supported by adequate funding?*
- *Are areas likely to provide significant potential for restoration protected and supported by funding for management?*

A preference to acquire land subject to Biodiversity Stewardship Agreements has been expressed by NPWS to fund reserve establishment. However, the interim “Reserve Program Delivery Agreement” dated 12 January 2022 between the applicant and NPWS provides sufficient flexibility that an alternative funding mechanism, such as direct funding from infrastructure contributions, could instead be agreed. See also Schedule 4 Conditions 26 and 27. Alternative funding may be suitable in instances where the scope of management actions and funding under a Biodiversity Stewardship Agreement do not align with the future on-park management regime.

Funding for the Plan has not been secured beyond the first 5 years. Contingent upon funding being secured under infrastructure contributions for the remainder of the Plan, the establishment of stages beyond the early transfer lots is reasonably certain. Under the interim Agreement with NPWS, a suitable source of in-perpetuity funding for future NPWS reserves will be provided.

Significant restoration of areas of future NPWS reserves are proposed, including up to 200 ha in the Georges River Koala Reserve, prior to transfer to NPWS. The restoration of koala habitat, including critically endangered ecological communities, is contingent upon ensuring that such communities are successfully re-established. See Schedule 4 Condition 24.

Principle 5 – Conservation measures are additional to existing conservation obligations

Are conservation measures additional to existing obligations?

The establishment of the proposed reserves are additional to existing obligations and will be managed by NPWS.

Do the conservation measures exclude existing DA obligations, VPAs, council plans of management for community land or other offsets?

The proposed reserves comprise a new on-park management framework that is additional to existing obligations.

Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade

Not applicable.

Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework

Is the proposal comprehensive, adequate and representative?

- **Comprehensiveness:** This principle requires that the reserve system samples the full range of forest communities across the landscape, which is extremely difficult. Smaller, more manageable units of forest communities are therefore preferred as a basis for consideration of comprehensiveness. The proposed reserves target communities impacted by the Plan, comprises the majority of impacted PCT's and offer connectivity to existing reserves, and are supported on this basis. In the case of Georges River Koala Reserve, this targets koala habitat and seeks to ensure landscape connectivity for the species. Chapter 41 of the BCAR notes that more than 95% of the land targeted for reserves comprises patches of native vegetation greater than 50 ha in size.
- **Adequacy:** This principle aims to ensure that the chances of long-term survival of a population being targeted are maximised and appropriately managed. The reserve investigation areas have been selected on the basis that they represent a number of threatened ecological communities and threatened species habitats impacted by the Plan, as described at Principle 2 above. This includes securing minimum corridor widths for the Georges River Koala Reserve in accordance with the NSW Office of Chief Scientist and Engineer's advice.
- **Representativeness:** This principle aims to ensure that targeted species are adequately reserved to maximise and ensure their viability. The reserve investigation areas have been informed by their conservation values and linkages to existing reserves. The proposed Georges River Koala Reserve also provides for mitigation measures such as fencing to preserve movement corridors and prevent edge effects.

Is the park supported by NPWS?

NPWS supports the proposed reserve locations in principle. An interim "Reserve Program Delivery Agreement" dated 12 January 2022 between the Applicant and NPWS will be followed by agreement of a full MoU in Year 1 (see Schedule 4 Condition 3). A concept plan for Georges River Koala Reserve is also proposed during Year 1 to guide land use planning decisions for the reserve in a strategic manner.

Will funds for ongoing management be provided? Is NPWS satisfied with the outcome?

Management funding will be provided under the terms of the Agreement described. NPWS is satisfied in-principle, on the proviso that in-perpetuity funding is provided as set out in the Agreement.

Is there a developable area? If so, is there a proposal to subdivide this from the reserve area?

No subdivision of developable areas is proposed for the Georges River Koala Reserve, as it has been specifically designed to provide a koala movement corridor. Suitable areas of restoration have however been identified and will be progressed over the life of the Plan as stages are acquired. This aspect will be refined for the reserve investigation areas as investigations progress.

Are the reserve management actions aligned with the requirements and existing reserve management practices of NPWS?

Land transferred into the NPWS estate will either be done so under the auspices of a Biodiversity Stewardship Agreement, or as otherwise agreed with NPWS in accordance with

the MoU, ensuring land is received by NPWS at an acceptable standard. NPWS will manage the land in accordance with the NPW Act once land has been reserved.

The transfer of land is addressed in the interim “Reserve Program Delivery Agreement” with NPWS as referred to in Schedule 4 Condition 3.

Is there a biodiversity certification agreement committing the landowner to the land transfer within a certain timeframe and describing the future funding arrangements?

No biodiversity certification agreement is proposed. An interim “Reserve Program Delivery Agreement” between the applicant and NPWS has instead been used, as discussed above.

Principle 8 – The delivery of conservation measures is timely and certain

Will conservation measures corresponding to impacts be fulfilled before the development impacting biodiversity values is carried out?

The initial stages of the Georges River Koala Reserve will be transferred at or prior to early impacts. The latter stages of this Reserve, and the Gulguer and Confluence Reserve Investigation Areas, will be progressed over Years 1-20 of the Plan. Impacts of development will be reconciled with conservation measures including reserve establishment over the life of the Plan. See Schedule 4 Conditions 4, 5, 6 and 7.

Is the BCAR accompanied by an implementation plan for conservation measures which identifies:

- *legal mechanism for securing delivery of conservation measures*
- *parties to the biodiversity certification and responsibilities*
- *timing for delivery of conservation measures*
- *funding sources for delivery of conservation measures*
- *framework for monitoring, reporting or auditing implementation of conservation measures*

The BCAR is accompanied by an implementation plan.

The interim “Reserve Program Delivery Agreement” with NPWS provides a framework for the Applicant and NPWS to progress as lands are added into the NPWS estate. It is noted that will be superseded by a more detailed MoU once certification is conferred.

Implementation of the Plan more broadly is discussed at Section 5.4.2.2 below.

Funding has been addressed under Principle 4 above.

5.4.2.2 Private land conservation program comprising 5,325 ha of targeted offset lands for establishment as biodiversity stewardship sites & retirement of credits

The following Commitments of the Plan related to private land conservation measures:

- Commitment 8 – Protect a minimum of 5,325 hectares of native vegetation in the Cumberland subregion to conserve biodiversity values in perpetuity in accordance with the conservation land selection steps, which may require up to 11,900 hectares of conservation land.
- Commitment 9 – Protect threatened species likely to be at risk of residual adverse impacts from development under the Plan (target species) in accordance with the

Plan's conservation land selection steps. This includes securing offsets to protect known locations for the following target threatened species.

- Commitment 13 – Deliver and support ecological restoration activities in conservation land including ecological reconstruction of up to a maximum of 25% of the Plan's offset target for native vegetation (Commitment 8).

The Plan's total offset target for native vegetation is 5,920 ha. It is noted that the following limitations apply to this figure:

- 10% allocated to non-land based measures
- 25% may comprise restoration
- 20% of offsets may be located outside of Plan area (the Cumberland Plain)

Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised

Are there SAIL impacts?

Entities at risk of an SAIL are targeted in the Conservation Lands Implementation Strategy and have informed mapping of the Strategic Conservation Area (SCA). Serious and irreversible impacts are likely to occur six threatened communities and species impacted by the Plan.

Refer to Section 5.5.

Can it be demonstrated that this type of impact is outweighed by the social and economic benefits that the development will deliver?

Refer to Section 5.5.

Has avoidance of SAIL been prioritised?

Refer to Section 5.5.

If SAIL are likely an assessment against principles of ESD is required.

Refer to Section 5.5.

Are there any additional conservation measures the Minister should consider?

None proposed.

Principle 2 – Conservation measures address the biodiversity values being impacted

Comparison of BCAR credit liability and offset credit proposal

Principle 2 states that the BCAR must specify the value of any land-based conservation measures in credits, and any other conservation measures are to be approved by the Minister.

Credit estimates for land-based measures have been provided. It is acknowledged that the credit estimates are based on best available data and assumptions. These indicate that the capability exists for land in the SCA to meet the offset targets. This will assist in providing a baseline measurement as sites are acquired for offsets over the Plan's life.

How are biodiversity values benefitted by the conservation measures relevant to the impacted biodiversity values?

- *Native vegetation*

The Applicant has developed a robust process to guide the headline 5,325 ha target figure for native vegetation communities impacted by the Plan, as discussed at Principle 3 below. TEC offset targets are outlined in Section 4.3.2.

This process determined a likely credit range for the offset targets, based on “required” or “active restoration” biodiversity stewardship management scenarios, of between 4,154 ha-8,615 ha. The target figure of 5,325 ha falls within this range. The total figure of 5,920 ha, including non-land measures, also falls within this range.

Non land-based conservation measures are discussed at Sections 5.4.2.5 below.

Direct purchase and retirement of credits can also be used as a substitute for establishing land-based offsets, such as reserves or BSA’s. Establishment of land-based offsets for the private reserve program, specifically Biodiversity Stewardship Agreements, will occur with credit purchases to meet offset targets also proposed.

The SCA comprises approximately 27,200 ha, including just over 7,808 ha of TECs that are impacted in the proposed certified area. The total area of native vegetation in the SCA also exceeds that being targeted for offsets under the Plan (5,325 ha). Although there is sufficient land in the SCA to meet offset targets, landholder willingness is critical to ensuring these targets are met. The applicant has partnered with the NSW Biodiversity Conservation Trust to develop a targeted landholder management program as discussed at Principle 8 below.

Based on an analysis of TEC’s in the SCA presented in Chapter 41 of the BCAR, there is sufficient land to meet offset targets for TEC’s being impacted, with the exceptions of Shale Gravel Transition Forest, Castlereagh Ironbark Forest and Swamp Oak Floodplain Forest TEC’s, where there is a shortfall of 196 ha, 48 ha and 61 ha respectively to meet offset targets. With restoration potential factored in, shortfalls would likely remain of 189 ha for Shale Gravel Transition Forest and 22 ha for Cooks River Castlereagh Ironbark Forest.

There is a significantly greater quantum of Cumberland Plain Woodland (2,309 ha), comprising PCT’s 849 and 850, available in the SCA to meet the offset target required. Analysis at the TEC level indicates that for PCT 849 there is a shortfall of 649 ha in the SCA, while PCT 850 is comparatively abundant.

For the other five TEC’s impacted by the Plan, whilst there is sufficient land within the SCA, offset targets may need to be met with significant restoration and/or sourcing offsets outside of the Plan Area.

Restoration is discussed at Principle 4 below.

- *Threatened species*

There are 17 species identified as target species warranting particular consideration for dedicated offsets under the conservation program, out of a total of 39 species credit species for which an offset liability was determined in the BCAR. The remaining 22 species credit species were determined in the BCAR (Chapter 8.3.4) to have ‘residual adverse risks’ not high enough to warrant offsetting, with habitat that is well-represented in the SCA and therefore not requiring specified targets. Offset targets for the remaining 17 species credit species were developed.

Of these 17 species, it is proposed to offset 15 of these by securing a specified number of “offset locations” for each, as detailed at Section 4.3.2. However, these locations are ambiguously defined, and conservation land selection steps allow for purchase of equivalent credits after a period of time. Based on existing data presented in Chapter 41 of the BCAR, five of these 15 species may require offsets outside the Plan area as sufficient land is not available.

These species are *Cynanchum elegans*, *Hibbertia fumana*, *Hibbertia puberula*, *Pimelea spicata* and *Pultenea pedunculata*. This cannot occur until the conservation land selection steps have been appropriately followed. This is considered a risk for the conservation program, given that almost a third of targeted species cannot be offset within the Plan area. A further risk is the potential delay in establishing species offset locations, given the time elapsed in following conservation land selection steps.

Although the Plan's intent is to secure landscape scale outcomes, the "offset location" approach to offsetting species credit species relies on existing records (eg. BioNet) being a proxy for occurrence. It does not factor in the area and condition of the offset locations for the target species. It is also noted that for species credit species, the likelihood of occurrence or elements of suitable habitat cannot be confidently predicted by vegetation surrogates and landscape features.

Targeted species, as well as other impacted species not covered by the offset targets, may also be present in sites secured for TEC's under the private land conservation program. However, the use of offset locations for species credit species targets could also result in species impacted by the Plan being under-represented across the SCA. This is especially the case for those species which require habitat features that are becoming increasingly rare, such as medium to large sized hollows, and breeding habitat with adequate buffers from disturbances like roads, residential areas, and light spill.

Koala and Swift Parrot, considered to be at highest risk, are proposed to be offset via area-based targets. Proposed measures to secure additional koala habitat, including the Georges River Koala Reserve, are discussed at Sections 5.4.2.1 and 5.4.2.2. Refer to Schedule 4 Conditions 8 and 9 relating to koala mitigations, and Schedule 3 Condition 4 relating to additional offset targets for other impacted species.

Are there any impacts to biodiversity values that are not addressed by the conservation measures?

Offset targets have been established for all threatened ecological communities impacted by the Plan. As discussed above, not all impacts to species credit species have been addressed but have been mitigated by conditions imposed in the Order.

Principle 3 – Conservation measures prioritise important biodiversity values

Are biodiversity values prioritised by the conservation measures in accordance with the guidelines? If not, why not? What are the implications?

The proposed offset targets in the SCA include:

- TEC's including critically endangered communities with the Plan area, such as Cumberland Plain Woodland and Shale Sandstone Transition Forest, which are also entities at risk of SAll and mapped on the NSW Biodiversity Values Map
- Key movement corridors for threatened species such as koalas (see Section 5.4.2.1)
- Large patches of intact native vegetation greater than 50 ha
- Connections through and between nominated areas and the broader Plan area
- Areas identified as core habitat corridors in BIO Map on the Cumberland Plain

The conservation priorities method, which informed mapping of the SCA, was developed by undertaking a repeatable process of ecological assessment, constraints analysis, conservation priorities/offset selection, and ground truthing. The SCA was designed to target TEC's and threatened species at threat from development under the Plan. It also covers approximately 25% of existing land on the Cumberland Plain mapped on the NSW Biodiversity Values Map, and the Plan commits to apply to EHG to update the BV Map during Year 1.

The Plan targets important biodiversity values, as detailed at section 4.3.2, however the proposed conservation lands selection steps retain some flexibility in acquiring offsets. These state that priority areas within the SCA must be targeted first, followed by anywhere in the SCA, the Cumberland subregion and adjacent subregions and finally anywhere in NSW. The total cap on offsets located outside the Plan area is 20%.

In accordance with the five-year delivery plan agreed between the Applicant and the NSW Biodiversity Conservation Trust, the Plan will target high value landscapes in Orangeville and Razorback for BSA establishment in Years 1-5. Achieving tangible outcomes in the initial period of the Plan, such as establishment of early BSAs in the southern part of the Plan area, will be critical to visibly demonstrate effectiveness of the conservation program.

Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term

- *Is the extent, geometry, ecological function, adjacent land uses and habitat compatible with long term viability?*
- *Is habitat for TECs and threatened species protected?*
- *Are connections in the landscape, habitat corridors and riparian areas protected?*

The SCA has been designed to identify highest priority conservation areas, comprising more than 90% remnant native vegetation patches greater than 50 ha in size. BIO Map corridor and core mapping have also informed the planning for the conservation lands within the nominated areas, with over half of the areas mapped avoided for biodiversity purposes and captured in the SCA.

SCA lands (shown purple hatched) within the broader Plan area and interactions with the nominated areas are depicted at Figures 5-2 and 5-3 below.

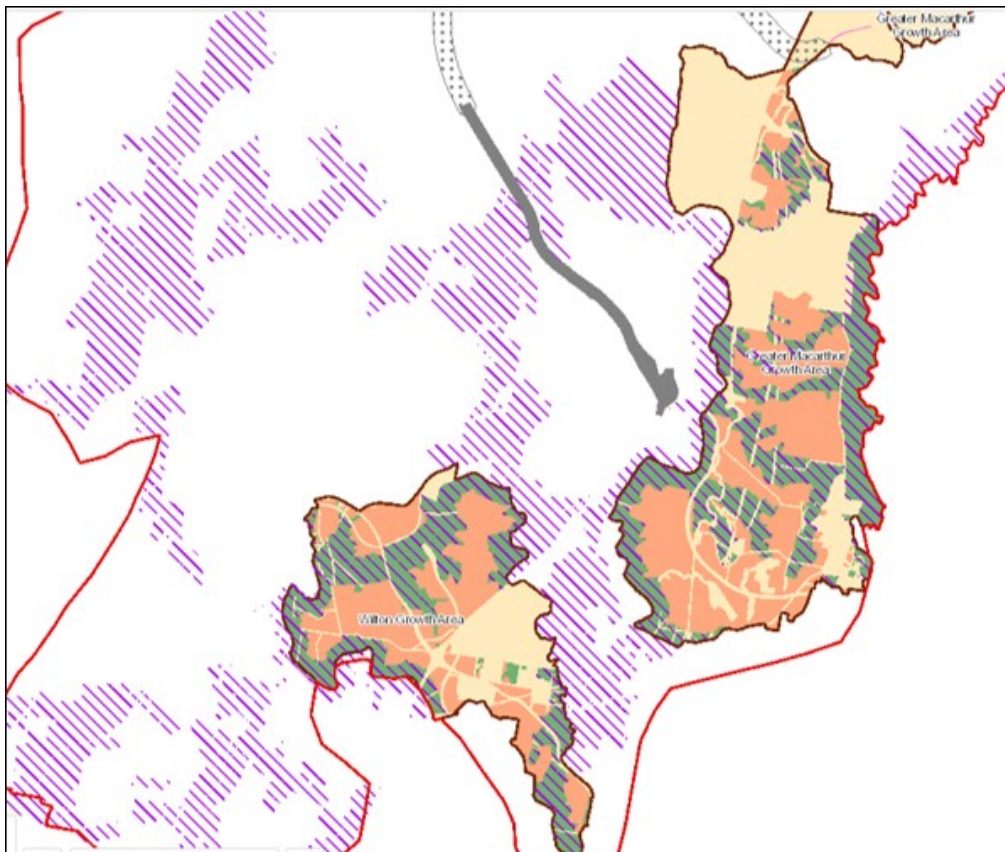


Figure 5-2 – Wilton & Greater Macarthur (south) nominated areas & SCA lands

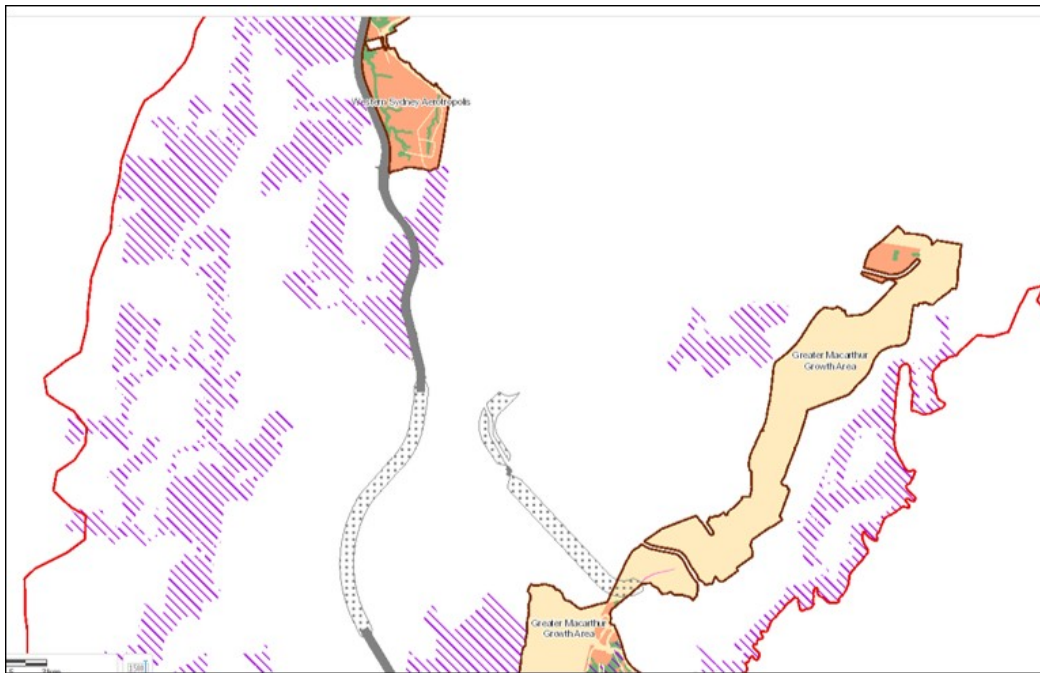


Figure 5-3 – Western Sydney Aerotropolis (south) & Greater Macarthur (north) nominated areas & SCA lands

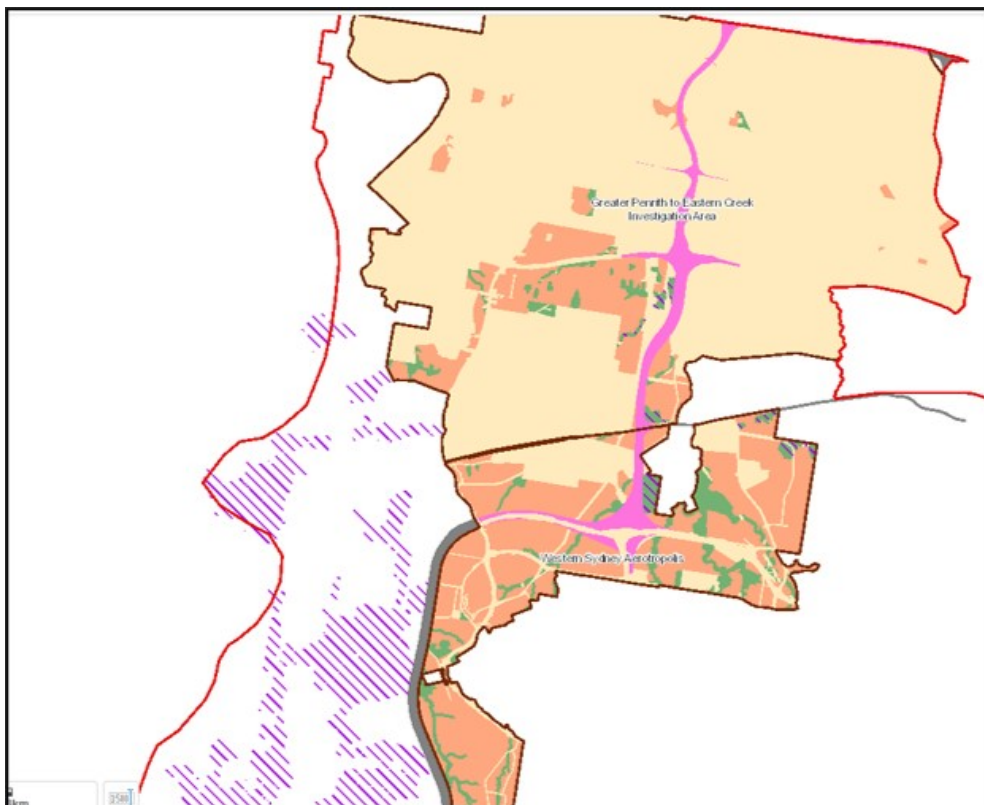


Figure 5-4 Western Sydney Aerotropolis (north) & Greater Penrith-Eastern Creek nominated areas & SCA lands

Connections through and between Wilton and Greater Macarthur nominated areas and the broader Plan area, including large patches of contiguous vegetation, are relatively well represented in the SCA. The South Creek corridor, despite being identified for future investigation as a reserve with TEC restoration potential of up to 370 ha, is not wholly represented in the SCA.

There are minimal areas of SCA in Western Sydney Aerotropolis and Greater Penrith-Eastern Creek nominated areas, and landscape connectivity from Wianamatta Regional Park to South Creek and further south will be impacted by proposed transport corridors certified under the Plan. It is noted that Wianamatta Regional Park, which is proposed to be bisected by the Outer Sydney Orbital corridor, was initially rezoned for conservation purposes as part of redevelopment of former Commonwealth land at St Marys. Impacts on connectivity and proposed mitigations in this location are discussed at section 5.4.1.

Some PCT's/TEC's being impacted and targeted have shortfalls in the SCA, as discussed at Principle 2. Flexibility to secure offsets outside of the Plan area is capped at 20% of the total offset target. This means that restoration or sourcing offsets outside the Plan area in accordance with the selection steps must be utilised to negate shortfalls. It is possible that offset delivery may not meet the headline offset target wholly within the Plan area. This is mitigated by adaptive management and reconciliation of offsets to track the offsets program during implementation are discussed at Principle 5 below.

- *Will key threatening processes in Schedule 4 of the BC Act be managed?*
- *Will landscape scale threats such as weeds and pests be managed?*

Key threatening processes are discussed at Section 5.4.1.

Existing landscape scale threats, including weed invasion, feral animals and pests, illegal dumping, grazing and disturbance from recreational activities all have the potential to degrade land over time.

Securing land early by way of biodiversity stewardships sites under the conservation program has the advantage of mitigating these threats and reversing ongoing degradation. Ongoing degradation is a risk for conservation program over time, particularly as offsets are proposed to be delivered over a lengthy period.

Landscape scale threats are discussed at Section 5.4.2.5.

- *Are areas identified by the government as priorities for conservation protected and supported by adequate funding?*
- *Are areas likely to provide significant potential for restoration protected and supported by funding for management?*

The SCA has been proposed to target the highest value conservation lands for offsets under the Plan. Funding has been secured for the Plan's first five years. Areas of restoration are also proposed in the conservation program. See Principle 8 below.

Principle 5 – Conservation measures are additional to existing conservation obligations

Are conservation measures additional to existing obligations?

The proposed Conservation Lands Implementation Strategy is critical to deliver the private land conservation program. Establishment of biodiversity stewardship agreements are one of two mechanisms by which land-based offsets will be secured, the other being gazettal of NPWS reserves as discussed at Section 5.4.2.1. Meeting offset targets is addressed in Commitments 8 and 9 of the Plan.

See also Schedule 3 Condition 2.

Do the conservation measures exclude existing DA obligations, VPAs, council plans of management for community land or other offsets?

Existing known reserves and offsets were excluded from the SCA during its development. Upon detailed investigation as part of offset site selection, sites that are already identified for existing conservation obligations, for example through conditions of consent, will be excluded from further consideration.

Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade

Planning provisions are proposed including notably a SEPP which identifies the SCA land and provides controls for future development applications. A section 9.1 Ministerial Direction is proposed to prevent rezoning of land in the SCA to uses incompatible with future conservation.

Refer to Section 5.4.2.4.

Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework

Not applicable.

Principle 8 – The delivery of conservation measures is timely and certain

- *Will conservation measures corresponding to impacts be fulfilled before the development impacting biodiversity values is carried out?*

The success of the private land conservation program hinges on engaging landholders to commit to establishing biodiversity stewardship agreements on their land. A delivery plan for the first 5 years has been developed by the applicant and the NSW Biodiversity Conservation Trust, this includes a landholder engagement strategy.

A Memorandum of Understanding between the applicant and the BCT has been finalised for offset delivery. Mechanisms available to the Trust for securing offsets include fixed price offers, tenders and use of a revolving fund to on-sell purchased properties with a BSA established.

- *Delivery of restoration*

A component of the native vegetation offset target is also proposed through restoration as per Commitment 13 (see Appendix 1), up to a maximum of 25%. It is acknowledged that achieving restoration is challenging, and even with restoration potential considered not all targets can be met within the Plan area. This is the basis for allowing up to 20% of offsets to be secured outside of the Plan area. Rigorous requirements for restoring ecological communities to a self-sustaining and recognisable state is essential to achieving long term viability and resilience.

While innovative restoration targets are welcomed, if the approach to restoration is not sufficiently robust, it may not result in self-sustaining communities in the long term. It may take many decades for an ecosystem to be suitable for use by some threatened species, especially those that rely on hollows or complex ecosystem structure.

The 25% figure must be justified with rigorous monitoring. The BAM should be utilised as the best available science to establish restoration objectives and track outcomes of restoration areas. Successful restoration relies on effective management of landscape scale threats, including resilience to climate change. A restoration strategy is proposed under Commitment 13 of the Plan, and Schedule 4 Condition 24 is proposed to ensure that it is sufficiently robust to deliver the offsets outcomes sought.

The restoration strategy will be required to undertake, as a minimum:

- Development of restoration objectives,
- Investigation of site suitability and consideration of constraints (biophysical, economic etc)
- Management of landscape threats
- Monitoring program that includes survey prior to works occurring to establish baseline data
- Immediately post-completion and at an appropriate time post-completion to confirm that restoration is self-sustaining, and/or is now recognisable as the TEC in accordance with the BAM
- Specific arrangements with NPWS to address restoration requirements for land that has been transferred into the NPWS estate.

The scope of restoration likely to be undertaken is highly varied, and site-by-site application of the restoration strategy will be required. If restoration is unsuccessful following completion of works, the site (or portion thereof being restored) cannot count towards the offset target.

Is the BCAR accompanied by an implementation plan for conservation measures which identifies:

- *Legal mechanism for securing delivery of conservation measures*

The proposed draft Conservation Land Implementation Strategy is designed to target values being impacted by the Plan. The majority (90%) of conservation program funding will be directed towards delivering private land conservation program.

- *Parties to the biodiversity certification and responsibilities*

The Parties to the certification are the Minister for Planning and Minister for Environment.

While no Biodiversity Certification Agreements under s8.16 of the BC Act are proposed, individual Memoranda of Understanding have been agreed with each of the Plan's delivery partners. These include:

- National Parks & Wildlife Service (interim only – to be upgraded to full Agreement in Year 1) – for gazettal and future management of reserves under the NPW Act, including funding arrangements
- NSW Biodiversity Conservation Trust – sourcing and delivery of private land offsets under the conservation program
- NSW Planning Ministerial Corporation – acquisition and management of land for holding prior to transfer to the NPWS estate
- Transport for NSW – funding of the offsets program relevant to transport corridors proposed to be certified

Please note these parties are not parties to the biodiversity certification.

- *Timing for delivery of conservation measures*

Timing for delivery of conservation measures are specified in the Plan and Conservation Lands Implementation Strategy. However, given the uncertainties of land acquisition to the conservation program, impacts will be reconciled over time and key milestones such as reserve acquisition have been addressed by way of condition. See Schedule 4 Conditions 2, 4, 5, 6 and 7.

- *Funding sources for delivery of conservation measures*

The Plan is funded for the first five years, with a total of \$114.7 million allocated to deliver priority conservation actions during this period. These include:

- Actions under the NSW Koala Strategy for priority areas for koala habitat

- Sourcing BSA's in priority areas in Razorback
- Cultural and conservation partnerships with Local Aboriginal Land Councils
- Early works and programs, such as purchase of conservation land, credits and koala fencing feasibility study

Funding beyond the first five years of the Plan has not been committed to date. It is proposed that funding be acquired through primarily infrastructure contributions, as well as via the funding agreement with Transport for NSW. Formal agreement is being sought for forward funding, to be repaid as contributions payments when received.

Reform of NSW's infrastructure contributions framework is underway, and proposes to replace the existing Special Infrastructure Contributions (SIC) system with a Regional Infrastructure Contribution (RIC) framework. This is proposed to include a Strategic Biodiversity Component, which will be levied on new development lots that have been biodiversity certified. The RIC system is proposed to commence on 1 July 2022.

Under proposed transitional arrangements, existing adopted or draft SIC's such as those for Wilton, Greater Macarthur and Western Sydney Aerotropolis will continue to be used. Other development areas on certified land will be subject to the RIC system.

The gross cost of the Plan over its life to 2056 is estimated by the applicant to be \$776.8 million NPV. Reconciliation accounting of costs will be undertaken over the life of the Plan, as discussed below. It is proposed that funding arrangements for each five-year period of the Plan be confirmed prior to the commencement of that period. Failure to secure offsets over time will also trigger adaptive management measures and/or compliance intervention from the Minister for Environment and Heritage. See Schedule 4 Conditions 12 and 21.

- *Framework for monitoring, reporting or auditing implementation of conservation measures*

Executive implementation committee

An executive implementation committee is proposed to oversee auditing, monitoring and reporting of the Plan over its life and report on meeting its Commitments and Actions. This committee will contain representatives from key agencies and delivery partners. The auditing and monitoring framework is set out in Sub-Plan A of the Plan and will be delivered over the life of the Plan. The Plan commits to finalising this framework in Year 1 under Commitments 24 and 25.

Reconciliation accounting

Reconciliation of impacts and offsets is required over the life of Plan under Commitment 25 (see Appendix 1), to ensure that offsets are tracking commensurate with impacts occurring on certified land. Five-yearly housing forecasts for development land impacted by the Plan will also be tracked against Metropolitan Housing Monitor and Sydney Greenfield Monitor.

The reconciliation accounting process will also report offset delivery in credits. The credit estimate provided for all proposed land-based measures will also act as a baseline to track offsets over the Plan's life.

Adaptive management

In the event offsets are not tracking to align impacts with offset targets and drop below 80% of total offsets required at that point in time, the proposed adaptive management steps will be triggered, after Year 8 of the Plan's operation. The proposed regime provides if adaptive management is triggered, the quantum of offset delivered will be 3.5 times greater than the total offset liability to enable the program to make up the shortfall. Steps that can be considered to redress the balance include property acquisition by agreement or compulsory means as last resort, and land use planning responses, such as a pause on rezonings.

The Minister for Environment & Heritage does not have the power to enforce the proposed land use planning measures, such as a pause on rezonings. The proposed 80% trigger applies across the entire credit obligation. There is potential for offsets for individual entities to fall below 80% before a fall in offset availability across the entire credit obligation triggers adaptive management action. It is recommended that the Minister for Environment and Heritage retain the power to request adaptive management be initiated outside of the Plan's proposed framework at set intervals. See Schedule 4 Condition 21.

Compliance, suspension and revocation

The Minister for Environment and Heritage has the power to modify, suspend and/or revoke biodiversity certification in a specific range of circumstances under sections 8.21 and 8.22 of the BC Act. The Minister may also issue an Order that a measure be rectified under compliance measures at section 8.13 of the BC Act, before moving to suspension and revocation. An intra-government dispute resolution mechanism under section 8.25 of the BC Act is also available as a backstop in the event of dispute between the applicant and the Minister for Environment and Heritage.

5.4.2.3 Koala mitigation measures, in accordance with the NSW Office of Chief Scientist and Engineer recommendations

The following commitments of the Plan relate to koala mitigation measures:

- Commitment 5 - Mitigate indirect and prescribed impacts from urban and industrial development; infrastructure; and intensive plant agriculture on threatened ecological communities, species and their habitat. This includes meeting specific mitigation requirements for threatened ecological communities, species and their habitat in accordance with Appendix E of the Plan
- Commitment 7 – Mitigate indirect and prescribed impacts from urban, industrial, infrastructure development on the Southern Sydney koala population to best-practice standards and in line with advice from the Office of the NSW Chief Scientist and Engineer, and in accordance with Appendix E of the Plan
- Commitment 10 – Establish a reserve to protect the north–south koala movement corridor along the Georges River between Appin and Long Point
- Commitment 12 – Protect koala corridors in the Cumberland subregion, including those along the Nepean River, Georges River, Cataract River and Ousedale Creek
- Commitment 20 – Provide opportunities for the residents of Western Sydney to learn about and actively participate in biodiversity conservation including koala conservation
- Commitment 23 - Support rehabilitation measures to help maintain koala health and welfare

Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised

Refer to Sections 5.5.2.2 and 5.5.3.

Principle 2 – Conservation measures address the biodiversity values being impacted

Comparison of BCAR credit liability and offset credit proposal

A biodiversity credit equivalent for the SCA, which includes the Georges River Koala Reserve, has been supplied. Refer to Appendix 9.

How are biodiversity values benefitted by the conservation measures relevant to the impacted biodiversity values?

The south-western Sydney koala population is recognised as being under threat from urban development. Koala habitat and movement corridors will be impacted on land proposed to be certified in the Wilton and Greater Macarthur nominated areas. Land-based measures proposed under the Plan to mitigate impacts on koalas include establishment of the Georges River Koala Reserve, and protection of koala corridors in avoided land under planning controls as discussed at section 5.4.2.4. Protecting 570 ha of koala habitat is also targeted under Commitment 9 of the Plan (see Appendix 1).

The proposed measures aim to maintain landscape scale connectivity for the south-western Sydney koala population. The Plan has been designed to be in accordance with the Office of Chief Scientist and Engineer's recommendations for the CPCP, including minimum functional corridor widths for movement of the species. Koala corridors identified in the Office of Chief Scientist and Engineer's report have been generally adhered to and are mapped under the proposed SEPP (Strategic Conservation Planning). See discussion at Principles 4 and 6 below.

Are there any impacts to biodiversity values that are not addressed by the conservation measures?

The proposed measures are designed to ensure the koala population of south-western Sydney persists and thrives. The NSW Government already owns significant land holdings, via the Office of Strategic Lands, to be transferred to NPWS for early stages of the Georges River Koala Reserve. The establishment of koala corridors in NPWS reserves and private land conservation in future stages is contingent upon successful acquisition of private properties.

Principle 3 – Conservation measures prioritise important biodiversity values

Are biodiversity values prioritised by the conservation measures in accordance with the guidelines? If not, why not? What are the implications?

Avoided and conservation land seeks to protect koala corridors from the impact of development in the certified areas. Proposed mitigation measures for koala habitat in the certified land are also proposed as part of the planning package, under the development control plan and mitigation guidelines. See section 5.4.2.4 for further discussion.

The avoided lands have been revised as part of the final Plan layout to meet the minimum functional corridor widths for koalas, as recommended by the NSW Office of the Chief Scientist and Engineer. This is discussed further at Principle 4 below.

In line with the Office of Chief Scientist and Engineer's recommendations, an ongoing monitoring program is proposed with the aims of:

- minimising threats such as disease from chlamydia, including vaccinating tagged koalas prior to re-release
- vaccine trials for koalas against chlamydia as a preventative measure against any future disease incursions
- effectiveness of koala mitigation measures introduced as part of the Plan
- building capacity in koala rehabilitation sector with wildlife carers veterinarians & vet's nurses, in partnership with Taronga Zoo.

A program of community engagement and education measures relating to biodiversity conservation including koalas are also proposed, as discussed at section 5.4.2.5. This will provide increased community engagement and allow for biodiversity impacted by the Plan and targeted for conservation measures, particularly koalas, to gain increased community awareness and assist in delivering the NSW Koala Strategy conservation actions.

Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term

- *Is the extent, geometry, ecological function, adjacent land uses and habitat compatible with long term viability?*
- *Is habitat for TECs and threatened species protected?*
- *Are connections in the landscape, habitat corridors and riparian areas protected?*

The Office of Chief Scientist and Engineer's report "*Advice regarding the protection of koala populations associated with the Cumberland Plain Conservation Plan*" (May 2021) made 31 recommendations in relation to the south-western Sydney koala population within the Plan area, which included the following:

- Habitat and connectivity: 390-425m minimum "functional" corridor widths, buffer zones in corridors/habitat separate from APZ's on proposed certified land, 30-60m buffers within corridor. This excludes areas of steep land, such as those adjacent to the Nepean River, which were determined unsuitable for koala movement
- Fauna crossings for linear infrastructure: safe movement, designed to maximise koala use, in place prior to new infrastructure
- Threat mitigation: exclusion fencing, avoid stressors from urbanisation, sensitive urban design
- Disease management: avoid chlamydia incursion, vaccine trials, disease monitoring
- Adaptive management: survey and monitoring, triggers for response, timely mitigation and alternatives if management approaches are not working.

As a result, the Plan's layout was amended prior to submission of the final application to address the findings and widen the proposed koala corridors on avoided land in some locations. Compliance with each of the 31 recommendations of the Office of Chief Scientist and Engineer are addressed in further detail at Appendix 8.

Corridors

Key corridors identified in the report include the Georges River and Nepean River primary north-south corridors and the Ousedale east-west corridor, identified at Figure 5-5 below.

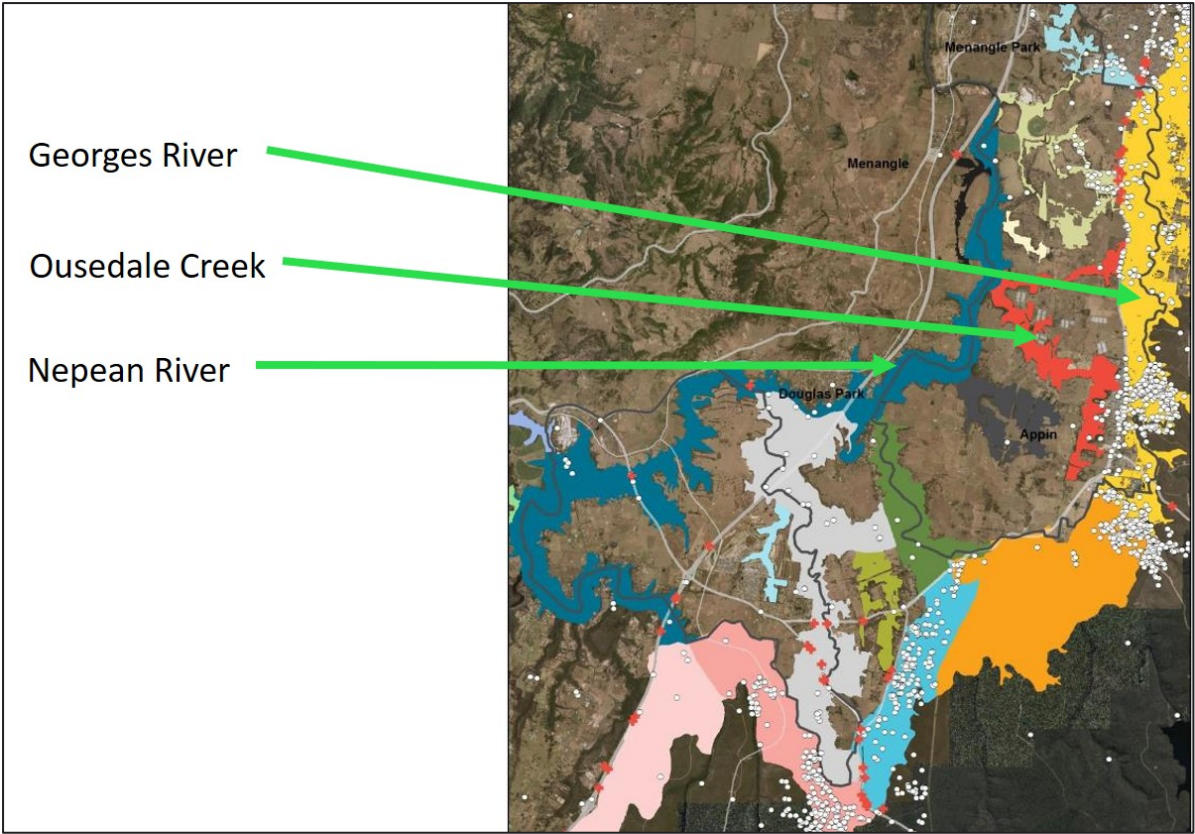


Figure 5-6 Key CPCP koala corridors identified in the OCSE report

All corridors in the final Plan layout meet the “functional” minimum widths of 390-425m, with the exception of the Nepean River-North corridor in the Wilton nominated area which has an average minimum width of 313m. The area of non-compliance is indicated at Figures 5-7 and 5-8 below:

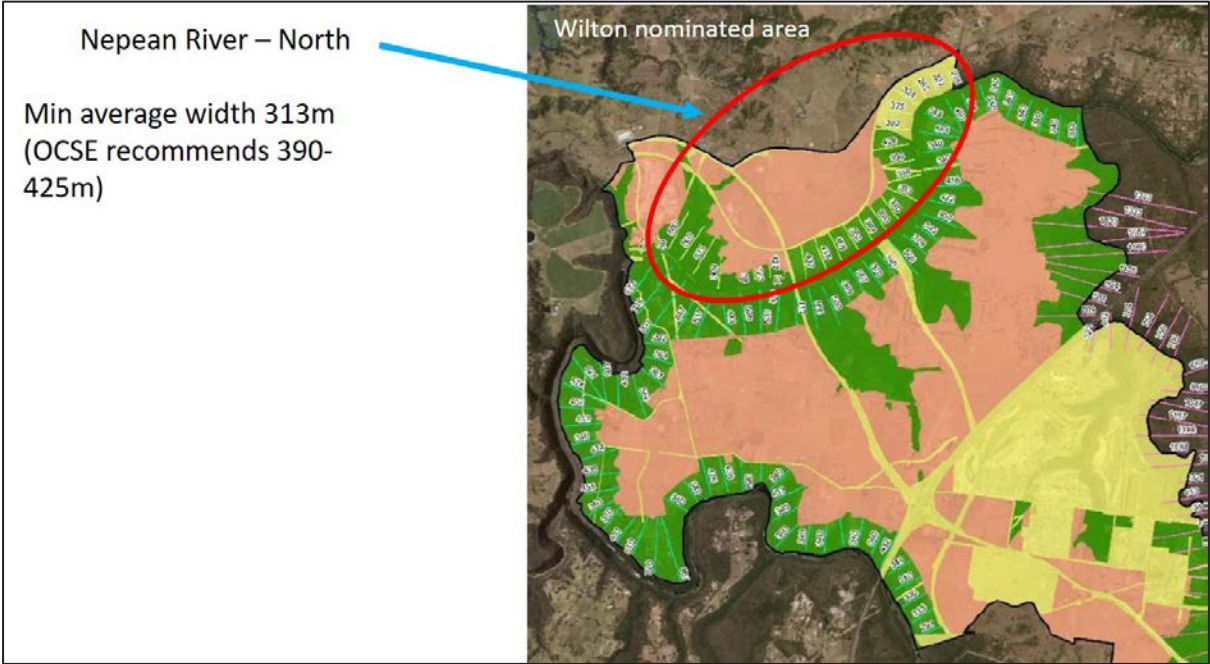


Figure 5-7 Area of non-compliant corridor widths

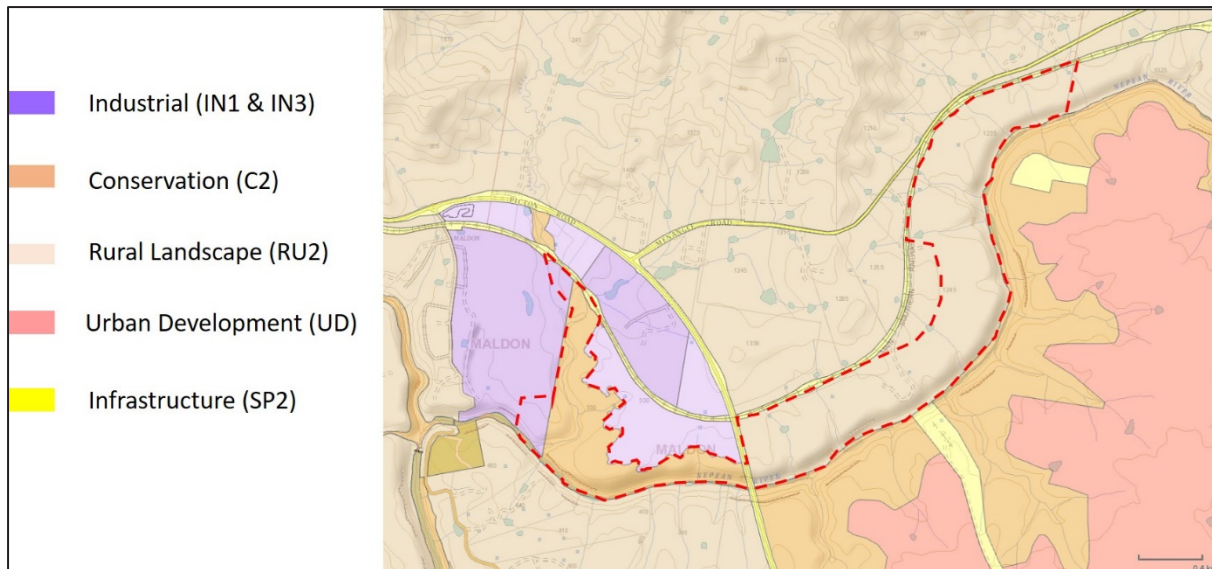


Figure 5-8 Non-compliant corridor – land use and Wollondilly LEP 2011 zoning

Non-compliance has been justified on the basis of:

- Existing zoning in this part of Wilton nominated area under the Wollondilly Local Environment Plan (WLEP) 2011 – there are significant land use constraints, including significant areas of industrial zoned land, along with conservation, urban development, rural landscape and infrastructure
- Existing industrial area – existing uses include Boral batching plant, and bisecting infrastructure such as Picton Road (north-south) and the Southern Railway (east-west)
- Short length of corridor – the total length of the corridor at 5.7km is second shortest of all identified corridors, in comparison with up to 31.2km for the longest.

Corridors within avoided lands were extended to achieve the recommended minimum corridor widths in all cases, bar the Nepean River-North corridor. The functional width was measured up to the edge of existing major land uses or infrastructure, where achieving additional width to meet the minimum requirement was not possible.

Within this context, achieving compliance is difficult and with no options to widen the corridor at this pinch point. It is also noted that the total average width of all corridors identified in the Office of Chief Scientist and Engineer report is greater than 500 metres, exceeding the recommended 390-425m.

The Ousedale Creek east-west corridor is critical for maintaining connectivity to koala habitat proposed to be secured in the George River Koala Reserve, to the east of Appin Road. Although the Plan states that the Ousedale Creek corridor will be “secured and enhanced”, there is no specific mechanism identified to protect land in this corridor and other koala habitat outside the proposed Georges River Koala Reserve. Physical barriers such as the Upper Canal also bisect the Ousedale Creek corridor and are a significant obstruction to koala movement. Land not identified for NPWS reserves within the SCA will be targeted for private land offsets including restoration works, as discussed at section 5.4.2.2.

Buffers between conservation, avoided and certified land

The Plan must achieve compliance with all Office of Chief Scientist and Engineer recommendations, including buffers/buffer interfaces delineating rural, avoided and development lands of 30m for fenced and 60m for non-fenced lands. APZ's for urban

development are to be wholly located outside of koala corridors on certified land, as per the Plan's commitments.

However detailed design has yet to occur for many of the precincts to be developed on proposed certified land. The final configuration of proposed reserves and biodiversity stewardship sites within the avoided land, including treatment of edges and management zones, is also yet to be determined.

The width of the proposed corridors is adequate to incorporate the minimum functional widths recommended by the Office of Chief Scientist and Engineer, including excluded areas such as steep land. Relevant recommendations from the Office of Chief Scientist and Engineer report are to be implemented in accordance with the Order and otherwise agreed at the commencement of the Plan. Compliance with the recommendations, particularly buffer interfaces where exact future land uses are not yet certain, are to be detailed subsequently at each five-year review period, at a minimum. See Schedule 4 Condition 8.

Restoration

Up to 200 ha of koala habitat is proposed to be restored within the Georges River Koala Reserve, with a broader target of up to 570 ha, including the Ousedale Creek corridor. The restoration will target land on shale transition soils well suited to koala habitat within the proposed reserve.

Restoration is discussed in further detail at Section 5.4.2.2.

Fauna crossings & fencing

Koala exclusion fencing or safe fauna crossings including underpasses are proposed, notably along both sides of Appin Road, the eastern side of the proposed Georges River Koala Reserve and Kings Fall Bridge. Final details to ensure landscape and habitat connectivity for koalas is maintained are still being determined. A fencing feasibility study is underway and due for completion imminently, as per the Plan's commitments. Early implementation works for the Plan will focus on fencing for Appin Road over the first five years. See Schedule 4 Condition 9.

Increased public awareness and community engagement around koalas, whilst not directly conserving biodiversity values or landscape function, will increase public support for proposed mitigation and conservation measures.

- *Will key threatening processes in Schedule 4 of the BC Act be managed?*
- *Will landscape scale threats such as weeds and pests be managed?*

The SCA has been proposed to target the highest value conservation lands for offsets under the Plan, including land identified to meet the target for 570 ha of koala habitat under protection. Funding has been secured for the Plan's first five years, with koala mitigations included in this timeframe.

- *Are areas identified by the government as priorities for conservation protected and supported by adequate funding?*
- *Are areas likely to provide significant potential for restoration protected and supported by funding for management?*

The Plan is fully funded for the first 5 years, and koala mitigation measures including exclusion fencing and fauna crossings form part of the early works program. Funding for the Plan is discussed in further detail at section 5.4.2.2.

Significant restoration works, including up to 200 ha of koala habitat in the Georges River Koala Reserve, is proposed. Refer to sections 5.4.2.1 and 5.4.2.2.

Principle 5 – Conservation measures are additional to existing conservation obligations

Are conservation measures additional to existing obligations?

The establishment of the Georges River Koala Reserve, koala crossings and fencing, mitigation measures in planning controls and education measures are additional to existing obligations.

Do the conservation measures exclude existing DA obligations, VPAs, council plans of management for community land or other offsets?

The proposed koala mitigation measures include all new obligations.

The proposed Koala Working Group, which includes EHG, will be responsible for ongoing monitoring over the Plan's life.

The Plan's koala mitigation measures mention alignment with the NSW Koala Strategy. Although the Plan may align with the Koala Strategy, the Strategy has no commitments to deliver components of the Plan or ensure the Plan meets its required objectives. The Strategy will partner with the Plan and provide opportunities for the Plan to deliver and align its work over the implementation phase.

Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade

Planning provisions are proposed including notably a SEPP which identifies the SCA land and provides controls for future development applications. A s9.1 Ministerial Direction is also proposed to prevent rezoning of land in the SCA to uses incompatible with future conservation.

Refer to Section 5.4.2.4.

Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework

An assessment of proposed future reserves including the Georges River Koala Reserve has indicated that they are capable of measures the CAR framework, as detailed at Section 5.4.2.1.

Principle 8 – The delivery of conservation measures is timely and certain

Will conservation measures corresponding to impacts be fulfilled before the development impacting biodiversity values is carried out?

The koala measures will be delivered over the life of Plan, including a focus on mitigation measures in the first five years as discussed above.

This matter is addressed by Schedule 4 Condition 9.

Is the BCAR accompanied by an implementation plan for conservation measures which identifies:

- *legal mechanism for securing delivery of conservation measures*
- *parties to the biodiversity certification and responsibilities*
- *timing for delivery of conservation measures*

- *funding sources for delivery of conservation measures*
- *framework for monitoring, reporting or auditing implementation of conservation measures*

The BCAR is accompanied by an implementation plan. An interim agreement has also been agreed between the applicant and NPWS for delivery of proposed reserves, including the Georges River Koala Reserve.

Koala mitigation measures will need to be delivered to align with development as it occurs over the Plan's life.

Refer to Schedule 4 Conditions 8 and 9.

5.4.2.4 Planning package including the Draft State Environmental Planning Policy (Strategic Conservation Planning) 2021, associated planning policies & guidelines

The following Commitments of the Plan relate to planning measures:

- Commitment 1 – Development will be undertaken in accordance with the Plan and any conditions of approval. This applies to the following classes of actions:
 - urban and industrial
 - infrastructure
 - intensive plant agriculture
 - major transport corridors.
- Commitment 2 - Avoid and minimise impacts of up to 4,505 hectares of high biodiversity value area (the avoided land) through strategic conservation planning in the nominated areas
- Commitment 5 - Mitigate indirect and prescribed impacts from urban and industrial development; infrastructure; and intensive plant agriculture on threatened ecological communities, species and their habitat. This includes meeting specific mitigation requirements for threatened ecological communities, species and their habitat in accordance with Appendix E of the Plan
- Commitment 14 - Minimise impacts from development on biodiversity values in the strategic conservation area.

Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised

Refer to Sections 5.5.

Principle 2 – Conservation measures address the biodiversity values being impacted

Comparison of BCAR credit liability and offset credit proposal

BAM 2017 does not provide a method for calculating the credit value of planning instrument conservation measures. No credit estimate has been provided.

How are biodiversity values benefitted by the conservation measures relevant to the impacted biodiversity values?

The SEPP (Strategic Conservation Planning) and Section 9.1 Direction – Strategic Conservation Planning are proposed to apply to:

- land in the nominated areas (the BCAA) shown as avoided
- land in the strategic conservation area.

These policies aim to:

- In the case of the SEPP, provide appropriate land use controls to protect the Strategic Conservation Area
- In the case of the s9.1 Direction, prevent incompatible land uses in the Strategic Conservation Area
- Support the conservation program, which has targeted private land and NPWS reserves in the Strategic Conservation Area to offset impacts, including like-for-like offsets.

The planning package applies to areas avoided due to their inherent biodiversity value. The values impacted by proposed development are generally represented in the avoided lands. Parts of the planning package prescribing mitigation measures apply to directly impacted lands proposed for certification.

The relationship between lands being impacted and targeted for offsets under the conservation program is discussed further at section 5.4.2.2.

The CPCP Guidelines for Infrastructure Development aim to ensure that essential infrastructure is located on land certified for urban development “wherever possible”. The Template DCP provides specific controls for threatened ecological communities and koala habitat which occur in the BCAA where state-led DCP’s are proposed. Precincts where state-led DCP’s are not proposed will be subject to the Mitigation Measures Guideline. These non-statutory guidelines are targeted at mitigation measure for entities impacts by development on certified land.

The requirements to mitigate impacts on land proposed to be certified for urban development are addressed in Schedule 4 Conditions 29 and 30 of the conferral.

Are there any impacts to biodiversity values that are not addressed by the conservation measures?

The planning package is aimed at protecting the SCA, as well as mitigating the impact of development on lands proposed to be certified. The s9.1 Direction and Guideline for Infrastructure. The SEPP retains the existing zoning and range of permissible land uses, including on avoided lands where incompatible land uses may already be permitted.

Under the Infrastructure Guidelines essential infrastructure can still be located on avoided or strategic conservation area land in certain circumstances, subject to design provisions in the Guidelines to avoid and minimise impacts. Infrastructure associated with development applications on the proposed certified urban land must be contained within the certified land footprint.

Principle 3 – Conservation measures prioritise important biodiversity values

Are biodiversity values prioritised by the conservation measures in accordance with the guidelines? If not, why not? What are the implications?

Areas of highest biodiversity value within the nominated areas have been avoided and are located in the proposed conservation lands, to which the SEPP and s9.1 Direction apply. These policies are targeted at those values being protected under the Plan.

The Template DCP and Mitigation Measures Guideline relates to mitigation of impacts in the proposed certified land. These include weed control, fire management, pre-clearance surveys, fauna translocation, temporary fencing, traffic calming controls and measures to restrict construction impacts.

Avoided and strategic conservation areas lands, identified as having biodiversity value and future offset potential, are subject to the Infrastructure Guidelines. The Guideline aims to reduce impacts of essential infrastructure under Part 5 of the EP&A Act in such areas.

Infrastructure for urban development in certified areas must be located wholly outside of the conservation lands.

Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term

- *Is the extent, geometry, ecological function, adjacent land uses and habitat compatible with long term viability?*
- *Is habitat for TECs and threatened species protected?*
- *Are connections in the landscape, habitat corridors and riparian areas protected?*

The strategic conservation area covered by the SEPP and s 9.1 Direction has been mapped under a conservation priorities selection process. This land will be subject to future offsets under the conservation program and reserve acquisition and is designed to protect areas of highest biodiversity value including threatened ecological communities, threatened species and their habitat.

Refer to discussion under section 5.4.2.2.

As described above, the planning measures are targeted at conservation areas which have been identified as those being of highest biodiversity value. Conservation areas having the greatest viability and at lowest risk of impacts from adjacent land uses have informed the avoidance process and been selected as candidates for future offsets. The Mitigation Measures Guideline and Template DCP provide a supporting role by mitigating impacts on land proposed to be certified.

The provision to replant native vegetation in the SEPP mapped areas not covered by the biodiversity offsets scheme at a rate of 1:1 will reduce incremental clearing and promote landscape connectivity.

The Infrastructure Guidelines aim to preserve intact vegetation, landscape connectivity and biodiversity values of threatened ecological communities and species, and koala habitat.

Koala mitigation measures are discussed at section 5.4.2.3.

- *Will key threatening processes in Schedule 4 of the BC Act be managed?*
- *Will landscape scale threats such as weeds and pests be managed?*

The SCA has been proposed to target the highest value conservation lands for offsets under the Plan, as identified in the SEPP. Landscape threats will be addressed via separate commitments, although the SCA mapping provides a planning pathway to these lands to be conserved.

- *Are areas identified by the government as priorities for conservation protected and supported by adequate funding?*
- *Are areas likely to provide significant potential for restoration protected and supported by funding for management?*

The proposed planning package does not require funding for management.

Principle 5 – Conservation measures are additional to existing conservation obligations

Are conservation measures additional to existing obligations?

The SEPP comprises new planning provisions for land in the SCA including:

- Development consent requirement to clear native vegetation, preventing clearing under the LLS clearing codes (where applicable) and SEPP (Vegetation in Non-Rural Areas) 2017
- Requirement to offset for clearing of native vegetation not captured by the biodiversity offsets scheme clearing thresholds, at a rate of 1:1
- Requirement that asset protection zones are located on certified land
- Requirements for development on avoided land in the strategic conservation area to consider whether clearing is likely to adversely impact upon biodiversity values
- Requirement for development to consider cumulative impacts, having regard to the land's biodiversity values and restoration potential
- Acquisition clause for land identified for an NPWS reserve.

While the SEPP applies to all land in the SCA, it is noted that conservation management obligations will not be imposed on such land until if or when the site is formally established as an offset site with the agreement of the landowner. The s9.1 Direction aims to prevent rezoning of conservation lands to incompatible uses. It is strictly a land use planning tool and no other management obligations will be imposed.

The Cumberland Plain Conservation Plan Guidelines for Infrastructure Development requires Part 5 activity authorities to submit a statement of consistency with the Guidelines to the Planning Secretary, to demonstrate how proposed essential infrastructure is consistent with the Plan. It is however unclear how effective the requirement for the statement will be in achieving compliance with the Guidelines, as it is not required until the post-approval stage.

Appendix E and the Mitigation Measures are additional to existing conservation provisions, and function as complementary to the enabling SEPP. These include the following additional controls:

- Urban design requirements to retain koala feed trees and habitat
- Pre-clearance protocols
- Traffic calming measures for development to reduce impacts on koalas and other fauna species
- Protective fencing for conservation areas
- Asset protection zones (APZ's) and stormwater infrastructure for urban development located within certified land only
- Weed, pest mitigation, soil and erosion management controls
- Setbacks for Grey-headed flying fox camps (100m) & raptor nests (500m)
- Riparian management and revegetation controls.

Do the conservation measures exclude existing DA obligations, VPAs, council plans of management for community land or other offsets?

The proposed planning package comprises all new policies, which are additional to any such existing obligations.

Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade

Will land use zoning for conservation or enhancement of the natural environment be implemented following application?

The SEPP represents an upgrade from the existing situation, as conservation lands are subject to a range of additional controls. However, rezoning conservation lands environmental is no longer proposed, in response to submissions received during public exhibition.

The proposed SEPP includes a biodiversity overlay for conservation lands, including avoided lands in the nominated areas and the strategic conservation area. The proposed biodiversity overlay does however allow for a wider range of development under the existing zoning than would have been permitted if conservation lands were rezoned to environmental.

It is also proposed to integrate the conservation lands mapping into Councils' Local Strategic Planning Statements over time, as they are updated.

Do specific local provisions set out the development controls that will apply to protect native vegetation and any other habitat for native species on the land?

Land captured in the biodiversity overlay map of the SEPP will be subject to additional provisions, as discussed at Principle 5 above. The range of development permissible under the existing zoning, as well as interpretation of the SEPP provisions, are at the discretion of the consent authority (ie. Councils). It is noted that many of the SEPP provisions are qualitative in nature and require interpretation by the decision-maker.

The s9.1 Direction provides a range of considerations that planning proposals must demonstrate consistency with. The proposed s9.1 Direction also prevents land in the strategic conservation area from being rezoned to:

- A rural, residential, business, industrial, SP1, SP3, RE2 or "equivalent" zone
- SP2 Infrastructure, unless for essential infrastructure consistent with the CPCP Guidelines.

This means that in certified precincts yet to be rezoned, conservation lands can only be rezoned to environmental or essential infrastructure zones only.

The Template DCP will apply in those areas where state-led DCP's are not proposed. The Greater Macarthur and Greater Penrith-Eastern Creek nominated areas, where state-led DCP's are not proposed, will be subject to the Mitigation Measures Guideline which prescribes a consistent set of mitigation measures consistent with Appendix E of the Plan.

Do proposed management actions enhance the natural environment?

The package of planning provisions broadly enhance the natural environment, subject to the following being monitored for effectiveness:

- How the range of uses permitted under existing zoning of conservation lands interact with provisions to avoid and minimise impacts under the SEPP
- How design provisions under the Infrastructure Guidelines impact on outcomes for essential infrastructure constructed under Part 5 of the EP&A Act on avoided and strategic conservation area land
- Ensuring that conditions requiring APZ's and stormwater infrastructure for urban development to be located outside of certified urban land are satisfied.

Monitoring of planning controls is addressed at Schedule 4 Condition 23.

Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework

Not applicable. Refer to Section 5.4.2.1.

Principle 8 – The delivery of conservation measures is timely and certain

Will conservation measures corresponding to impacts be fulfilled before the development impacting biodiversity values is carried out?

The planning package will be in force in the first year of the Plan's life.

This matter is addressed by Schedule 4 Condition 1.

Is the BCAR accompanied by an implementation plan for conservation measures which identifies:

- *legal mechanism for securing delivery of conservation measures*
- *parties to the biodiversity certification and responsibilities*
- *timing for delivery of conservation measures*
- *funding sources for delivery of conservation measures*
- *framework for monitoring, reporting or auditing implementation of conservation measures*

The BCAR is accompanied by an implementation plan.

The planning measures are not subject to a legal mechanism but will be enacted within Year 1, as per the Plan's Commitments.

These controls will need to be incorporated into the planning framework as development progresses. An audit process is proposed to ensure this occurs and will be ongoing.

Timing and audit measures for planning measures are addressed by Schedule 4 Conditions 1 and 23.

5.4.2.5 Non land-based measures

The following Commitments of the Plan relate to landscape management measures:

- Commitment 15 - Manage priority weeds in strategic locations in the Cumberland subregion to reduce threats to land secured within the strategic conservation area
- Commitment 16 - Manage priority pest animals in strategic locations in the Cumberland subregion to reduce threats to land protected within the strategic conservation area.
- Commitment 17 - Manage fire in strategic locations in the Cumberland subregion to support the maintenance of biodiversity values on conservation land
- Commitment 18 - Support new or existing programs to control key diseases affecting threatened species and ecological communities in the Cumberland subregion.

The following commitments relate to additional non-land based measures, including education, research, compliance, landowner services, climate change adaptation & an Aboriginal Engagement Strategy:

- Commitment 19 - Support existing or new programs to help threatened species and ecological communities adapt to the impacts of climate change in the plan area
- Commitment 20 - Provide opportunities for the residents of Western Sydney to learn about and actively participate in biodiversity conservation including koala conservation
- Commitment 21 - Partner with Aboriginal groups and community to help maintain a distinctive cultural, spiritual, physical and economic relationships with their land and waters in Western Sydney
- Commitment 22 – Invest in research priorities that will support the implementation of the Plan and help to deliver the Plan's outcomes.

Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised

No biodiversity credit equivalent for non-land based conservation measures has been supplied, as it is not feasible to do so and BAM 2017 does not contemplate such a calculation. The Plan notes that up to 10% of funding will be delivered to non-land based measures, including landscape management measures.

Weeds, fire and pests are all key landscape threats for entities at risk of SAIL such as:

- Cooks River Castlereagh Ironbark Forest TEC
- Shale Sandstone Transition Forest TEC
- Cumberland Plan Woodland TEC

Given the general nature of these commitments and actions, it is difficult to know how or where SAIL entities will benefit at this stage. The benefits of the proposed disease research programs on SAIL entities will need to be detailed at the implementation stage. It is noted that climate change is likely to exacerbate impacts upon entities at risk of SAIL under the Plan. Similarly, however, the proposed climate research has yet to be determined or specified in detail and the benefit to SAIL entities.

SAIL is further discussed at section 5.5.1.

Principle 2 – Conservation measures address the biodiversity values being impacted

Landscape management measures

The proposed landscape management actions include:

- Preparation of a fire/weed/pest management strategies and implementation agreements with delivery partners
- Integration of weed/fire/pest control actions for into biodiversity stewardship agreements and reserve management plans
- Provision of grants to relevant stakeholders to reduce weeds in the following locations: on public land adjoining or near conservation land, and on Aboriginal-owned land adjoining or near to conservation land
- Funding of organisations to deliver fire management outcomes and partner with Aboriginal knowledge holders to investigate traditional fire management techniques
- Investigate programs related to key threatening processes
- Consult broadly to determine research priorities into key threatening processes such as *Phytophthora cinnamoni* root fungus, amphibian chytrid fungus and psittacine circovirus.

As the Plan is likely to increase the number of pest species at the peri-urban interface, the plan includes regional measures to manage pest species. Funding of organisations such as LLS as proposed is considered effective to undertake these aims. Proposed fire management actions are aimed at minimising the threat of fire upon sensitive areas or biodiversity values in the Plan's avoided areas, particularly given the Plan will result in significant changes to land use and human settlement in or near landscapes susceptible to fire.

The BCAR states that a landscape scale management approach to weeds under the proposed strategy will be undertaken. Fire, weed and pest management strategies are proposed in this suite of measures. It is unclear how these strategies will integrate with fire, weed, pest and disease management in NPWS reserves and biodiversity stewardship sites.

Weed, fire and pest management are also proposed to be addressed in the proposed planning controls, including DCP controls and the proposed Mitigation Measures, and more broadly in the proposed Strategic Conservation Planning SEPP, as discussed at Section 5.4.2.4 above. Post-conferral monitoring by the executive implementation committee will be required to ensure effective integration occurs.

Additional non –land based measures

The proposed development of a research program is supported in principle. Notwithstanding, it is difficult to ascertain the exact scope of species and communities being benefited at this stage. The proposed development of research priorities will be required to deliver the intended outcomes at implementation stage.

Identifying new priority locations reflecting adaptation to climate impacts over the Plan's life is supported in principle. The exact nature of the proposed additional areas and/or entities that will be benefitted is as yet unclear. These measures can be addressed and implemented as a post-conferral requirement.

Principle 3 – Conservation measures prioritise important biodiversity values

Landscape management measures

The proposed suite of landscape management measures is targeted at areas of sensitive biodiversity values in the SCA.

Further research of key threatening processes are supported in principle. Given the general nature of this commitment, and as the diseases targeted by the Plan are already existing threats, it is difficult to ascertain the likely extent of benefits at this stage.

The Plan commits to locating asset protection zones for bushfire within land certified for urban development in the proposed SEPP. As discussed at section 5.4.2.4, this measure is supported to minimise bushfire risk to sensitive areas and prevent asset protection clearing on avoided and conservation lands.

Regional scale commitments, including funding of organisations such as NSW Local Land Services, are an effective way of dealing with pests at the landscape scale. Regional funding to organisations for pest management is therefore supported, however the proposed level of funding has not been quantified at this stage.

Additional non -land based measures

Early establishment of priority research during the first 5 years is considered essential to guide development of the research program over the Plan's life. Given the Plan's reliance on restoration as a key contributor to meeting offset targets, the proposed research into effective restoration measures will be required to ensure this has the best chance of successfully delivering offset outcomes.

Whilst it is proposed to consider funding climate change adaptation, this will require follow-up to ensure adaptation actions are implemented. The exact scope of climate research has not been quantified at this stage and will be further developed during implementation.

Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term

As discussed at Principles 2 and 3 above, the proposed measures have the intention of improving biodiversity values and landscape function in the long term by managing landscape scale threats, and are supported in principle. Their long- term benefits cannot be fully ascertained at this stage and require further development during implementation.

Identifying new priority locations and reflecting adaptation to climate impacts over the Plan's life is supported in principle. It is proposed to update the Conservation Lands Implementation Strategy to reflect new areas incorporated into the SCA. It has not been stated whether updates to the Strategic Conservation Planning SEPP mapping, which is the planning mechanism that enacts protection of SCA land, are also proposed.

Principle 5 – Conservation measures are additional to existing conservation obligations

Fire, weed, pest and management measures are additional to existing obligations, however the mechanisms by which the proposed management strategies can be imposed has not been detailed.

The proposed research program, whilst additional to existing obligations, is difficult to quantify in terms of scope and impact until the after initial prioritisation and development of the program has occurred.

Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade

Not applicable. Refer to section 5.4.2.4.

Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework

Not applicable. Refer to section 5.4.2.1.

Principle 8 – The delivery of conservation measures is timely and certain

Development of the proposed suite of strategies, consultation and development of research programs is proposed to occur within the first ten years of the Plan. Monitoring of these actions will need to occur over the life of the Plan to ensure outcomes being sought are delivered.

Funding of the Plan is discussed in further detail at section 5.4.2.2.

5.4.3 Ecologically Sustainable Development

Ecologically sustainable development is a central tenet of the BC Act. Ecologically sustainable development is described in section 6(2) of the *Protection of the Environment Administration Act 1991* and requires effective integration of social, economic and environmental considerations in decision-making processes.

Ecologically sustainable development can be achieved through the implementation of four principles and programs:

1. the precautionary principle
2. intergenerational equity
3. conservation of biological diversity and ecological integrity
4. improved valuation, pricing and incentive mechanisms.

To effectively integrate social, economic and environmental considerations in biodiversity certification decisions, the conservation measures and biodiversity certification as a whole must respond to the principles of ecologically sustainable development.

Discussion:

1. The precautionary principle

- *Are there threats of serious or irreversible environmental damage?*

The Plan does threaten entities at risk of serious and irreversible impact. This includes three TEC's, and seven threatened species.

Entities at risk of serious and irreversible impact as a result of the Plan are discussed at Section 5.3 below.

- *Is there an evaluation to avoid, wherever practicable, serious or irreversible damage to the environment?*

Avoidance principles have been incorporated into the Plan's land use categories, including consideration of avoiding SAll entities as highest priority. Whilst avoidance has been carried out, the application of avoidance criteria varies across the Plan's areas proposed to be certified, particularly in relation to land proposed to be certified as transport corridors.

This matter is discussed further at sections 4.1.1, 5.1.2 and 5.3.

- *Is there an assessment of the risk-weighted consequences of various options?*

Various options have been canvassed in the BCAR, and development of the Plan's avoidance principles may equate to considering the risk-weighted consequences of these options.

2. Intergenerational equity

If the project was to be approved, does it ensure that the health, diversity and productivity of the environment would be maintained or enhanced for the benefit of future generations?

Should the Plan not proceed, it is conceivable that ongoing piecemeal development on the Cumberland Plain will continue to degrade environmental values in the absence of a strategic approach to offsetting impacts at the landscape scale.

The proposed Commitments and Actions aim to ensure that the Plan offsets impacts on certified land through a targeted suite of conservation measures. The Plan relies on securing conservation measures over the Plan's life, and landholder willingness will be a critical factor in determining success of the Plan.

Assessment of the proposed conservation measures having regard to EHG guidance for strategic certification is at Section 5.4.2.

3. Conservation of biological diversity and ecological integrity

- *Does the proposal adequately consider conservation of biological diversity and ecological integrity?*

The proposal adequately addresses these matters through assessment of the proposal's impacts in the BCAR and package of conservation measures.

4. Improved valuation, pricing and incentive mechanisms

- *Does the generator of the pollution and waste bear the cost of containment, avoidance and abatement?*
- *Are users of an approved project paying prices based on the full life cycle of costs providing the use of natural resources and assets?*
- *Are environmental goals pursued in the most cost-effective way?*

The Applicant is responsible for funding the Plan over its life. The Plan seeks to offset impacts of development on certified land based substantially on the NSW private land conservation framework, in partnership with the NSW BCT. Dedication of land to NPWS reserves is also proposed.

This matter is discussed further at section 5.4.2.

Recommendation:

That the Minister be **satisfied** in accordance with section 8.7(1) of the *Biodiversity Conservation Act 2016* that, having regard to the biodiversity certification assessment report, the approved conservation measures under the biodiversity certification adequately address the likely impacts on biodiversity values of the biodiversity certification of the land.

5.5 Serious and irreversible impacts

Section 8.8 of the BC Act states that:

- (2) If the Minister is of the opinion that the clearing of native vegetation and loss of habitat on land proposed for biodiversity certification is likely to have serious and irreversible impacts on biodiversity values, the Minister—
- (a) is required to take those impacts into consideration in determining the application for biodiversity certification, and
- (b) is required to determine whether there are any additional and appropriate measures that will minimise those impacts.

5.5.1 Overview of Serious and Irreversible Impact (SAIL) Principles

An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species (including endangered populations) or ecological community becoming extinct based on the four principles (DPIE 2019):

- Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline
- Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size
- Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution
- Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.

These principles are set out in clause 6.7 of the BC Regulation 2017.

These principles have also been used to identify threatened species and ecological communities with the potential to be impacted by SAIL (see Table 1 below and Appendix A of DPIE 2019).

For avoidance of doubt, “likely” in the context of this assessment is taken to mean “*a real chance or possibility*”, as per *White v Ballina* 2021 NSWLEC 1468.

5.5.2 Threatened Ecological Communities currently at risk of serious and irreversible impacts

Three ecological communities that will be directly and indirectly impacted by this proposal are identified in the BCAR as being at risk of an SAIL. These are:

- Cooks River/Castlereagh Ironbark Forest (CRCIF)
- Cumberland Plain Woodland (CPW)
- Shale Sandstone Transition Forest (SSTF)

Table 1 below identifies the principles against which these were assessed to be at risk of an SAIL.

Table 1 The principles for which CRCIF, CPW and SSTF were assessed as being at risk of an SAIL:

	Principle 1 - species or ecological community currently in a rapid rate of decline	Principle 2 - species or ecological communities with a very small population size	Principle 3 - species or area of ecological community with very limited geographic distribution	Principle 4 - species or ecological community that is unlikely to respond to management and is therefore irreplaceable
CRCIF	✓	✓		
CPW	✓	✓		
SSTF		✓	✓	

Table 2 below summarises the extent of proposed clearing for each of these communities.

Table 2 Summary of impacts to those TEC's at risk of an SAIL:

	% / Area of SAIL entity proposed to be avoided in nominated areas	% / Area of SAIL entity proposed to be impacted in BCAA	% / Area of SAIL entity in intact & thinned state proposed to be impacted in nominated areas	Area of SAIL entity in scattered trees / derived native grassland state proposed to be impacted in nominated areas
CRCIF	41% / 25.9 ha	59% / 37.6 ha	92% / 34.7 ha	8% / 2.9 ha
CPW	26% / 321.3 ha	74% / 931.5 ha	40% / 376.8 ha	60% / 554.7 ha
SSTF	83% / 2,180.5 ha	17.4% / 459.8 ha	42% / 191.3 ha	58% / 268.5 ha

Note: all figures exclude retained/excluded land

For ecological communities, Principle 1 (i.e. those currently in a rapid rate of decline) refers to a very large reduction in distribution, and Principle 2 (i.e. those with a very small population size) means "they have very high levels of either environmental degradation or disruption of

biotic processes, and interactions have an increased risk of failure to sustain their characteristic native species assemblages (Keith et al. 2013)” (page 11, DPIE 2019). In short, Principle 2 refers to a very high reduction in ecological function.

EHG considers the impacts of the proposal is likely to result in serious and irreversible impacts for these three communities. The reasons for this are discussed further below and at Appendix 5A.

This conclusion was based on information in the BCAR, the application of section 8.8(2) of the BC Act and clause 6.7(2) of the BC Regulation, and the *Guidance to assist a decision-maker to determine a serious and irreversible impact* (DPIE 2019).

5.5.2.1 Cooks River/Castlereagh Ironbark Forest

EHG considers that, following application of the avoidance criteria in accordance with Stage 2 of the BAM, the residual impacts of the proposal will likely result in serious and irreversible impacts for this community. This conclusion is supported by application of the 4 principles under cl 6.7(2) of the BC Act.

- *Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline*

Cooks River/Castlereagh Ironbark Forest (CRCIF) was listed as endangered in NSW in 2002 because it was likely to become extinct unless the circumstances and factors threatening its survival or evolutionary development stopped operating (paragraph 14 of the final determination).

The community is confined to the Sydney Basin Bioregion and mostly restricted to the Cumberland subregion (as per s25.3 of the BCAR). Extensive clearing of CRCIF has occurred for urban development, and very extensive clearing and fragmentation has occurred in the area between Parramatta and Canterbury (Paragraph 11 of the determination). As of 2002, 1.7% of remaining extent of the community was secured in conservation reserves (Paragraph 12 of the determination).

These circumstances and factors, including extensive disturbance, fragmentation and weed invasion are ongoing, and will be exacerbated by the Proposed Certification. The serious and irreversible impact will likely significantly contribute to an increased risk of extinction as it will further reduce the distribution, condition and ecological function of CRCIF.

- *Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size*

It estimated that 7% of the initial distribution remained at the time of listing (Paragraph 11 of the determination). The proposed avoidance for this TEC, excluding areas of retained land, is 40.7%, resulting in 37.6 ha from 63.4 ha in the BCAA (excluding retained land) being cleared. The principles of SAI operate at the state level (DPIE 2019) and this TEC only occurs within the Sydney Basin bioregion, and within that region is largely restricted to the Cumberland Plain. The proposal would in total impact on 2.8% (166.3 ha) of the total remaining extent of CRCIF in the Cumberland subregion (as per s25.3.4 of the BCAR).

In highly fragmented systems, the loss of small patches has large impacts on the long-term viability of a community because their loss prevents or hinders connectivity, dispersal, gene flow and adaptive capacity. The creation of increasingly isolated patches increases the risks,

for example local and regional extinction, associated with catastrophic events like bushfires, floods, droughts and disease.

- *Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution*

This principle was not assessed as contributing to this community being likely subject to an SAI (Table 1).

- *Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.*

This principle was not assessed as contributing to this community being likely subject to an SAI (Table 1).

Avoidance for this community has been discussed under Principle 2 above, and it is noted that a range of mitigations are prescribed under Appendix E of the Plan. See also Schedule 4 Conditions 29 and 30. As such, further “additional and appropriate” measures under s8.8(2)(b) of the BC Act for this community have not been recommended.

5.5.2.2 Cumberland Plain Woodland

EHG considers that, following application of the avoidance criteria in accordance with Stage 2 of the BAM, the residual impacts of the proposal will likely result in serious and irreversible impacts for this community. This conclusion is supported by application of the 4 principles under cl 6.7(2) of the BC Act.

- *Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline*

Cumberland Plain Woodland (CPW) was listed as critically endangered in NSW in 2009 because it was facing an extremely high risk of extinction in the immediate future due to a very large reduction in distribution and ecological function (paragraphs 13-17 and 19-23 of the final determination). Estimates at the time of listing in 2009 indicated a reduction of 5.8% of the remnant extent of the population between 2000-2009 (paragraph 13 of the determination).

These factors are ongoing and will be exacerbated by the Proposed Certification, noting that ecological function can be indicated by community structure, species composition, ecological processes, exotic species, degradation and fragmentation. The serious and irreversible impact will likely significantly contribute to an increased risk of extinction as it will further reduce the distribution, condition and ecological function of CPW.

- *Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size*

The proposed avoidance for this TEC, excluding areas of retained land, are 25.6%, resulting in 931.5 ha from a total of 1252.8 ha in the BCAA (excluding retained land) being cleared. 64.8% of intact CPW (31.5 ha) is proposed to be cleared, from a total of 89.4 ha of intact CPW in the BCAA.

The principles of SAI operate at the state level (DPIE 2019) and this TEC only occurs within the Sydney Basin bioregion, and within that region is largely restricted to the Cumberland

Plain. The proposal would in total impact on 4.1% (931.5ha) of the total remaining extent of CPW in the Cumberland subregion (as per s25.4.4 of the BCAR).

In highly fragmented systems, the loss of small patches has large impacts on the long-term viability of a community because their loss prevents or hinders connectivity, dispersal, gene flow and adaptive capacity. The creation of increasingly isolated patches increases the risks, for example local and regional extinction, associated with catastrophic events like bush fires, floods, droughts and disease.

- *Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution*

This principle was not assessed as contributing to this community being likely subject to an SAI (Table 1).

- *Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.*

This principle was not assessed as contributing to this community being likely subject to an SAI (Table 1).

Avoidance for this community has been discussed under Principle 2 above, and a range of mitigations are prescribed under Appendix E of the Plan. See also Schedule 4 Conditions 29 and 30. As such, further “additional and appropriate” measures under s8.8(2)(b) of the BC Act for this community have not been recommended.

5.5.2.3 Shale Sandstone Transition Forest

EHG considers that, following application of the avoidance criteria in accordance with Stage 2 of the BAM, the residual impacts of the proposal will likely result in serious and irreversible impacts for this community. This conclusion is supported by application of the 4 principles under cl 6.7(2) of the BC Act.

- *Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline*

This principle was not assessed as contributing to this community being likely subject to an SAI (Table 1).

- *Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size*

SSTF was listed as critically endangered in NSW in 2014 because it was facing an extremely high risk of extinction in the immediate future due to a very large reduction in distribution and ecological function (paragraphs 3.1.2, 3.1.1 and 3.2 of the final determination). These factors are ongoing and will be exacerbated by the Proposed Certification. The proposal would in total impact on 3.7% (459.8ha) of the total remaining extent of SSTF in the Cumberland subregion (as per s25.5.4 of the BCAR).

The proposed avoidance for this TEC, excluding areas of retained land, is 82.6%, resulting in 459.8 ha from a total of 2640.2 ha in the BCAA (excluding retained land) being cleared. Three per cent of intact SSTF (45.7 ha) is proposed to be cleared, from a total of 1492.6 ha of intact

SSTF in the BCAA. As detailed in the BCAR, the area of this TEC is in derived native grassland and thinned condition states will most heavily impacted, with 63.7% (227.5 ha) and 20.3% (145.6 ha) respectively proposed to be cleared (excluding excluded areas). A further 41 ha of this TEC in scattered tree condition will also be cleared.

In highly fragmented systems, the loss of small patches has large impacts on the long-term viability of a community because their loss prevents or hinders connectivity, dispersal, gene flow and adaptive capacity. The creation of increasingly isolated patches increases the risks, for example local and regional extinction, associated with catastrophic events like bush fires, floods, droughts and disease.

- *Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution*

The principles of SAIL operate at the state level (DPIE 2019) and this TEC only occurs within the Sydney Basin bioregion. Before European settlement, this community was extensive around the edges of the Cumberland lowlands throughout western Sydney, most particularly in the southern half. The remnant extent of SSTF has a limited geographic distribution, as currently 9,950 ha remains intact (22.6% of its original extent) with the bulk of this occurring in the Hawkesbury, Baulkham Hills, Liverpool, Parramatta, Penrith, Campbelltown and Wollondilly local government areas.

- *Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.*

This principle was not assessed as contributing to this community being likely subject to an SAIL (Table 1).

Avoidance for this community has been discussed under Principle 2 above, and it is noted that a range of mitigations are prescribed under Appendix E of the Plan. See also Schedule 4 Conditions 29 and 30. As such, further “additional and appropriate” measures under s8.8(2)(b) of the BC Act for this community have not been recommended.

5.5.3 Species currently at risk of serious and irreversible impacts

Six species proposed to be impacted by this proposal were assessed in the BCAR as being at risk of serious and irreversible impacts. They are:

- *Allocasuarina glareicola*
- *Chalinolobus dwyeri* (Large-eared Pied Bat)
- *Hibbertia fumana*
- *Lathamus discolor* (Swift Parrot)
- *Melaleuca deanei* (Deane’s Paperbark)
- *Micromyrtus minutiflora*

Table 3 below identifies the principles against which these species were assessed at being at risk of an SAIL.

Table 3 The principles for which these species were assessed as being at risk of an SAI

	Principle 1 - species or ecological community currently in a rapid rate of decline	Principle 2 - species or ecological communities with a very small population size	Principle 3 - species or area of ecological community with very limited geographic distribution	Principle 4 - species or ecological community that is unlikely to respond to management and is therefore irreplaceable
<i>Allocasuarina glareicola</i>			✓	✓
<i>Chalinolobus dwyeri</i>				✓
<i>Hibbertia fumana</i>			✓	
<i>Lathamus discolor</i>	✓			
<i>Melaleuca deanei</i>				✓
<i>Micromyrtus minutiflora</i>	✓			✓

The BCAR assessed these species under section 10.2.3 of the BAM. EHG considers the impacts of the proposal will likely result in serious and irreversible impacts for three of these species, these being *Allocasuarina glareicola*, *Hibbertia fumana* and *Lathamus discolor* (Swift Parrot). EHG considers the impacts of the proposal are unlikely to result in serious and irreversible impacts for *Chalinolobus dwyeri* (Large-eared Pied Bat), *Micromyrtus minutiflora* and *Melaleuca deanei*.

5.5.3.1 *Allocasuarina glareicola*

EHG considers that, following application of the avoidance criteria in accordance with Stage 2 of the BAM, the residual impacts of the proposal are likely to result in serious and irreversible impacts for this species. This conclusion is supported by application of the 4 principles under cl 6.7(2) of the BC Act.

- *Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline*

This principle was not assessed as contributing to this species being likely subject to an SAI (Table 3).

- *Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size*

This principle was not assessed as contributing to this species being likely subject to an SAI (Table 3).

- *Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution*

Allocasuarina glareicola has a very limited geographic distribution (36 km² or 3,600 ha). 17.4 ha of potential habitat is proposed to be impacted by urban capable land and major transport corridors, representing 53.9% of potential habitat within the BCAA (without excluded land) and 8.7% of potential habitat within the BCAA (including excluded land). This area of habitat is modelled habitat in areas without access, and those areas surveyed in accessible areas did not identify occurrences of the species.

However, the restriction of the modelled habitat for this species to the intact and thinned condition states has likely underestimated the area of potential habitat for *Allocasuarina glareicola*.

While no recorded occurrences of this species are proposed to be impacted, there is a residual risk that targeted surveys in accessible areas did not identify all individuals, as larger than required transect separation distances were used and may have resulted in individuals being missed. In addition, no surveys were completed in areas around Orchard Hills, which is a key known habitat area for the species.

- *Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.*

Allocasuarina glareicola is unlikely to respond to management, as it reproduces clonally.

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

Overall, it is considered, having regard to Principles 3 and 4, likely that the proposal will result in a SAIL to *Allocasuarina glareicola* given:

- the CPCP will impact on significant amounts of the modelled habitat for a species with an already restricted geographic distribution.

Avoidance for this species has been discussed under Principle 3 above, and a range of mitigations are prescribed under Appendix E of the Plan. See also Schedule 4 Conditions 29 and 30. As such, further “additional and appropriate” measures under s8.8(2)(b) of the BC Act for this species have not been recommended.

5.5.3.2 *Chalinolobus dwyeri* (Large-eared Pied bat)

EHG considers that, following application of the avoidance criteria in accordance with Stage 2 of the BAM, the residual impacts of the proposal are not likely to result in serious and irreversible impacts for this species. This conclusion is supported by application of the 4 principles under cl 6.7(2) of the BC Act.

- *Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

- *Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

- *Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

- *Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.*

The BCAR identifies that Large-eared Pied Bat is unlikely to respond to management as the species is reliant of caves for breeding; a feature which cannot be readily recreated. No known breeding habitat will be impacted, however adjacent foraging habitat may be impacted, reducing the ongoing viability of retained breeding habitat. Further, increased access to retained breeding habitat due to increased development could impact on viability of those sites.

Overall, it is considered, having regard to Principles 1-4, not likely that the proposal will result in a SAIL to the Large-eared Pied Bat.

5.5.3.3 *Melaleuca deanei*

EHG considers that, following application of the avoidance criteria in accordance with Stage 2 of the BAM, the residual impacts of the proposal are not likely to result in serious and irreversible impacts for this species. This conclusion is supported by application of the 4 principles under cl 6.7(2) of the BC Act.

- *Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

- *Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

- *Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

- *Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.*

Melaleuca deanei is unlikely to respond to management as the species reproduces clonally. The BCAR concludes that the ecology of the local population is unlikely to be affected as the species has a low likelihood of occurring within potential habitat, loss of habitat will not affect key life-cycle processes and potential habitat will not be fragmented by development.

Given the prevalence of the species outside the BCAA within well connected habitats (particularly within Reserves and Protected Areas) conclusions around low likelihood of impact to life-cycle processes and impacts to fragmentation are supported.

Mitigation measures proposed to address key threats are not specific enough to address direct threats. The SCA may result in the conservation of up to 7,466 ha of mapped habitat, noting 5,325 ha of native vegetation is proposed to be targeted for offsets.

Overall, it is considered, having regard to Principles 1-4, not likely that the proposal will result in a SAIL to *Melaleuca deanei*.

5.5.3.4 *Micromyrtus minutiflora*

EHG considers that, following application of the avoidance criteria in accordance with Stage 2 of the BAM, the residual impacts of the proposal are not likely to result in serious and irreversible impacts for this species. This conclusion is supported by application of the 4 principles under cl 6.7(2) of the BC Act.

- *Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline*

No known occurrences will be impacted, and the species was not recorded during targeted surveys. The BCAR concludes that the species is absent within the OSO corridor within GPEC. However, not all suitable habitat was able to be surveyed, with no surveys of suitable habitat were completed at Orchard Hills or Kemps Creek. Loss of habitat along the southern margins of the species' stronghold in Londonderry may impact on factors such as seed dispersal and recruitment.

- *Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

- *Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

- *Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

Overall, it is considered, having regard to all four principles, not likely that the proposal will result in a SAIL to *Micromyrtus minutiflora*

5.5.3.5 *Hibbertia fumana*

EHG considers that, following application of the avoidance criteria in accordance with Stage 2 of the BAM, the residual impacts of the proposal are likely to result in serious and irreversible

impacts for this species. This conclusion is supported by application of the 4 principles under cl 6.7(2) of the BC Act.

- *Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

- *Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

- *Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution*

Hibbertia fumana was thought to be extinct until a population was discovered at Moorebank in 2016. This species has a very limited distribution of 400 ha, and little is known about its lifecycle and ecology (Principle 3). 73.8 ha of potential habitat will be impacted by urban capable land and major transport corridors, representing 5.6% of potential habitat within the nominated areas (without excluded land) and 4.3% of potential habitat within the nominated areas (including excluded land).

While no recorded occurrences of this species are proposed to be impacted, it is unclear whether surveys carried out in spring 2019 were adequate, and surveys were not completed in most areas of suitable habitat in WSA, GMAC or Wilton due to a lack of access and potential habitat was modelled through an expert report. There is a residual risk that targeted surveys at the strategic scale did not identify all individuals and the current area of potential habitat is an underestimate.

The proposal will impact 73.8 ha potential habitat for this species. Further fragmentation and removal of habitat may impact the ecology of the species and reduce its long-term viability.

- *Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

Overall, it is considered, having regard to Principle 3, likely that the proposal will result in a SAIL to *Hibbertia fumana* given:

- the CPCP will impact on significant amounts of the modelled habitat for a species with an already restricted geographic distribution; and
- further fragmentation and removal of habitat may impact on the ecology of the species.

Avoidance for this species has been discussed under Principle 3 above, and a range of mitigations are prescribed under Appendix E of the Plan. See also Schedule 4 Conditions 29 and 30. As such, further “additional and appropriate” measures under s 8.8(2)(b) of the BC Act for this species have not been recommended.

5.5.3.6 *Lathamus discolor* (Swift Parrot)

EHG considers that, following application of the avoidance criteria in accordance with Stage 2 of the BAM, the residual impacts of the proposal are likely to result in serious and irreversible impacts for this species. This conclusion is supported by application of the 4 principles under cl 6.7(2) of the BC Act.

- *Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline*

The Swift Parrot is considered to be in a rapid rate of decline in its Tasmanian breeding range (paragraph 3 of the determination). This is due to nest predation by the introduced Sugar Glider (*Petaurus breviceps*). Habitat loss and alteration are also contributing factors. It is also considered to be in immediate danger of extinction in NSW (paragraph 5 of the determination).

An estimated 46.1 ha of important habitat area will be directly impacted by urban capable land and transport corridors, representing 53% important habitat within the nominated areas (without excluded land) and 8% of important habitat within the nominated areas (including excluded land). It represents <1% of the total 5,631 ha of important habitat mapped across the Sydney basin. Notwithstanding, this is considered significant, and the amount of habitat proposed to be removed may lead to a decline of this species within the Sydney Basin bioregion.

- *Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

- *Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

- *Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.*

This principle was not assessed as contributing to this species being likely subject to an SAIL (Table 3).

Overall, it is considered, having regard to Principle 1, likely that the proposal will result in a SAIL to Swift Parrot given:

- the CPCP will cause further decline for a species that is undergoing a rapid rate of decline; and
- the amount of habitat removal may lead to significant decline of the species within the Sydney Basin IBRA region.

Avoidance for this species has been discussed under Principle 1 above, and a range of mitigations are prescribed under Appendix E of the Plan. See also Schedule 4 Conditions 29 and 30. As such, further “additional and appropriate” measures under s 8.8(2)(b) of the BC

Act for this species have not been recommended. The Plan contains specific offset targets for this species (see Commitment 9).

5.5.4 Other impacted entities with the potential to become a SAI

Section 10.2.1.4 of the BAM states “The assessor must identify any other entity impacted on by the proposed development, activity, clearing proposal or proposed application for biodiversity certification with potential to become a serious and irreversible impact in accordance with the four principles in the BC Regulation.”

The BCAR has addressed this in Chapter 25, with Tables 25-2 and 25-3 summarising the conclusions for TECs and species. The BCAR considered no TECs and the following five species, which are not currently listed in the TBCD as SAI entities, have the potential to become an SAI:

- *Haliaeetus leucogaster* (White-bellied Sea-Eagle)
- *Hieraaetus morphnoides* (Little Eagle)
- *Lophoictinia isura* (Square-tailed Kite)
- *Litoria aurea* (Green and Golden Bell Frog)
- *Pseudophryne australis* (Red-crowned Toadlet)

EHG does not consider the raptors White-bellied Sea Eagle, Little Eagle and Square-tailed Kite to be likely subject to SAI, because these species are widely distributed across the State. The BCAR documents the impacts to these species in the BCAA.

In summary:

- Principle 1 was not assessed as contributing to the raptor species being likely subject to an SAI (Table 3).
- Principle 2 was not assessed as contributing to the raptor species being likely subject to an SAI (Table 3).
- Principle 3 was not assessed as contributing to the raptor species being likely subject to an SAI (Table 3).
- With regard to Principle 4, breeding habitat cannot be readily recreated on offset sites and the proposal impacts on breeding habitat (Table 3).

Overall, it is considered, having regard to all four principles 4, not likely that the proposal will result in a SAI to these raptor species.

As such, no further mitigations for these species are considered necessary.

The remaining two species identified as potential SAI entities in the BCAR are addressed below.

5.5.4.1 *Pseudophryne australis* (Red-crowned Toadlet)

EHG considers that, following application of the avoidance criteria in accordance with Stage 2 of the BAM, the residual impacts of the proposal are not likely to result in serious and irreversible impacts for this species. This conclusion is supported by application of the 4 principles under cl 6.7(2) of the BC Act.

- *Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline*

This principle was not assessed as contributing to this species being likely subject to an SAI (Table 3).

- *Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size*

This principle was not assessed as contributing to this species being likely subject to an SAI (Table 3).

- *Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution*

This principle was not assessed as contributing to this species being likely subject to an SAI (Table 3).

- *Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.*

The Red-crowned Toadlet is not a previously listed potential SAI entity, however the Plan has assessed it as having potential to become an SAI entity due to susceptibility to Chytrid.

No known occurrences of the species are proposed to be impacted by the Plan, noting however that habitat for this species was modelled as it was subject to the knowledge-based method. It is particularly susceptible to changes in water quality, and that although generic controls are proposed in planning measures no species-specific measures are proposed.

Having regard to all four principles, it is considered that the proposal is unlikely to result in a SAI to this species.

5.5.4.2 *Litoria aurea* (Green & Golden Bell Frog)

EHG considers that, following application of the avoidance criteria in accordance with Stage 2 of the BAM, the residual impacts of the proposal are not likely to result in serious and irreversible impacts for this species. This conclusion is supported by application of the 4 principles under cl 6.7(2) of the BC Act.

- Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline

This principle was not assessed as contributing to this species being likely subject to an SAI (Table 3).

- Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size

This principle was not assessed as contributing to this species being likely subject to an SAI (Table 3).

- Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution

This principle was not assessed as contributing to this species being likely subject to an SAI (Table 3).

- Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.

The BCAR assessed the Green and Golden Bell Frog against the four principles and found it had potential to become at risk of an SAI due to the species' susceptibility to Chytrid under Principle 4. The BCAR also identified changes in hydrology as a result of development on certified land would be a key threat to the species. 13.3 ha of GGBF habitat is proposed to be impacted within the nominated areas, with more than 1,600 ha of habitat on retained land.

Having regard to all four principles, it is considered that the proposal is unlikely to result in a SAI to this species, as no currently known occupied habitat will be impacted, and only small areas of potential habitat will be impacted (<1% within the BCAA).

5.5.4.3 Other entities with the potential to become SAI entities

EHG considers an additional 12 species and populations have the potential to become entities at risk of SAI over the life of the Plan. These are:

- *Acacia bynoeana* (Bynoe's Wattle)
- *Acacia pubescens* (Downy Wattle)
- *Eucalyptus benthamii* (Camden White Gum)
- *Grevillea juniperina subsp. juniperina* (Juniper-leaved Grevillea)
- *Marsdenia viridiflora R. Br. subsp. viridiflora* population
- *Meridolum corneovirens* (Cumberland Plain Land Snail)
- *Persoonia bargoensis* (Bargo Geebung)
- *Persoonia nutans* (Nodding Geebung)
- *Pimelea spicata* (Spiked Rice-flower)
- *Pomaderris brunnea* (Brown Pomaderris)
- *Pterostylis saxicola* (Sydney Plains Greenhood)
- *Pultenaea parviflora*

EHG also considers three threatened ecological communities have the potential to become entities at risk of SAI over the life of the Plan. These are:

- Moist Shale Woodland,
- River-flat Eucalypt Forest and
- Shale Gravel Transition Forest.

The assessment of these additional entities was based on a range of factors (Appendices 5B, 5C and 5D), with a key consideration being that many entities listed in Tables 25-2 and 25-3 of the assessment report are largely confined to Western Sydney and neighbouring regions. This is important since SAI is assessed at the state level.

Another key factor was that the circumstances and factors which led to their threatened status continue today, and will be exacerbated by future developments and activities, including those from the current proposal.

However, it is considered that, in accordance with Principles 1-4 under clause 6.7 of the BC Regulation and the Guidance it is not likely that the proposal will result in an SAI to these entities.

5.5.5 Has avoidance of SAll been prioritised?

The majority of impacts to TEC's in the BCAA comprise impacts on entities at risk of SAll. Whilst the Plan's avoidance has focused on retaining intact native vegetation, there are still substantial impacts on these TEC's as detailed at Table 2 above.

A robust avoidance process was applied in the nominated areas to define urban capable (certified) land. However, transport corridors will be certified at the time of conferral, and a future process of avoidance will occur at detailed design stage. This means that based on current certification footprints, further avoidance of SAll entities such as Cooks River Castlereagh Ironbark Forest may be achieved as detailed designs are developed.

With regard to flora and fauna, it is noted that many of the species impacted by the Plan have wide distributions and that SAll are therefore unlikely to occur for these species.

5.5.6 Can it be demonstrated that this type of impact is outweighed by the social and economic benefits that the development will deliver?

The proposed strategic biodiversity certification would deliver opportunities for future urban development and employment in Western Sydney, in accordance with the objectives of the Western Sydney City Deal, the Greater Sydney Region Plan and Western Sydney District Plan.

Strategic biodiversity certification would deliver certainty in terms of setting developer and government expectations for development of land in the BCAA over the life of the Plan. It would also deliver increased employment opportunities and assist government in meeting housing targets for the Western Sydney region over coming decades.

Setting clear expectations and limitations for development up front would allow for developer certainty and illustrate the benefits of the strategic biodiversity assessment process on this scale to industry stakeholders.

Recommendation

- That the Minister determine, in accordance with section 6.5 of the *Biodiversity Conservation Act 2016*, that the clearing of native vegetation and loss of habitat on land proposed for biodiversity certification **is** likely to have serious and irreversible impacts on biodiversity values.
- That the Minister, having taken those serious and irreversible impacts into consideration, in accordance with section 8.8 of the *Biodiversity Conservation Act 2016*, determine that there **are no** additional and appropriate measures that will minimise those impacts.

6 Decision to confer biodiversity certification

Section 8.2 of the BC Act states that:

8.2 Biodiversity certification

The Minister may, by order published in the Gazette, confer biodiversity certification on specified land in accordance with this Part.

Section 8.5 of the BC Act sets out the grounds on which the Minister may decline to deal with an application for biodiversity certification or confer biodiversity.

8.5 Application for biodiversity certification

(5) The Minister may decline to deal with an application for biodiversity certification or to confer biodiversity certification—

- (a) if the application for certification has not been duly made, or
- (b) if the Minister considers that insufficient information has been provided to enable the conferral of biodiversity certification, or
- (c) for any other reason the Minister considers sufficient.

Discussion:

DPE-EHG considers that the application for biodiversity certification **has** adequately addressed the requirements of the BAM (section 5.4.1 above) and that the proposed conservation measures under the biodiversity certification **do** adequately address the likely impacts on biodiversity values of the biodiversity certification of the land (section 5.4.2 above).

Recommendation

That the Minister **confer** biodiversity certification on land specified in the order in accordance with section 8.2 of the *Biodiversity Conservation Act 2016* by signing and dating the attached briefing note, and by signing and dating the order conferring biodiversity certification attached to the briefing note accompanying this report and approving its publication in the Government Gazette.

Appendices

Appendix 1 – Cumberland Plain Conservation Plan Commitments & Actions

Appendix A. Commitments and Actions

Development actions

General

Commitment 1

Development will be undertaken in accordance with the Plan and any conditions of approval. This applies to the following classes of actions:

- urban and industrial
- infrastructure
- intensive plant agriculture
- major transport corridors.

Actions

1. Integrate the Plan into the planning delivery framework for the nominated areas through mechanisms including an environmental planning instrument with development controls, a ministerial direction under section 9.1 of the *Environmental Planning and Assessment Act 1979*, and Cumberland Plain Conservation Plan Guidelines for Infrastructure Development (Commitments 2, 4, 6, 7, 13, 14) (**Before start of Plan**).
2. Monitor the implementation of urban and industrial development, infrastructure, major transport and intensive plant agriculture through the Plan's evaluation program to ensure development is consistent with the Plan. This includes the Plan's:
 - a. commitments for avoiding, minimising, mitigating and offsetting impacts
 - b. reporting and compliance requirements
 - c. class of action approvals (EPBC Act); strategic biodiversity certification order (BC Act).(**Life of Plan**)
3. Require proponents of essential infrastructure to notify the department of any development or activity in avoided land, including how the Cumberland Plain Conservation Plan Guidelines for Infrastructure Development have been addressed (**Life of Plan**).
4. Implement the Cumberland Plain Conservation Plan Guidelines for Infrastructure Development, including Appendix A of the Plan by:
 - a. notifying proponents of essential infrastructure of their obligations under the EPBC Act, including when development does not have Part 10 EPBC Act approval under the Plan
 - b. monitoring the impacts of development on the avoided land
 - c. monitoring compliance with the avoidance, mitigation and offset commitments under the Plan, relevant to these guidelines
 - d. providing annual updates to the Australian Government Department of Agriculture Water and Environment
 - e. share information and data as required to assist councils and infrastructure providers to implement these guidelines
 - f. undertaking monitoring and audit of infrastructure construction and operation as required, to ensure adequate mitigation measures are being applied.(**Life of Plan**)
5. Undertake a formal modification to the Plan's strategic biodiversity certification if required to adjust the boundaries of the certified-urban capable land in circumstances where:
 - a. minor adjustments are identified at the site level
 - b. updates are consistent with the avoidance criteria and supported by a BAM-accredited assessor
 - c. residual impacts to biodiversity, including matters of national environmental significance, are mitigated and offset in accordance with the BAM (or equivalent) and EPBC Act Environmental Offsets Policy, 2012 for any EPBC Act matters not covered by the BAM.(**Years 1 to 10**)

6. Progress and submit (subject to compliance with legislative requirements) a modification of the strategic biodiversity certification under the Biodiversity Conservation Act 2016 to include lands proposed by Deerubbin Local Aboriginal Land Council (**Year 1**).

Conservation program

Commitments to avoid and minimise impacts

Commitment 2

Avoid and minimise impacts of up to 4,505 hectares of high biodiversity value area (the avoided land) through strategic conservation planning in the nominated areas.

Commitment 2.1

Limit cumulative direct impacts⁸ over the life of the Plan from essential infrastructure to the following EPBC Act-listed threatened ecological community in the avoided land⁹:

- Shale Sandstone Transition Forest
- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest
- River-Flat Eucalypt Forest
- Coastal Swamp Oak (*Casuarina glauca*) Forest
- Cooks River Castlereagh Ironbark Forest Western Sydney Dry Rainforest and Moist Woodland on Shale.

Commitment 2.2

Prioritise the avoidance of impacts from essential infrastructure on the avoided land to:

- known populations¹⁰ of the following threatened flora species:
 - *Grevillea parviflora* subsp. *parviflora* (small-flower grevillea)
 - *Persoonia bargoensis* (Bargo geebung)
 - *Persoonia nutans* (nodding geebung)
 - *Genoplesium baueri* (yellow gnat-orchid)
 - *Pimelea spicata* (spiked rice-flower)
 - *Pultanea parviflora*
- protected koala habitat¹¹ within the Wilton and Greater Macarthur growth areas to maintain the function of koala movement corridors.

Actions

1. Introduce an environmental planning instrument to apply development controls to protect important biodiversity on avoided land under the Plan (**Before start of Plan**).
2. Issue a ministerial direction under section 9.1 of the NSW *Environmental Planning and Assessment Act 1979* to restrict rezoning of avoided land from its current zone to a zone that permits a more intensive land use (**Before start of Plan**).

⁸ Impact thresholds for each threatened ecological community per nominated area are listed in the Plan (Table 3, Cumberland Plain Conservation Plan, page 39).

⁹ Distributions of these TECs are mapped in the *Cumberland Plain Assessment Report* and will require confirmation of extent through survey or assessment

¹⁰ Known populations are mapped in the *Cumberland Plain Assessment Report* and will require confirmation of extent through survey or assessment

¹¹ Protected koala habitat is mapped in the *Cumberland Plain Assessment Report* and the department's spatial viewer

3. Introduce the Cumberland Plain Conservation Plan Guidelines for Infrastructure Development to manage impacts on biodiversity from infrastructure development, including essential infrastructure development, on avoided land in the nominated areas (**Before start of Plan**).
4. Monitor the impacts of development on the avoided land through the Plan's reconciliation accounting process (**Life of Plan as precincts designed**).
5. Notify proponents of essential infrastructure of their obligations under the EPBC Act, including when development does not have Part 10 EPBC Act approval under the Plan (**Life of Plan as precincts designed**).
6. Locate Asset Protection Zones wholly within certified urban-capable land (**Life of Plan as precincts designed**).

Commitment 3

Avoid and minimise impacts to threatened ecological communities, species and their habitat within certified-major transport corridors through detailed planning and design. This includes:

- avoiding areas of potential habitat connectivity within riparian corridors where possible, particularly for the following species¹²:
 - eastern pygmy possum
 - green and golden bell-frog
 - spotted-tailed quoll
 - squirrel glider
 - yellow-bellied glider
- avoiding known flora populations¹³ within the Outer Sydney Orbital and M7/Ropes Crossing Link Road corridors where possible, particularly:
 - *Dillwynia tenuifolia*
 - *Grevillea juniperina subs. juniperina*
 - *Pultanea parviflora*
 - *Persoonia nutans*
- for the Outer Sydney Orbital, minimising where possible the placement of waterway crossing structures within riparian corridors, changes to waterway alignments, and bulk earthworks on adjacent floodplain areas.

Actions

1. To avoid and minimise impacts to threatened ecological communities, species and their habitats, Transport for NSW will apply the Plan's avoidance criteria during the strategic planning phase of each transport project, with specific consideration to the matters identified in Commitment 3 (**Life of Plan**).
2. Include the biodiversity benefits of avoiding threatened ecological communities, species and their habitats as well as the costs of offsets into the evaluation of the route options (for example using multi-criteria analysis) (**Life of Plan**).
3. Locate Asset Protection Zones, if required, within the certified-major transport corridor (**Life of Plan**).
4. Where an action cannot feasibly or practically avoid impacts on an area of high environmental value, these impacts should be minimised as far as possible using design refinements to reduce overall impact (**Life of Plan**).
5. Transport for NSW will provide to the department a clearing reconciliation report within 60 days of the completion of clearing for each major transport corridor project. The report will provide information on vegetation cleared, resulting direct impacts to threatened species habitat and threatened ecological communities, and a demonstration of how the Plan's avoidance criteria were applied. The report will be used to:
 - a. inform the Plan's reconciliation accounting process to track impacts

¹² Potential habitat for fauna species are mapped in the *Cumberland Plain Assessment Report*

¹³ Known flora populations are mapped in the *Cumberland Plain Assessment Report*

- b. determine Transport for NSWs actual offsets liability, which will be reconciled against Transport for NSWs schedule of estimated forward payments for amounts outstanding or overpaid.

(Life of Plan)

6. Ensure that proponents of any Third Party Activities not included in the Western Sydney major transport corridors class of action are aware that they must consider the need for referral under the EPBC Act for actions likely to have a significant impact on matters of national environmental significance (**Life of Plan**).
7. Impacts to biodiversity (including to matters of national environmental significance) in the major transport corridors will be published through the Plan's annual updates and 5-yearly reviews (**Life of Plan**).

Commitment 4

Avoid and minimise impacts on threatened ecological communities, species and their habitat within major transport corridors (strategically assessed only), including the Outer Sydney Orbital and Metro Rail Future Extension tunnel sections, in accordance with the:

- major transport corridors class of action description, including the NSW state-significant infrastructure (or equivalent) approvals process
- Biodiversity Assessment Method (BC Act) (or equivalent).

Commitment 4.1

Avoid and minimise impacts to known flora populations¹⁴ within the Outer Sydney Orbital and M7/Ropes Crossing Link Road corridors, including:

- *Dilwynia tenuifolia*
- *Grevillea juniperina* subs. *Juniperina*
- *Pultanea parviflora*
- *Cynanchum elegans*.

Commitment 4.2

Avoid and minimise impacts where possible within and adjacent to the tunnel sections, including:

1. known populations and habitat¹⁵ of:
 - *Eucalyptus benthamii*
 - *Pomaderris brunnea*
 - *Pimelea spicata*
 - *Cumberland Plain Land Snail*
2. known populations and habitat, and threatened ecological communities¹⁶ within:
 - Mater Dei BioBank site within the Outer Sydney Orbital footprint near Camden
 - registered property agreement site within the Outer Sydney Orbital footprint at Camden Airport
 - Metro offset site within the footprints for the Outer Sydney Orbital and Metro Rail Future Extension near Harrington Park
 - Nepean River and associated riparian corridor within the Outer Sydney Orbital footprint
 - Camden Golf Club at Narellan adjacent to the footprint for the Metro Rail Future Extension
 - Mount Annan Botanic Gardens within the footprint for the Metro Rail Future Extension.

¹⁴ Known flora populations are mapped in the Cumberland Plain Assessment Report and will require confirmation of presence through survey or assessment.

¹⁵ Known populations and habitat of listed species are mapped in the Cumberland Plain Assessment Report and will require confirmation of extent through survey or assessment. The assessment report includes a specific map as part of the assessment of tunnels (See the Cumberland Plain Assessment Report, Chapter 36.6).

¹⁶ Known populations and habitat of listed species and distribution of listed TECs are mapped in the Cumberland Plain Assessment Report and will require confirmation of extent through survey or assessment. The report includes a specific map as part of the assessment of tunnels (See the Cumberland Plain Assessment Report, Chapter 36.6)

Commitment 4.3

Avoid and minimise impacts where possible to environmental values within Commonwealth land sites¹⁷, including known populations and habitat and threatened ecological communities, and existing infrastructure and services, at:

- Camden Airport
- Western Sydney University (Campbelltown Campus)
- 12 Werombi Road, Grasmere NSW.

Actions

1. To avoid and minimise impacts to threatened ecological communities, species and their habitat, Transport for NSW will:
 - a. undertake surveys to confirm biodiversity values, including matters of national environmental significance during the strategic planning phase of each transport project
 - b. include the biodiversity benefits of avoiding threatened ecological communities, species and their habitats as well as the costs of offsets into the evaluation of the route options (for example using multi-criteria analysis)
 - c. avoid and minimise impacts to biodiversity values, including matters of national environmental significance, in accordance with the Biodiversity Assessment Method (or equivalent) and with specific consideration to the protected matters identified in commitments 4.1, 4.2 and 4.3 during the environmental impact assessment phase of each transport project
 - d. offset impacts to biodiversity values, including matters of national environmental significance, in accordance with the Biodiversity Assessment Method (or equivalent) and EPBC Act Environmental Offsets Policy, 2012 for any EPBC Act matters not covered by the BAM
 - e. report to the department and executive implementation committee on vegetation cleared and adjustments to transport corridor boundaries identified through the NSW SSI approval (or equivalent) for each transport project. This will include: reporting on avoidance achieved within the mapped or protected corridors identified in this Plan; additional impacts outside of mapped corridors for EPBC Act-listed species, populations or ecological communities; and offsets to be secured under the NSW SSI approval and EPBC Act Environmental Offsets Policy, 2012, where relevant.
(Life of Plan)
2. The department will use this information to track impacts and adjust Transport for NSW's offset liabilities through the Plan's reconciliation accounting process, in agreement with Transport for NSW **(Life of Plan)**.
3. Transport-related impacts to biodiversity (including MNES) will be published through the Plan's annual updates and five yearly reviews **(Life of Plan)**.

¹⁷ The Cumberland Plain Assessment Report includes a specific map as part of the assessment of tunnels (See the Cumberland Plain Assessment Report, Chapter 36.6)

Commitments to mitigate indirect and prescribed impacts

Commitment 5

Mitigate indirect and prescribed impacts from urban and industrial development; infrastructure; and intensive plant agriculture on threatened ecological communities, species and their habitat. This includes meeting specific mitigation requirements for threatened ecological communities, species and their habitat in accordance with Appendix E of the Plan

Actions

1. Incorporate development controls in the state-led development control plans where they apply to relevant nominated areas, setting out development controls that need to be addressed by neighbourhood plans and development applications to mitigate indirect and prescribed impacts on threatened species. This includes:
 - a. specific controls that apply to the nominated areas to mitigate indirect and prescribed impacts on specific threatened species or ecological communities or other environmentally sensitive areas in accordance with Appendix E of the Plan
 - b. a common set of development controls to mitigate indirect and prescribed impacts across the 4 nominated areas that inform general biodiversity protection as listed in Chapter 15 of the Cumberland Plain Assessment Report.

(Before start of Plan)
2. Introduce the Cumberland Plain Conservation Plan Mitigation Measures Guidelines consistent with Appendix E of the Plan to address indirect impacts in Greater Macarthur Growth Area and Greater Penrith to Eastern Creek Investigation Area (**Year 1**).
3. Provide ongoing support to local councils and other proponents in the application of development control plans and the Mitigation Measures Guidelines within the nominated areas, including the sharing of knowledge, maps and data (**Life of Plan**).
4. Audit growth area development control plans for the Plan's nominated areas where they apply to ensure the Cumberland Plain Conservation Plan DCP template development controls are incorporated in accordance with the development control plan requirements for each growth area (**Life of Plan**).
5. Monitor the implementation of the development controls through approval conditions by the relevant consent authority. If monitoring finds that development controls are not being effectively implemented, review and redraft new controls to update relevant state development control plans and the Mitigation Measures Guidelines and re-educate councils to ensure stronger consideration of the controls through their assessment process (**Life of Plan**).
6. Introduce the Cumberland Plain Conservation Plan Guidelines for Infrastructure Development to be addressed by a public authority or other proponents of essential infrastructure, including mitigation measures for indirect and prescribed impacts to biodiversity from infrastructure activities in accordance with Appendix E of the Plan (**Year 1**).
7. Implement mitigation measures based on the outcomes of environmental assessment of detailed designs in accordance with the requirements of the NSW approval process, as well as published, best-practice guidelines (**Life of Plan**).
8. Consult with the relevant public land manager to minimise disturbance and impacts to threatened species in accordance with Appendix E, including:
 - a. ensuring walking tracks and management trails in Wianamatta Regional Park are located in a way that avoids and minimises exposure of *Personia nutans* to human disturbance
 - b. ensuring land management in potential habitat for *Pimelea spicata*, particularly mowing and slashing activities and weed management activities involving the use of herbicides, will minimise risks and maintain the species
 - c. work with NSW DPI – Fisheries to address the risk of illegal and incidental recreational fishing capture along stretches of known habitat for Macquarie Perch in Erskine Creek, Glenbrook Creek, Georges River and Cordeaux River

- d. installing signs and/or interpretive displays at appropriate sites in areas used for recreational fishing along Erskine Creek, Glenbrook Creek, Georges River and Cordeaux River to assist with identification of Macquarie perch and awareness of threats.

(Years 1 to 5)

Commitment 6

Mitigate indirect and prescribed impacts on threatened ecological communities, species and their habitat within major transport corridors, including the Outer Sydney Orbital and Metro Rail Future Extension tunnel sections, in accordance with the:

- major transport corridors class of action description, including the NSW state-significant infrastructure (or equivalent) approval for certified-major transport corridors
- major transport corridors class of action description and the Biodiversity Assessment Method (BC Act) (or equivalent) for major transport corridors (strategically assessed only)
- specific mitigation measures to address impacts on biodiversity values prescribed in Appendix E.

Actions

1. To mitigate indirect and prescribed impacts on threatened species and their habitat, Transport for NSW will across all major transport corridors:
 - a. assess the impacts on biodiversity values for major transport corridors (strategically assessed only) and other environmental values (for certified- and strategically assessed-only major transport corridors) based on detailed design
 - b. implement specific mitigation measures prescribed in Appendix E and identify and implement additional mitigation measures based on the outcomes of environmental assessment of detailed designs in accordance with the requirements of the State Significant Infrastructure (or equivalent) approval process, as well as published, best practice guidelines, including but not limited to, the [RMS Biodiversity Guidelines \(PDF 8.07 MB\)](#)
 - c. apply further mitigation according to the Biodiversity Assessment Method (BC Act) (or equivalent) for major transport corridors (strategically assessed only), including the tunnels sections
 - d. identify potential design options for major watercourse crossings to reduce disruption to connectivity and the risk of fauna vehicle strikes
 - e. establish baseline monitoring data and undertake ongoing monitoring of high-value environmental areas, and review and adjust mitigation measures (where practical) in response to monitoring outcomes, in accordance with the requirements of the state-significant infrastructure (or equivalent) approval.

(Life of Plan)

2. Transport for NSW will report to the department and executive implementation committee on mitigation measures proposed to manage impacts of each major transport corridor project, including proposed techniques, timing, frequency and responsibility for implementing each measure **(Life of Plan)**.

Commitment 7

Mitigate indirect and prescribed impacts from urban, industrial, infrastructure development on the Southern Sydney koala population to best-practice standards and in line with advice from the Office of the NSW Chief Scientist & Engineer, and in accordance with Appendix E of the Plan.

Actions

1. Install koala-exclusion fencing, including gates and grids, between koala habitat that can safely support koalas and urban land within the Greater Macarthur Growth Area and Wilton Growth Area, except where exclusion fencing is not feasible or necessary due to slope, heritage or water courses.
 - a. Manage impacts to fences by locating koala-exclusion fencing at least 3 metres from any trees where practical (measured from canopy).
 - b. Apply koala specific mitigation actions in accordance with Appendix E.

- c. Where fencing must cross existing or planned linear infrastructure such as gas and electricity transmission, consider appropriate access treatments such as gates to ensure the integrity of the koala exclusion fencing.
- d. Fence off koala corridors that are too narrow to safely support koalas and relocate koalas out of the unsafe corridors if needed. (Commitment 12 Action 1f).
- e. Address the requirements of the Cumberland Plain Conservation Plan Guidelines for Infrastructure Development as essential infrastructure for EPBC Act approval in the avoided land.

(Life of Plan)

2. Complete a feasibility study on the koala-exclusion fencing to help inform the design, locations and construction of the fencing and identify fencing priorities for the first 5 years (**Year 1**).
3. Install koala-exclusion fencing along the western alignment of the Georges River Koala Reserve where existing urban development is a threat to the koala population (**Years 1 to 20**).
4. Install koala-exclusion fencing, in the vicinity of koala habitat, along both sides of Appin Road between Rosemeadow and Appin to mitigate koala vehicle strikes at roadkill hotspots. Fencing along Appin Road will be in addition to planned fencing works to be delivered by Transport for NSW (**Years 1 to 5**).
5. Undertake targeted stakeholder and community engagement to support the delivery of koala-exclusion fencing (**Years 1 to 3**).
6. Establish a koala working group with representation from relevant government agencies to support implementation of the koala commitments and actions. The working group will support implementation of the koala sub-plan, by providing advice to inform:
 - a. alignment, staging, and design of the koala exclusion fencing and fauna crossing, including advice about providing appropriate koala movement corridors
 - b. priority locations and approach for koala habitat restoration
 - c. monitoring and evaluation of the Plan's koala commitments, including providing advice to support adaptive management based on monitoring and evaluation data
 - d. community and stakeholder engagement for the koala conservation commitments and actions
 - e. research and management actions relating to koalas.

(Before start of Plan)

7. Work with local councils, National Parks and Wildlife Service and Office of Strategic Lands to ensure the threats posed by dogs on all public land that is identified as koala habitat protected under the Plan, are managed:
 - a. For land that is not publicly accessible, this will include the installation of signs and/or fences.
 - b. For land managed as a reserve or for recreation, this will be achieved by incorporating requirements in a relevant plan of management.

(Life of Plan)

8. Provide safe fauna crossings, based on current best practice design, across Appin Road and other linear infrastructure by:
 - a. installing a koala underpass culvert under Appin Road, near the intersection with Brian Road to support east–west koala movement from the Georges River to the Nepean River
 - b. augmenting the existing Kings Falls Bridge at the Georges River by constructing a bench adjacent to the bridge abutments to allow dry passage for koalas (and other fauna) under Appin Road, supporting north–south koala movement from the Georges River Koala Reserve to the southern koala habitat
 - c. investigating options for enhancing koala movement across the Upper Canal
 - d. addressing the requirements of the Cumberland Plain Conservation Plan Guidelines for Infrastructure Development, as essential infrastructure for EPBC Act approval in the avoided land.

(Years 1 to 5)

Conserving flora, fauna and habitat

Commitment 8

Protect a minimum of 5,325 hectares of native vegetation¹⁸ in the Cumberland subregion to conserve biodiversity values in perpetuity in accordance with the conservation land selection steps, which may require up to 11,900 hectares of conservation land.

Commitment 8.1

This target includes minimum areas of the following EPBC Act-listed threatened ecological communities:

- 675 hectares of Shale Sandstone Transition Forest
- 665 hectares of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest
- 570 hectares of River-flat eucalypt forest of eastern Australia
- 125 hectares of Cooks River Castlereagh Ironbark Forest
- 20 hectares of Coastal Swamp Oak Forest
- 0.2 hectares of Western Sydney Dry Rainforest and Moist Woodland on Shale.

Commitment 8.2

This target includes minimum areas of the following BC Act-listed threatened ecological communities:

- 2,885 hectares of Cumberland Plain Woodland
- 1,455 hectares of Shale Sandstone Transition Forest
- 505 hectares of River-Flat Eucalypt Forest
- 285 hectares of Shale Gravel Transition Forest
- 115 hectares of Cooks River Castlereagh Ironbark Forest
- 70 hectares of Swamp Oak Floodplain Forest
- 10 hectares of Freshwater Wetlands on Coastal Floodplains
- 0.2 hectares of Moist Shale Woodland.

Actions

1. Prepare a conservation land implementation strategy to guide the establishment of land for conservation, including:
 - a. priorities for selecting and purchasing land
 - b. targets and proposed timeframes for establishing new conservation land
 - c. proposed land-based conservation type for each area of priority conservation land (reserve or biodiversity stewardship agreement)
 - d. suitable land managers for each area of priority conservation land
 - e. a process to secure alternative areas where targets and timing cannot be met.

(Year 1)
2. Enter into written agreements with delivery partners to set out the arrangements for conservation land under the plan, including:
 - a. roles and responsibilities
 - b. processes for implementation
 - c. land management arrangements, including prior to purchase
 - d. funding arrangements

¹⁸ While there is overlap between the TEC targets listed in commitments 8.1 and 8.2, there are differences in the listings between EPBC Act-listed and BC Act-listed TECs, such as differences in approach and criteria. Therefore, the BC Act-listed TECs in commitment 7.2 incorporate targets for EPBC Act-listed TECs.

e. progress reporting.

(Year 1)

3. Seek to include the strategic conservation area (excluding cleared areas) in the Biodiversity Values Map **(Year 1)**.
4. Undertake surveys within the strategic conservation area or other avoided land prior to protecting the land to confirm plant community extent and condition and update vegetation mapping if necessary **(Life of Plan)**.
5. Protect and manage land containing targeted plant communities within the strategic conservation area by:
 - a. establishing reserves under relevant legislation including the *National Parks and Wildlife Act 1974*, *Crown Land Management Act 2016*, and *Local Government Act 1993*
 - b. establishing biodiversity stewardship agreements under the BC Act
 - c. purchasing and retiring biodiversity credits under the Biodiversity Offsets Scheme.**(Life of Plan)**
6. Track the progress of meeting threatened ecological community targets (in hectares) through the reconciliation accounting process (Commitment 25 Action 2) **(Life of Plan)**.
7. Provide up-front funding for business cases and Biodiversity Assessment Method assessments to support landholders entering into biodiversity stewardship agreements where this investment can be recouped through the later sale of biodiversity credits **(Life of Plan)**.
8. Define a land purchase strategy that will guide decision-making and processes to be used when purchasing land for conservation under the Plan **(Before start of plan)**.
9. Purchase land within the strategic conservation area to commence establishing reserves under the Plan with priority given to land listed for sale and land in the Georges River Koala Reserve **(Life of Plan)**.
10. Introduce an acquisition clause in an environmental planning instrument to land identified for future reserves under the Plan as funds become available through the program **(Life of Plan)**.
11. Work with local councils and other land managers to ensure that reserves established under the Plan provide for increased public access, including the provision of compatible low biodiversity impact recreation activities **(Life of Plan)**.

Commitment 9

Protect threatened species likely to be at risk of residual adverse impacts from development under the Plan (target species) in accordance with the Plan's conservation land selection steps.

This includes securing offsets to protect known locations for the following target threatened species.

Flora species:

- 2 offset locations for *Cynanchum elegans*
- 3 offset locations for *Dillwynia tenuifolia*
- 3 offset locations for *Grevillea juniperina* subsp. *juniperina*
- 1 offset location for *Hibbertia fumana*
- 1 offset location for *Hibbertia puberola*
- 2 offset locations for *Marsdenia viridiflora* subsp. *viridiflora*
- 2 offset locations for *Persoonia nutans*
- 3 offset locations for *Pimelea spicata*
- 2 offset locations for *Pultenaea parviflora*
- 2 offset locations for *Pultenaea pedunculata*

Fauna species:

- 1 offset location for *Haliaeetus leucogaster*

- 1 offset location for *Hieraaetus morphnoides*
- 1 offset location for *Lophoictinia isura*
- 3 offset locations for *Meridolum corneovirens*
- 1 offset locations for *Myotis macropus*

This includes securing habitat for the following target threatened fauna species:

- 4,410 hectares of potential foraging habitat for *Lathamus discolour* (including 100 hectares of *Lathamus discolour* important habitat as defined under the BAM)
- 570 hectares of important habitat¹⁹ for *Phascolarctos cinereus* as defined in the Cumberland Plain Assessment Report.

Actions

1. Assess and record the habitat attributes of where target species have been located and use the information to establish baseline monitoring data for areas of known habitat for target species and incorporate into the evaluation program (Commitment 25) (**Year 1**).
2. Protect offset locations and species habitat for the target threatened species through establishing reserves or biodiversity stewardship sites or through the direct purchase of species credits in the Cumberland subregion or across NSW (**Life of Plan**).
3. Achieve the Plan's species targets by applying the conservation land selection steps (**Life of Plan**).
4. Identify species-specific management measures for areas of known habitat for target species in consultation with future land managers of reserves established under the Plan and incorporate these into management plans for the land (**Life of Plan**).
5. Track progress in meeting species offset targets through the reconciliation accounting process (Commitment 25 Action 2) (**Life of Plan**).

Commitment 10

Establish a reserve to protect the north–south koala movement corridor along the Georges River between Appin and Long Point.

Actions

1. Transfer and reserve lots identified for early transfer to National Parks and Wildlife Service as the first stage in establishing Georges River Koala Reserve (**Years 1 to 2**).
2. Reserve additional areas of the Georges River Koala Reserve between Appin and Kentlyn using NSW government land as a priority and by purchasing additional land (Stages 1a and 1b) (**Years 1 to 10**).
3. Reserve additional areas of the Georges River Koala Reserve between Kentlyn and Long Point using NSW government land as a priority and by purchasing additional land (Stage 2) (**Years 1 to 20**).
4. Restore up to 80 hectares of cleared land for koala habitat in priority areas including the Georges River Koala Reserve to strengthen the north–south koala corridor (**Years 1 to 5**).
5. Restore additional koala habitat within the Georges River Koala Reserve to strengthen the north–south koala movement corridor (**Years 6 to 25**).
6. Work with National Parks and Wildlife Service, Office of Strategic Lands and other key stakeholders to prepare a concept plan for the Georges River Koala Reserve (**Year 1**).

¹⁹ Important koala habitat is the term used to describe primary, secondary and tertiary corridors, as defined in the Cumberland Plain Assessment Report. It is the area that is critical to the long-term viability of koalas (primary corridors) as well as the areas (if enhanced) that would support the population (secondary and tertiary corridors).

Commitment 11

Establish at least 2 new reserves in addition to the Georges River Koala Reserve that will protect threatened communities, species and habitats that are targeted for protection through the Plan.

Actions

1. Investigate a new reserve that will provide an ecological connection between Gulguer Nature Reserve, Bents Basin State Conservation Area and Burragorang State Conservation Area (**Year 1**).
2. Investigate a new reserve on Wianamatta (South Creek) that will allow for the restoration of up to 370 hectares of threatened ecological communities (**Year 1**).
3. Establish a community engagement program with landholders in the reserve investigation areas to provide information and seek expressions of interest for land purchase to support establishment of new reserves (**Years 1 to 10**).
4. Establish biodiversity stewardship agreements appropriate to land purchased for a future reserve to commence management of the site (**Life of Plan**).
5. Gazette at least 2 new reserves in addition to the Georges River Koala Reserve by Year 20 of the Plan (**Year 1 to 20**).

Commitment 12

Protect koala corridors in the Cumberland subregion, including those along the Nepean River, Georges River, Cataract River and Ousedale Creek.

Actions

1. Apply development controls to koala habitat protected under the Plan and ensure safe, functional corridors for koala movement (consistent with advice from the Office of the NSW Chief Scientist & Engineer) including:
 - a. the north–south koala corridor along the Georges River (Commitment 10)
 - b. the north–south koala corridor along the Nepean and Cataract rivers
 - c. the east–west corridor along Ousedale Creek between the Georges River and Nepean River
 - d. Elladale Creek and Simpsons Creek as an area of functional koala habitat
 - e. the north–south koala corridor along Allens Creek
 - f. excluding koalas from east–west corridors that do not meet the minimum requirements for a functional koala corridor (Corridor C: Nepean Creek to Beulah, and Corridor D: Mallaty Creek to Georges River)

(**Before start of Plan**).
2. Restore koala habitat in the Georges River and Ousedale Creek corridors to ensure they meet requirements for safe and functional koala movement corridors, consistent with advice from the Office of the NSW Chief Scientist & Engineer (Commitment 13) (**Life of Plan**).

Commitment 13

Deliver and support ecological restoration activities in conservation land including ecological reconstruction of up to a maximum of 25% of the Plan's offset target for native vegetation (Commitment 8).

Actions

1. Establish a restoration working group to guide the implementation of restoration activities under the Plan including the preparation of a restoration implementation strategy and supporting technical guidance where relevant (**Year 1**).

2. Develop a restoration implementation strategy in consultation with the restoration working group and other key stakeholders to establish best practice principles and methodologies, to:
 - a. identify the range of restoration activities and what will be undertaken under the Plan
 - b. ensure the long-term sustainability of restoration considers genetic diversity in what is established
 - c. identify considerations for restoration potential and constraints of land
 - d. provide reference to guidelines for restoration, including the NSW Biodiversity Conservation Trust guidelines for restoring native vegetation undertaken in a biodiversity stewardship site
 - e. develop a seed-procurement approach
 - f. reference research needs being considered through the research program implementation strategy (Commitment 22, Action 1).
 - g. enter into written agreements with delivery partners and engage specialist providers where necessary to implement the restoration actions.

(Year 1)

3. Deliver ecological restoration (including reconstruction) to restore koala habitat in the Georges River Koala Reserve and other priority locations in the strategic conservation area including along Ousedale Creek and around Appin (**Year 1 onwards**).
4. Incorporate adaptive management principles into restoration actions including pilot sites to trial and develop restoration methodologies and applying new research as appropriate (**Life of Plan**).
5. Deliver up to a maximum of 1,330 hectares of ecological reconstruction on conservation land targeting the following threatened ecological communities:
 - a. Cooks River Castlereagh Ironbark Forest
 - b. Cumberland Plain Woodland
 - c. River-flat Eucalypt Forest
 - d. Shale Gravel Transition Forest
 - e. Swamp Oak Forest.

(Life of Plan)

Commitment 14

Minimise impacts from development on biodiversity values in the strategic conservation area.

Actions

1. Introduce a State Environmental Planning Policy to apply development controls to the strategic conservation area to require consideration of impacts on biodiversity values when consent authorities assess development applications (**Before start of Plan**).
2. Issue a ministerial direction under section 9.1 of the *Environmental Planning and Assessment Act 1979* (NSW) to require consistency with the objectives of the strategic conservation area when a planning authority prepares a planning proposal or reviews local environmental plans within the strategic conservation area (**Before start of Plan**).
3. Work with local councils to integrate mapping of the strategic conservation area into local and regional planning through local strategic planning statements, which guide the local plan-making process (**Life of Plan**).

Managing landscape threats

General

Commitment 15

Manage priority weeds in strategic locations in the Cumberland subregion to reduce threats to land secured within the strategic conservation area.

Actions

- Participate in the Sydney Weeds Network to inform the implementation of weed control activities under the Plan including the preparation of a weed control strategy (**Year 1**).
 - Prepare a weed control strategy in consultation with the Sydney Weeds Network to establish a coordinated weed control program in the Cumberland subregion that:
 - a. identifies priority weed species and priority locations for weed control to maximise benefits to biodiversity in the strategic conservation area
 - b. identifies the training, extension and resource needs to address threats
 - c. provides guidance on weed control methods
 - d. identifies roles, responsibilities, delivery partners and other stakeholders
 - e. provides guidance on funding decisions under the weed control program
 - f. is consistent with existing weed control programs, reserve or biodiversity stewardship agreement management requirements.
- (**Year 2**)
- Enter into written agreements with delivery partners to implement the weed control strategy (**Year 2**).
 - Integrate weed control actions for conservation land into reserve management plans (**Life of Plan**).
 - Fund organisations to help deliver actions in the weed control strategy for example Bushcare and Landcare groups, and local Aboriginal land councils (**Year 3 onwards**).

Commitment 16

Manage priority pest animals in strategic locations in the Cumberland subregion to reduce threats to land protected within the strategic conservation area.

Actions

1. Establish a pest animal control working group to guide the implementation of pest animal control activities under the Plan including preparation of a pest animal control implementation strategy (**Year 1**).
 2. Prepare a pest animal control strategy to guide the implementation of the pest control program, that:
 - a. identifies pest control priorities, including priority pest species and priority locations for pest control to maximise benefits to biodiversity in the strategic conservation area
 - b. identifies the training, extension and resource needs to address threats
 - c. provides guidance on pest control methods
 - d. identifies roles, responsibilities delivery partners and other stakeholders
 - e. provides guidance on funding arrangements under the pest control program
 - f. is consistent with existing pest control programs, reserve or biodiversity stewardship agreement management requirements.
- (**Year 2**)
3. Ensure that the pest animal control strategy specifies the use of pest control techniques that will reduce the risk of secondary poisoning from Pindone or second-generation rodenticides in accordance with Appendix E (**Year 2**).

4. Enter into written agreements with delivery partners to implement the pest animal control program (**Year 2**).
5. Fund organisations to help deliver actions in the pest animal control strategy, for example Greater Sydney Local Land Care Services, Bushcare and Landcare groups, and local Aboriginal land councils (**Year 3 onwards**).

Commitment 17

Manage fire in strategic locations in the Cumberland subregion to support the maintenance of biodiversity values on conservation land.

Actions

1. Consult with the NSW Rural Fire Service, NSW National Parks and Wildlife Service, and the department (Environment, Energy and Science group) to identify fire management priorities, including fire-sensitive species and ecological communities (**Year 2**).
2. Partner with Aboriginal knowledge holders and organisations to learn about Indigenous fire management techniques and consider how this knowledge may be applied to manage and protect conservation land (**Year 2**).
3. Prepare a fire management strategy that:
 - a. identifies priority locations for fire management to maximise benefits to biodiversity in the strategic conservation area
 - b. identifies priority fire-sensitive species and ecological communities
 - c. provides guidance on fire management to maintain and promote biodiversity values, particularly among fire-sensitive species and ecological communities
 - d. identifies roles and responsibilities and co-ordinates delivery partners
 - e. provides criteria to guide decisions on funding of fire management under the Plan.(**Year 2**)
4. Enter into written agreements with delivery partners to implement the fire management strategy (**Year 2**).
5. Integrate fire management actions for conservation land identified in the fire management strategy in stewardship agreements and reserve management plans (**Year 3 onwards**).

Commitment 18

Support new or existing programs to control key diseases affecting threatened species and ecological communities in the Cumberland subregion.

Actions

1. Consult with researchers, government agencies and other delivery partners to identify programs that contribute to the management of disease and dieback in the Cumberland subregion including consideration of the following key threatening processes:
 - a. *Phytophthora cinnamomi* root fungus
 - b. amphibian chytrid fungus
 - c. psittacine circoviral beak and feather disease
 - d. psyllid and bell miner-associated dieback in eucalypts.(**Year 6 onwards**)
2. Enter into written agreements with delivery partners to implement priority disease control programs (**Year 6 onwards**).
3. Require regular reporting by delivery partners on the disease control program outcomes to the department and to the executive implementation committee (**Year 6 onwards**).

Commitment 19

Support existing or new programs to help threatened species and ecological communities adapt to the impacts of climate change in the plan area.

Actions

1. Consider funding research on climate change adaptation in developing the research program implementation strategy (Commitment 22, Action 1) (**Year 1**).
2. Partner with the Royal Botanic Gardens Greater Sydney to develop seed sourcing guidelines for ten keystone Cumberland Plain Woodland species and define the species-specific seed transfer zones for these species (**Years 1 to 3**).
3. Update the strategic conservation area if new priority locations are identified through research that will support biodiversity adaptation to climate impacts and incorporate these new areas into the conservation land implementation strategy (Commitment 8) (**Every 5 years**).

Building knowledge and capacity

Commitment 20

Provide opportunities for the residents of Western Sydney to learn about and actively participate in biodiversity conservation including koala conservation.

Actions

1. Prepare an education and engagement implementation strategy to guide implementation of the education and engagement program that:
 - a. identifies priority topics for education
 - b. identifies intended audiences
 - c. proposes implementation mechanisms
 - d. outlines governance arrangements for implementing the program.

(Year 4)
2. Establish 3 full-time community engagement officers to work across the local councils in the plan area to:
 - a. undertake activities according to the education and engagement implementation strategy and monitor its implementation
 - b. support biodiversity programs that are consistent with the objectives of the Plan
 - c. coordinate activities and pop-up events
 - d. coordinate grants to local councils and community groups for projects that meet criteria developed in the strategy.

(Year 5)
3. Fund local councils and community groups to help deliver an education and engagement program that is consistent with the education and engagement implementation strategy, with indicative activities that include:
 - a. engaging with local schools to provide biodiversity education
 - b. hosting community activities such as tree planting and nature walks
 - c. developing a mobile education trailer as a shared resource for local councils in the plan area
 - d. promoting new and existing citizen science programs to encourage participation in nature-related science
 - e. raising awareness of the cultural significance of biodiversity to Aboriginal people.

(Year 5 onwards)
4. Invest in the NSW Koala Strategy to raise awareness of the Southern Sydney koala population and encourage community participation in koala conservation in Western Sydney **(Year 1 onwards)**.
5. In partnership with the Biodiversity Conservation Trust, establish a community engagement program to educate landholders within the strategic conservation area and promote the opportunities and benefits of biodiversity stewardship sites **(Year 1)**.
6. Work with councils and other landholders to install signs and interpretive displays at identified conservation land to raise awareness of the biodiversity values of a site **(Life of Plan)**.

Commitment 21

Partner with Aboriginal groups and community to help maintain a distinctive cultural, spiritual, physical and economic relationships with their land and waters in Western Sydney

Actions

1. Fund a grants program to build capacity in the 3 local Aboriginal land councils in the plan area to fund land management and biodiversity works, and culture and heritage projects on Aboriginal-owned lands and other important areas **(Years 1 to 2)**.

2. Partner with Traditional Custodians, local Aboriginal land councils and other interested Aboriginal people in Western Sydney to collaboratively develop a 10-year Aboriginal engagement and implementation strategy (**Year 1**).
3. Partner with Western Sydney's Aboriginal communities to implement the Plan and a 10-year Aboriginal engagement and implementation strategy through:
 - a. establishing partnerships, including the co-design of actions under the strategy, with Traditional Custodians, local Aboriginal land councils, Aboriginal businesses and other interested Aboriginal groups
 - b. establishing an Aboriginal advisory group to provide advice on the delivery of the Aboriginal engagement and implementation strategy and the Plan
 - c. actively engage and empower Aboriginal groups and community to enable participation in decision-making to deliver the Aboriginal engagement and implementation strategy and the Plan.

(Years 2 to 11)
4. Implement a 10-year Aboriginal engagement and implementation strategy to support economic participation for Aboriginal people and cultural outcomes under the Plan to:
 - a. recognise, celebrate and promote Aboriginal culture and heritage in Western Sydney with a focus on natural areas and protecting biodiversity
 - b. recognise and embed the knowledge and connection that Aboriginal people have with Country into the implementation of the Plan
 - c. enable Traditional Custodians and interested Aboriginal groups to care for Country on new conservation land
 - d. grow Aboriginal businesses and employment in the environmental sector.

(Years 2 to 11)

Commitment 22

Invest in research priorities that will support the implementation of the Plan and help to deliver the Plan's outcomes.

Actions

1. Develop a research program implementation strategy to guide delivery of a 35-year research program that will help achieve the Plan's outcomes in Western Sydney, including identifying research priorities for the first 4 years of the program (**Year 1**).
2. Deliver a research program in accordance with the research program implementation strategy. The research program may include:
 - a. research on the vulnerability of threatened species and ecological communities to climate change
 - b. research that increases knowledge of the adaptive capacity of plant, animal and microbial organisms used in active restoration of ecological communities of the sub-region
 - c. research that improves restoration outcomes, including ecosystem function and resilience, for threatened ecological communities of the sub-region
 - d. research on ecological connectivity and landscape function at site, local and regional scales to enhance conservation outcomes
 - e. research into changing community attitudes and behaviour to biodiversity and conservation values including factors influencing those and how they evolve and change
 - f. research into the connections between land management, biodiversity and Aboriginal culture and practices in Western Sydney as proposed by the Aboriginal engagement and implementation strategy (Commitment 21).

(Year 2 onwards)
3. Support NSW Government programs for threatened species research in Western Sydney including:
 - a. research on threatened species impacted by the Plan in the Cumberland subregion through the Saving our Species program

- b. research that increases knowledge of population demographics, life-history and ecology of the Southern Sydney koala population as part of the NSW Koala Strategy's NSW Koala Research Plan.

(Year 2 onwards)

Commitment 23

Support rehabilitation measures to help maintain koala health and welfare.

Actions

1. Invest in the NSW Koala Strategy and other potential partners to implement the koala health and welfare program in south-western Sydney, with key deliverables that include:
 - a. monitoring koalas, key threats, and the effectiveness of mitigation measures as part of the NSW Koala Strategy Monitoring Framework
 - b. designating the koalas in south-western Sydney as one of the dedicated monitoring sites for the NSW Koala Strategy
 - c. providing enhanced training in wildlife treatment for veterinarians
 - d. providing grants for community wildlife organisations for resources and carer recruitment and training
 - e. establishing health and welfare programs to support koalas from threats including vehicle strike, fire, disease and climate change.
- (Year 1 onwards)**
2. Koalas that are captured and/or handled as part of a monitoring program will be vaccinated against chlamydia and have a tissue sample taken for genetic analysis, with the tissue samples lodged with the NSW Koala Biobank **(Year 1 onwards)**.

Governance and reporting

General

Commitment 24

Establish governance arrangements including roles, responsibilities and funding to ensure the efficient and effective implementation of the Plan.

Actions

1. Establish a multi-agency executive implementation committee to act as a central governance steering committee for the Plan (**Year 1**).
2. Enter into written agreements with delivery partners, including Transport for NSW as project partner responsible for delivering the major transport corridors, to support the implementation of specific commitments and actions (**Year 1**).
3. Establish working groups to advise the executive implementation committee and oversee implementation of specific commitments and actions (commitments 7, 13, 16 and 26) (**Year 1**).
4. Establish arrangements to fund delivery of the Plan's commitments and actions through contributions from residential, commercial and industrial developers in the nominated areas (**Year 1**).
5. Ensure that at least 90% of conservation program funding is spent on establishing and restoring conservation land or purchasing biodiversity credits consistent with the conservation land selection steps (**Life of Plan**).

Commitment 25

Implement an evaluation program for the Plan that sets out requirements for monitoring, evaluation, reporting and adaptive management.

Actions

1. Finalise the evaluation program in consultation with key stakeholders, including:
 - a. establishing governance arrangements for the evaluation program as part of the Plan's governance arrangements for implementation
 - b. establishing a monitoring and data collection methodology
 - c. finalising evaluation questions including scope and frequency
 - d. developing a method for evaluation outputs to support adaptive management
 - e. establishing the reconciliation accounting process to track progress of the Plan's commitments and actions
 - f. developing templates for reporting quarterly to the executive implementation steering committee and annual updates over the life of the Plan.
 - g. establishing processes to support independent 5-yearly reviews of the Plan (**Year 1**)
2. Track progress in meeting conservation targets (in hectares) through the reconciliation accounting process (**Life of Plan**).
3. Implement adaptive management steps for offsets if the reconciliation accounting process determines that the Plan's offsets are not keeping track with development (**Life of Plan**).
4. Publish annual updates on implementation of the Plan (**Life of Plan**).
5. Undertake independent 5-yearly reviews of the progress of the Plan, including progress towards meeting commitments and achieving outcomes, and publish a review report (**Life of Plan**).
6. Undertake internal process reviews at the mid-term point (2.5 years) between independent reviews and provide a report to key delivery partners and stakeholders (**Life of Plan**).

7. Develop an overarching communication and engagement strategy to support the Plan's implementation. Review the strategy every 5 years and updated it accordingly (**Year 1 then life of Plan**).

Commitment 26

Implement a compliance program to ensure compliance with the Plan and conditions of approval.

Actions

1. Establish a compliance and implementation working group comprising the department, local councils and other relevant stakeholders to guide the implementation of compliance activities under the Plan including preparation of a compliance strategy (**Year 1**).
2. Prepare a compliance strategy under guidance of the working group to:
 - a. identify relevant compliance mechanisms
 - b. set out compliance monitoring and auditing priorities and processes
 - c. set out a decision-making framework for taking compliance action
 - d. set out procedures and protocols for taking compliance action
 - e. identify roles and responsibilities for compliance.(**Year 1**)
3. Provide funding to employ 6 full-time compliance officers to work with local councils to carry out compliance activities in the Plan area (**Year 2 onwards**).
4. Share knowledge, maps and data and provide ongoing support and training to council staff to help local councils carry out implementation and compliance activities (**Life of Plan**).
5. Publish a compliance report as part of the yearly update on implementation of the Plan and provide it to local councils for review and investigation (**Life of Plan**).
6. Prepare reports every two-and-a-half years on any identified breaches with Plan commitments and approval conditions, such as auditing development consent conditions and environmental management plans (**Life of Plan**).

Appendix 2 - Native vegetation impacts and credit requirements (ecosystem credits)

Table A-1 Ecosystem credits required to offset the proposed biodiversity certification of land (if the offset rules applied)

Wilton nominated area

Plant community type (PCT ID and name)	Threatened Ecological Community	Number of ecosystem credits	IBRA sub-region
PCT 849 Cumberland shale plains woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	3,178	Cumberland
PCT 850 Cumberland shale hills woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	2,581	Cumberland
PCT 1395 Cumberland shale – sandstone Ironbark forest	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	6,698	Cumberland
	Total:	12,457	

Greater Macarthur nominated area

Plant community type (PCT ID and name)	Threatened Ecological Community	Number of ecosystem credits	IBRA sub-region
PCT 830 Cumberland moist shale woodland	Moist Shale Woodland in the Sydney Basin Bioregion	2	Cumberland
PCT 835 Cumberland riverflat forest	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	262	Cumberland
PCT 849 Cumberland shale plains woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	2,115	Cumberland
PCT 850 Cumberland shale hills woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	1,086	Cumberland
PCT 1395 Cumberland shale – sandstone Ironbark forest	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	6,096	Cumberland
	Total:	9,561	

Western Sydney (Aerotropolis) nominated area

Plant community type (PCT ID and name)	Threatened Ecological Community	Number of ecosystem credits	IBRA sub-region
PCT 724 Castlereagh shale - gravel transition forest	Shale Gravel Transition Forest in the Sydney Basin Bioregion	824	Cumberland
PCT 725 Castlereagh Ironbark forest	Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion	236	Cumberland
PCT 781 Coastal freshwater wetland	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	61	Cumberland
PCT 835 Cumberland riverflat forest	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	1533	Cumberland
PCT 849 Cumberland shale plains woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	5917	Cumberland
PCT 850 Cumberland shale hills woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	192	Cumberland
PCT 1800 Cumberland Swamp Oak riparian forest	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	396	Cumberland
	Total:	9,159	

Greater Penrith-Eastern Creek nominated area

Impacted plant community type	TEC	Number of ecosystem credits	IBRA sub-region
PCT 724 Castlereagh shale - gravel transition forest	Shale Gravel Transition Forest in the Sydney Basin Bioregion	1028	Cumberland
PCT 725 Castlereagh Ironbark forest	Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion	591	Cumberland
PCT 781 Coastal freshwater wetland	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	70	Cumberland
PCT 835 Cumberland riverflat forest	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	3781	Cumberland
PCT 849 Cumberland shale plains woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	2526	Cumberland
PCT 850 Cumberland shale hills woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	841	Cumberland
PCT 1800 Cumberland Swamp Oak riparian forest	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	209	Cumberland
	Total:	9,046	

Total number of ecosystem credits: 40,223

Appendix 3 - Species impact and credit requirements (species credits)

Table A-2 Species credits required to offset the proposed biodiversity certification of land (if the offset rules applied)

Wilton nominated area

Impacted species	Number of species credits	IBRA sub-region
<i>Acacia bynoeana</i> / Bynoe's Wattle	4,695	Any in NSW
<i>Acacia pubescens</i> / Downy Wattle	7,268	Any in NSW
<i>Callocephalon fimbriatum</i> / Gang-gang Cockatoo	20	Any in NSW
<i>Calyptorhynchus lathamii</i> / Glossy Black-Cockatoo	51	Any in NSW
<i>Cercartetus nanus</i> / Eastern Pygmy-possum	241	Any in NSW
<i>Chalinolobus dwyeri</i> / Large-eared Pied Bat	4,799	Any in NSW
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	473	Any in NSW
<i>Grevillea parviflora</i> subsp. <i>parviflora</i> / Small-flower Grevillea	84	Any in NSW
<i>Haliaeetus leucogaster</i> / White-bellied Sea-Eagle	90	Any in NSW
<i>Heleioporus australiacus</i> / Giant Burrowing Frog	9	Any in NSW
<i>Hibbertia fumana</i>	1,084	Any in NSW
<i>Hibbertia puberula</i>	701	Any in NSW

Impacted species	Number of species credits	IBRA sub-region
<i>Hieraaetus morphnoides</i> / Little Eagle	114	Any in NSW
<i>Lophoictinia isura</i> / Square-tailed Kite	118	Any in NSW
<i>Melaleuca deanei</i> / Deane's Paperbark	1,936	Any in NSW
<i>Meridolum corneovirens</i> / Cumberland Plain Land Snail	2,704	Any in NSW
<i>Myotis macropus</i> / Southern Myotis	2,104	Any in NSW
<i>Persoonia bargoensis</i> / Bargo Geebung	1,170	Any in NSW
<i>Petaurus norfolcensis</i> / Squirrel Glider	1,696	Any in NSW
<i>Phascolarctos cinereus</i> / Koala	3,185	Any in NSW
<i>Pimelea spicata</i> / Spiked Rice-flower	4,014	Any in NSW
<i>Pomaderris brunnea</i> / Brown Pomaderris	552	Any in NSW
<i>Pseudophryne australis</i> / Red-crowned Toadlet	63	Any in NSW
<i>Pterostylis saxicola</i> / Sydney Plains Greenhood	394	Any in NSW
<i>Pultenaea pedunculata</i> / Matted Bush-pea	667	Any in NSW
<i>Tyto novaehollandiae</i> / Masked Owl	1	Any in NSW
	Total: 38,233	

Greater Macarthur nominated area

Impacted species	Number of species credits	IBRA sub-region
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<i>Acacia bynoeana</i> / Bynoe's Wattle	4,038	Any in NSW
<i>Acacia pubescens</i> / Downy Wattle	6,049	Any in NSW
<i>Callocephalon fimbriatum</i> / Gang-gang Cockatoo	100	Any in NSW
<i>Calyptorhynchus lathami</i> / Glossy Black-Cockatoo	275	Any in NSW
<i>Cercartetus nanus</i> / Eastern Pygmy-possum	1,282	Any in NSW
<i>Chalinolobus dwyeri</i> / Large-eared Pied Bat	7,895	Any in NSW
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	655	Any in NSW
<i>Grevillea parviflora</i> subsp. <i>parviflora</i> / Small-flower Grevillea	74	Any in NSW
<i>Haliaeetus leucogaster</i> / White-bellied Sea-Eagle	315	Any in NSW
<i>Heleioporus australiacus</i> / Giant Burrowing Frog	8	Any in NSW
<i>Hibbertia fumana</i>	,469	Any in NSW
<i>Hibbertia puberula</i>	309	Any in NSW
<i>Hieraaetus morphnoides</i> / Little Eagle	452	Any in NSW
<i>Lophoictinia isura</i> / Square-tailed Kite	615	Any in NSW
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> population	864	Any in NSW
<i>Melaleuca deanei</i> / Deane's Paperbark	2,783	Any in NSW

<i>Meridolum corneovirens</i> / Cumberland Plain Land Snail	4,531	Any in NSW
<i>Myotis macropus</i> / Southern Myotis	3,260	Any in NSW
<i>Persoonia bargoensis</i> / Bargo Geebung	1,515	Any in NSW
<i>Phascolarctos cinereus</i> / Koala	4,226	Any in NSW
<i>Pimelea spicata</i> / Spiked Rice-flower	932	Any in NSW
<i>Pomaderris brunnea</i> / Brown Pomaderris	732	Any in NSW
<i>Pseudophryne australis</i> / Red-crowned Toadlet	192	Any in NSW
<i>Pterostylis saxicola</i> / Sydney Plains Greenhood	1,224	Any in NSW
<i>Pultenaea pedunculata</i> / Matted Bush-pea	749	Any in NSW
<i>Tyto novaehollandiae</i> / Masked Owl	4	Any in NSW
	Total: 46,616	

Western Sydney (Aerotropolis) nominated area

Impacted species	Number of species credits	IBRA sub-region
<i>Acacia bynoeana</i> / Bynoe's Wattle	235	Any in NSW
<i>Acacia pubescens</i> / Downy Wattle	6,708	Any in NSW
<i>Cercartetus nanus</i> / Eastern Pygmy-possum	304	Any in NSW
<i>Dillwynia tenuifolia</i>	1,106	Any in NSW
<i>Grevillea juniperina</i> subsp. <i>juniperina</i> / Juniper-leaved Grevillea	3,978	Any in NSW
<i>Grevillea parviflora</i> subsp. <i>parviflora</i> / Small-flower Grevillea	138	Any in NSW
<i>Haliaeetus leucogaster</i> / White-bellied Sea-Eagle	36	Any in NSW
<i>Hibbertia fumana</i>	135	Any in NSW
<i>Hibbertia puberula</i>	92	Any in NSW
<i>Hieraaetus morphnoides</i> / Little Eagle	29	Any in NSW
<i>Lophoictinia isura</i> / Square-tailed Kite	27	Any in NSW
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> population	4,895	Any in NSW
<i>Maundia triglochinoides</i>	325	Any in NSW
<i>Meridolum corneovirens</i> / Cumberland Plain Land Snail	5,184	Any in NSW
<i>Micromyrtus minutiflora</i>	462	Any in NSW

Impacted species	Number of species credits	IBRA sub-region
<i>Myotis macropus</i> / Southern Myotis	6,589	Any in NSW
<i>Ninox strenua</i> / Powerful Owl	2	Any in NSW
<i>Persicaria elatior</i> / Tall Knotweed	65	Any in NSW
<i>Persoonia nutans</i> / Nodding Geebung	1,060	Any in NSW
<i>Pimelea spicata</i> / Spiked Rice-flower	3,874	Any in NSW
<i>Pultenaea parviflora</i>	907	Any in NSW
<i>Pultenaea pedunculata</i> / Matted Bush-pea	1,446	Any in NSW
	Total: 37,597	

Greater Penrith-Eastern Creek nominated area

Impacted species	Number of species credits	IBRA sub-region
<i>Acacia bynoeana</i> / Bynoe's Wattle	538	Any in NSW
<i>Acacia pubescens</i> / Downy Wattle	6183	Any in NSW
<i>Allocasuarina glareicola</i>	489	Any in NSW
<i>Callocephalon fimbriatum</i> / Gang-gang Cockatoo	3	Any in NSW
<i>Cercartetus nanus</i> / Eastern Pygmy-possum	482	Any in NSW
<i>Chalinolobus dwyeri</i> / Large-eared Pied Bat	29	Any in NSW
<i>Dillwynia tenuifolia</i>	1844	Any in NSW

Impacted species	Number of species credits	IBRA sub-region
<i>Grevillea juniperina</i> subsp. <i>juniperina</i> / Juniper-leaved Grevillea	2791	Any in NSW
<i>Grevillea parviflora</i> subsp. <i>parviflora</i> / Small-flower Grevillea	74	Any in NSW
<i>Haliaeetus leucogaster</i> / White-bellied Sea-Eagle	224	Any in NSW
<i>Hibbertia fumana</i>	1012	Any in NSW
<i>Hibbertia puberula</i>	743	Any in NSW
<i>Hieraaetus morphnoides</i> / Little Eagle	68	Any in NSW
<i>Lathamus discolor</i> / Swift Parrot	534	Any in NSW
<i>Litoria aurea</i> / Green and Golden Bell Frog	100	Any in NSW
<i>Lophoictinia isura</i> / Square-tailed Kite	316	Any in NSW
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> population	4046	Any in NSW
<i>Maundia triglochinoidea</i>	227	Any in NSW
<i>Meridolum corneovirens</i> / Cumberland Plain Land Snail	5939	Any in NSW
<i>Micromyrtus minutiflora</i>	427	Any in NSW
<i>Myotis macropus</i> / Southern Myotis	5246	Any in NSW
<i>Persicaria elatior</i> / Tall Knotweed	1330	Any in NSW
<i>Persoonia nutans</i> / Nodding Geebung	1541	Any in NSW

Impacted species	Number of species credits	IBRA sub-region
<i>Petaurus norfolcensis</i> / Squirrel Glider	3180	Any in NSW
<i>Pimelea curviflora</i> var. <i>curviflora</i>	1142	Any in NSW
<i>Pimelea spicata</i> / Spiked Rice-flower	1651	Any in NSW
<i>Pterostylis saxicola</i> / Sydney Plains Greenhood	20	Any in NSW
<i>Pultenaea parviflora</i>	1250	Any in NSW
<i>Pultenaea pedunculata</i> / Matted Bush-pea	1217	Any in NSW
<i>Tyto novaehollandiae</i> / Masked Owl	15	Any in NSW
	Total: 42,661	

Total number of species credits: 165,107

Appendix 4 – Assessment against Stages 1 & 2 of the BAM (Tables 25 & 26)

BDAR/BCAR Checklist – Stage 1: Biodiversity assessment (based on Table 25 of BAM)

Report section	BAM Ref	Maps & data	Information	Comments <i>Have the maps/data/information been supplied? Are these adequate? Are the arguments reasonable?</i>
Intro- duction	Chapters 3 & 4	<ul style="list-style-type: none"> Site Map (as described in Section 4.2) Location Map (as described in Section 4.2) Digital shape files for all maps and spatial data 		<p>Cadastre The cadastre of the subject land (section 4.2.1.1 of the BAM) is not shown on the site maps. This would have been difficult however, given the size of the nominated areas, but this information could have been provided as a shape file.</p> <p>Landscape features Not all of the landscape features identified in section 4.2.1.3 of the BAM were included in the site maps (i.e. IBRA bioregions and subregions, and habitat connectivity) but this was probably due to the number of features already shown on these maps. Digital shape files have been provided for these features.</p>
		<p>Introduction to the biodiversity assessment including:</p> <ul style="list-style-type: none"> identification of development/biodiversity stewardship site footprint, including: operational footprint construction footprint indicating clearing associated with temporary construction facilities and infrastructure general description of development/biodiversity stewardship site sources of information used in the assessment, including reports and spatial data 		<p>Definition of subject land (and inconsistent terminology) The BCAR does not use the definition of subject land used by the BAM, and the definition it does use changes throughout the document.</p> <p>The BAM defines subject land as <i>“Subject land: is land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land. It includes land that may be a development site, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement”</i> (page 74). The BAM also refers to assessment area in the context of <i>“assessment area surrounding the subject land”</i>, which is defined as <i>“the area of land in the 1500m buffer zone around a development site, or land to be biodiversity certified or a biodiversity stewardship site, that is determined in accordance with Subsection 4.3.2.”</i> (page 68).</p> <p>In contrast, the BCAR states</p> <ul style="list-style-type: none"> <i>“For the BCAR, the assessment area is called the Subject Land and covers the nominated areas”</i> (page 1-2) <i>“Subject Land ... The Assessment Report defines the assessment area for the Biodiversity Certification Assessment Report as the nominated areas.”</i> (page xxv) <i>“The BAM uses the term Subject Land to mean land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land, In this Assessment Report, the terms ‘nominated areas’ and ‘urban capable land’ are used instead of the term Subject Land.”</i> (page 18-1) <p>However, there are different land categories within the nominated areas, and not all of them are being sought for certification.</p> <p>After consideration of Chapters 1 and 7 of the BCAR, and the associated shape files, it can be seen that the subject land for this proposal, as defined by the BAM, is the urban capable land (which includes urban development, infrastructure (but not all essential infrastructure and not that associated with the major transport corridors), and the intensive plant agriculture within the agribusiness precinct of the WSA) and the major transport corridors identified for certification. This makes sense and the treatment of this ‘subject land’ under the BAM and in the BAM-C was appropriate. However, the use of different, and inconsistent, terms throughout the BCAR, meant it was sometimes difficult to understand and interpret. Using the terminology in the BAM would have prevented much initial confusion.</p> <p>Operational and construction footprints There are no operational and construction footprints, only the area sought for certification. It is noted that</p> <ul style="list-style-type: none"> this application precedes precinct planning for many areas proposed to be certified, and under the proposal, essential infrastructure may be able to be carried out on avoided land in limited circumstances for Part 5 activities, so the area sought for certification may not encompass all of the operational/construction footprint. Such activities outside certified areas will be subject to the normal planning and biodiversity assessment pathways requiring approval.

Report section	BAM Ref	Maps & data	Information	Comments <i>Have the maps/data/information been supplied? Are these adequate? Are the arguments reasonable?</i>
Landscape features	Sections 4.2 and 4.3, Appendix 3	<ul style="list-style-type: none"> • IBRA bioregions and subregions (as described in Paragraphs 4.2.1.3–4.2.1.4) • NSW landscape regions (as described in Paragraph 4.2.1.5) • Rivers and streams (as described in Paragraph 4.2.1.6) • Wetlands (as described in Paragraph 4.2.1.7) • Connectivity of different areas of habitat (4.2.1.8–4.2.1.11) • Areas of geological significance and soil hazard features (4.2.1.12–15) • AOBV (4.2.1.16-18) • Native vegetation extent (as described in Subsection 4.3.2) 		<p>Rivers and streams Strahler stream order has been mapped on the site and location maps, but it is sometimes difficult to distinguish the colours used for the different orders i.e. orders 3 and 4, and 5 and 9, look very similar. A digital shape file has been provided for riparian buffers but there is no information in the attribute table for buffer widths or stream order. Together, this makes it somewhat difficult to determine if appropriate buffers have been applied.</p> <p>Native vegetation extent Some areas of native vegetation in the 1500 m buffer have not been mapped, for example: Shanes Park and along, and near, Eastern Creek for GPEC; along the eastern and southern boundaries for GMAC; and along the eastern most, and south western boundary for Wilton. However, this would not have affected the cover class used by the BAM-C to generate candidate species. The 'Development_footprint_1500m_buffer' shape file incorrectly marks Wilton as WSA in the attribute table.</p>
		<p>Identification of landscape features at the development/ biodiversity stewardship site, including:</p> <ul style="list-style-type: none"> • IBRA bioregions and subregions, NSW landscape region and area (ha) • native vegetation extent in the buffer area • cleared areas • evidence to support differences between mapped vegetation extent and aerial imagery • rivers and streams classified according to stream order • wetlands within, adjacent to and downstream of the site • connectivity features • areas of geological significance and soil hazard features • site context components, including: • identification of method applied (i.e. linear or site-based) • percent native vegetation cover in the landscape 		<p>Connectivity Page 24-27 of the BCAR describes how habitat connectivity was mapped, but no details are given for how the Priority Conservation Lands layer, and the native vegetation map, were used to extend the BIO Map mapping for those parts of the nominated areas occurring outside of the Cumberland subregion. It is noted however, that only a very small percentage of Wilton (1.54%) and GMAC (3.55%) occurred outside of this subregion (see Table 18-1).</p> <p>Page 24-27 defines 'connected' and 'isolated' vegetation, which includes reference to 100 m of/from another patch of woody vegetation, but it is not explained why this figure was chosen.</p> <p>While it seems unlikely that these two points had an appreciable effect on the application of section 4.2.1.3(d) of the BAM, transparent methodologies add rigour to a biodiversity assessment report and aid in its assessment.</p> <p>More comments are made on connectivity in the next table of this appendix 'BDAR/BCAR Checklist – Stage 2: Impact assessment (biodiversity values)'.</p>

Native vegetation	Chapter 5 and App 6	<p>Map of native vegetation extent within the development/biodiversity stewardship site (as described in Section 5.1)</p> <ul style="list-style-type: none"> • Map of PCTs within the development/biodiversity stewardship site (as described in Section 5.2) • Map of plot locations relative to PCTs • Map of TECs • Plot field data (MS Excel format) • Plot field data sheets • Patch size of intact native vegetation (as described in Subsection 5.3.2) • Table of current vegetation integrity scores for each vegetation zone within the site. 	<p>Mapping PCTs/TECs</p> <p>Comments on native vegetation mapping are provided below (see also DOC22/41843 and DOC22/235422 for further detail):</p> <ul style="list-style-type: none"> • Mapping methods were generally consistent with those applied to the mapping of PCTs across small to medium scale study areas. Most available contemporary data and imagery was accessed. • Grassland mapping is inherently difficult, and the processes followed were consistent with the Department’s approach. • The approach used LIDAR derived data sets; fine scale topographic variables generated from LIDAR can be useful to prepare elevation models, drainage and aspect patterns, and help overcome the inherent limitations of coarser scale substrate maps (especially in areas that were not surveyed). • Mapping criterion and thresholds applied to the mapping of woody/non woody and native and non-native cover are not clearly defined. • Inclusion of BAM compatible BioNet Flora Survey Plot Data could have been used to aid the selection and mapping of PCTs in areas that were not surveyed e.g. see Figure 1 below. The potential exists to use this data as an independent validation dataset. • Use of stereoscopic imagery provides greater interpretative power in assessing vegetation attributes and landscape features than the two-dimensional approach applied in this mapping. Problems, including shadowing of tree crowns, can constrain the accuracy of woody extent and the assessment of ground condition. However, limitations of this approach were reduced by the use of the LIDAR canopy height data and multi-date image sets, and by carrying out field surveys. • Thresholds applied to crown density can determine the extent to which native cover is under, or over, estimated. Rule sets applied to CPW in 2000 using coarser scaled imagery resulted in about 10% of native vegetation retained in scattered trEHG classes (Tozer 2003). With the more detailed mapping completed here, it is expected that this proportion would be significantly lower. • The ruleset used to map vegetation extent (on page 11-12 of the BCAR) has not been justified because there is no explanation for why the various parameters were used e.g. why was >60 m chosen as the cut off to exclude gaps from intact vegetation, and why was this figure reduced to >30 m for thinned vegetation? Also, how does excising waterbodies fit in with mapping communities associated with ephemeral or standing water (like Freshwater Wetlands on Coastal Floodplains)? And regarding “<i>Map aquatic vegetation where it is contiguous with vegetation on the adjacent bank</i>” (page 11-12), why does the vegetation need to be contiguous? Freshwater Wetlands on Coastal Floodplains for example, can have vegetation that is not contiguous with vegetation on the adjacent bank, also, communities like this change through time in response to seasonal variables and disturbances (including drought, flooding, climate variability). • Selection of PCTs appropriately applied diagnostic tests available in published literature (Tozer 2003; Tozer et al 2010; OEH 2013). However, there are no tables providing results of these tests to evaluate and assess PCT choice. • The assessment area is large and requires the extrapolation of known assigned points of truth to areas that were not surveyed. A range of methods have been applied to the extrapolation process including environmental relationships, imagery patterns, field assessment and expert opinion. Additional supporting information could be provided to describe the model applied for each PCT, so that map decision rules are explicit. This could identify combinations of soil types, elevation or slope gradients in combination with species assemblage patterns. Part of the results are included within the EPBC Act TEC ruleset tables, but it is unclear if the PCT rulesets differ from those applied to the TECs. The extent to which these fall within the known environmental gradients of Tozer et al (2010) and OEH (2016) would strengthen the map conclusions. • Confidence levels are mentioned twice in the BCAR, but no details are given on how many levels there were and how they were defined. Also, the attribute table for the shape file ‘Veg Zones and BC Act TECs’ does not contain any reference to confidence levels. It would be good to know the confidence of PCT assignment based on field visitation, relationship to adjoining areas or extrapolation of image patterns. It would also be good to know what percentage of each vegetation zone was mapped with low and high confidence levels, and where this occurred. • Addressing uncertainty in information could be improved by identifying areas which have been visited either by formal plot sampling, rapid survey, or confident extrapolation from surrounding areas (no distinction has been made in the shape files (see the attribute tables for ‘CPCP survey tracks 20210810’ and ‘Flora and fauna survey tracks’) for rapid assessment ground truthing etc.). • The thresholds and criterion that distinguish each of the condition classes are not described. Canopy density and age is identified as an attribute used to assess and annotate condition class through image interpretation and LIDAR data, but limited definitions are provided.
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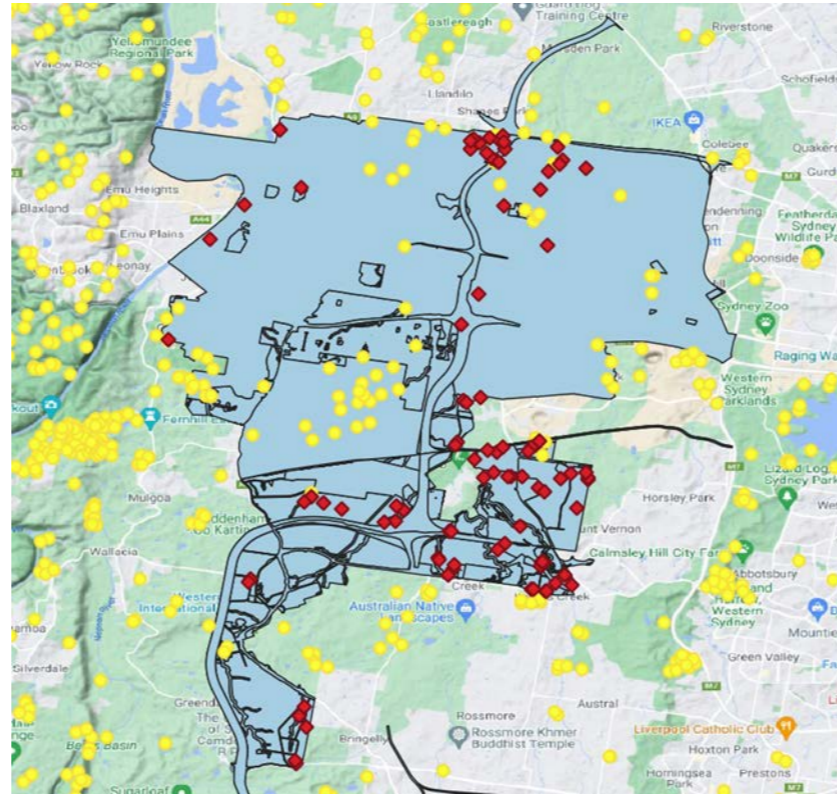


Figure 1 Systematic BAM compatible flora survey locations (yellow) available in BioNet and within and adjoining part of GPEC and WSA

Other comments regarding the rule set for mapping vegetation condition (see page 11-14 of the BCAR)

- the limitations associated with the scale of existing mapping, most notably for soil landscapes and geology, were not identified in Chapter 13 of the BCAR; soil landscapes and geology are mapped at 1:100000 and 1:250000 scales respectively, and need to be ground-truthed
- the limitations of using LiDAR derived models is not discussed in Chapter 13 or in 'B.3 INFORMATION ON LIDAR PROCESSING', with the data dating to 2011 (that said, the age of the LiDAR data is mentioned in passing on page 11-26 as a limitation for the Commonwealth TEC mapping method)
- page 11-12 of the BCAR states *"The extent of native vegetation within the nominated areas was mapped by Biosis botanists using purpose-built GIS web apps supporting hi-definition aerial imagery, over multiple capture dates and seasons."* However, it is not known what 'purpose-built GIS web apps' refers to. The report discusses the rule sets and the key data sets used (see Chapter 13.2 and Table 13-1, pages 13-2 – 13-5) but no other mention is made of 'purpose-built GIS web apps'.
- page 11-14 states *"Consideration of the expected density of tree and shrub layers for each PCT when assigning condition and considering evidence for disturbance. For example, PCT 849 in intact condition may regularly have gaps in vegetation layers whereas this is less likely for PCT 1395"*. However, both PCTs 849 and 1395 can have gaps in vegetation layers in stands with 'intact' condition; the final determination for CPW (which includes PCT 849) states *"Less disturbed stands of the community may have a woodland or forest structure"* (para 2) and *"Contemporary tree-dominated stands of the community are largely relics or regrowth of originally taller forests and woodlands, which are likely to have had scattered shrubs and a largely continuous grassy groundcover."* (para 6), and the final determination for Shale Sandstone Transition Forest (PCT 1395) states *"The structure of Shale Sandstone Transition Forest varies from grassy woodland to forest"* (para 4.5).

Mapping of Elderslie Banksia Scrub Forest (EBSF) (PCT 774)

Page 11-13 discusses the identification of PCTs and briefly addresses PCT 774 (Elderslie Banksia Scrub Forest), PCT 781 (Freshwater Wetlands on Coastal Floodplains), PCT 877 (Western Sydney Dry Rainforest) and PCT 1800 (Swamp Oak Floodplain Forest), which are representative of TECs with *"little known distributions, small or restricted spatial extents, dynamic wetter boundaries, or potentially difficult to detect using aerial imagery"*. The BCAR states *"It is acknowledged that there is a slight risk that these four PCTs/TECs have been under-mapped. However, the systematic and methodical approach undertaken to develop the native vegetation map, by experienced botanists, along with the ongoing reference to all best available data (including field data whenever available) is considered to sufficiently mitigate the risk of small areas not being mapped, and the even*

			<p><i>smaller risk of any small under-mapped areas occurring within urban capable land. This is considered to be the case for PCT 774, as urban capable land is not proposed in the landscape position known to support this PCT, and the PCT was not recorded during any ground validation surveys. The methodology used is appropriate for the scale of the project.” (page 11-13).</i></p> <p>PCT 774 is Elderslie Banksia Scrub Forest, which is critically endangered under the BC Act and EPBC Act. Very little is known about this community, including its current distribution (NSW Scientific Committee 2015; Department of Agriculture, Water and the Environment 2020). This community is highly critically endangered, which is reflected by this statement in the federal conservation advice <i>“National listing typically focuses legal protection on the remaining patches of the ecological community that are most functional, relatively natural and in relatively good condition. ... However, because of the very small size of patches and extent remaining and the nature of the threats, condition thresholds have not been applied to the Elderslie Banksia Scrub Forest ecological community. All remaining patches are considered critical to the survival of this ecological community. Even degraded patches that retain the characteristics of the ecological community need protecting.”</i> (page 7, Department of Agriculture, Water and the Environment 2020).</p> <p>Up until recently, this community was only known from the Camden LGA, although the final determination did acknowledge that it could occur elsewhere in the Sydney Bioregion (paragraph 4.4. in NSW Scientific Committee 2015). We now know that this community occurs within the Campbelltown LGA in the Menangle Park Urban Release Area (MPURA), see Figure 11 of the <i>Menangle Park Planning Proposal Dahua Group (Aust) Pty Ltd</i> (AAP Corporation Pty Limited, November 2018) https://www.campbelltown.nsw.gov.au/files/assets/public/document-resources/builddevelop/localplanningpanel/2019/23oct2019/menangleparkplanningproposalrequest16november2018.pdf) (bearing in mind that the mapping is not final, and the extent of EBSF in the area may be greater than that shown in Figure 11). This release area forms part of the excluded land within GMAC and it is contiguous with some urban capable land as well. While parts of this urban capable land were surveyed and sampled for the current proposal, and while the BCAR states that this community was not recorded, there is potential for this community to occur there. This is because:</p> <ul style="list-style-type: none"> • The proximity of the urban capable land to the MPURA, with the potential for similar and related soil landscapes (note that the soil landscapes have not been ground truthed for this proposal, and the federal conservation advice highlights the complexity (in terms of composition) and uncertainties surrounding the distribution of the sand associated with this community (see page 4 of Department of Agriculture, Water and the Environment 2020). • Some associated communities (Cumberland Plain Woodland and River-flat Eucalypt Forest) have been identified in the urban capable land by the current proposal (and Moist Shale Woodland (PCT 830), also an associated community, was identified by the current proposal in adjacent avoided and excluded land). • The quarry in the urban capable land (see Figure 2 below) has been mapped as the Blacktown, Mowbray Park and Disturbed Terrain soil landscapes but, due to the scale of the mapping, this needs to be ground truthed; the quarry is located very close to the Nepean River and is most likely mining sand and soil, however, the Blacktown and Mowbray Park soil landscapes are associated with shale. Also, the current proposal mapped the vegetation immediately adjacent to the quarry as PCT 850 (CPW), PCT 1395 (Shale Sandstone Transition Forest) and PCT 1181 (Smooth-barked Apple - Red Bloodwood - Sydney Peppermint healthy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion). • Regarding sampling protocols, page 8 of the federal conservation advice states <i>“Thorough and representative on-ground surveys are essential to accurately assess the extent of the ecological community. Because of the small patch size, small number of patches, and modified state of all remnants of the ecological community, entire patches should be sampled. Standard sampling methods that are often applied to the Sydney region and other parts of NSW (e.g. 20 x 20 m or equivalent 400 m² quadrats) may not be feasible or useful.”</i> This has not been done for this proposal. • The definition of this community includes remnant trEHG under the BC Act (paragraph 4.3 in NSW Scientific Committee 2015).
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Figure 2 The black oval shows the approximate location of a quarry in proposed urban capable land in GMAC, and the orange ovals show the approximate location of EBSF in the MPURA (excluded land in GMAC) as shown in Figure 11 of the *Menangle Park Planning Proposal Dahua Group (Aust) Pty Ltd* (AAP Corporation Pty Limited, November 2018)

Plot field data sheets

Plot field data (MS Excel format) was provided. Note however, that plot field data sheets contain additional information than plot field data (MS Excel format), such as physiography, site notes and plot disturbance (e.g. compare the 'Systematic Flora Survey field data sheet' on the EHG website (see <https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet/resources>) with the Excel file provided with the application '26276.MASTER.IMPORT.BAM.Plots.FINAL.20211101.xlsx').

No plot field data sheets were provided, and no reports from an electronic recording system (or copies of digital forms) used in the field were provided. It is noted that digital forms were referred to on page 8-10 of the BCAR i.e. the final stage of the Conservation Priorities Method involved "over-the-fence' style assessment of specific sites ... collecting ecological data using a fit-for-purpose Rapid Assessment Method (RAM) digital form". Sub-Plan A also refers to this form and includes an extract and snapshot of the form and data overview on pages 158-159. It is not clear if digital forms were used for the collection of plot and transect data, or for targeted species surveys and habitat assessments.

Identify native vegetation extent within the development/biodiversity stewardship site, including cleared areas and evidence to

Justification of evidence used to identify a PCT

Report section	BAM Ref	Maps & data	Information	Comments <i>Have the maps/data/information been supplied? Are these adequate? Are the arguments reasonable?</i>
		<p>support differences between mapped vegetation extent and aerial imagery.</p> <p>Describe PCTs within the development/biodiversity stewardship site, including:</p> <ul style="list-style-type: none"> • vegetation class • vegetation type • area (ha) for each vegetation type • species relied upon for identification of vegetation type and relative abundance • justification of evidence used to identify a PCT (5.2.1.12) • TEC status (5.2.1.14–5.2.1.15) • estimate of percent cleared value of PCT (5.2.1.16) 		<p>Page 19-1 lists the measures taken to identify the PCTs and as mentioned above, the selection of PCTs appropriately applied diagnostic tests available in published literature (Tozer 2003; Tozer et al 2010; OEH 2013). However, there are no tables providing the results of these tests to evaluate and assess PCT choice.</p>
		<ul style="list-style-type: none"> • Review any existing information on native vegetation that is relevant to the subject land and land within 1500 m (5.2.1.5) 		<p>Review of existing information As mentioned above, inclusion of BAM compatible BioNet Flora Survey Plot Data could have been used to aid the selection and mapping of PCTs in areas that were not surveyed by this proposal.</p>

	<p>Perform a vegetation integrity assessment of the development/biodiversity stewardship site, including:</p> <ul style="list-style-type: none"> • mapping vegetation zones (5.3.1) • patch size • assessing vegetation integrity using benchmark data (Subsection 5.3.3) • survey effort as described in Subsection 5.3.4 (number of plots) • plots must be randomly distributed (5.3.4.5) and not near ecotones or disturbed areas (5.3.4.6) • determining the vegetation integrity score (Appendix 6) 	<p>Mapping vegetation zones As discussed above, the thresholds and criterion that distinguish each of the condition classes are not described. Canopy density and age is identified as an attribute used to assess and annotate condition class through image interpretation and LIDAR data, but limited definitions are provided.</p> <p>Representative plot data Sections 5.3.4.3 and 5.3.4.4 of the BAM require the plot data to be representative of the vegetation zone, but there is no discussion of the representativeness of the plot data in the BCAR.</p> <p>Regarding the plot data (in '26276.MASTER.IMPORT.BAM.Plots.FINAL.20211101.xlsx')</p> <ul style="list-style-type: none"> • It can be highly variable for a vegetation zone, both within and across the nominated areas. For example, for PCT 849 thinned, the average (\pm standard deviation) for 'strucGrass' is 44 ± 27.6 for Wilton, 11 ± 11.3 for GMAC and 9.4 ± 7.7 for WSA (no values are given for GPEC because it was not sampled, despite a proposed direct impact of approximately 83 ha to this vegetation zone in the area). • There will be direct impacts in certain nominated areas, but no plots have been used from these areas to calculate the VI scores. This is most noticeable for GPEC, where the direct impacts to PCTs 849 and 850 (including NOGs) are proposed to be approximately 858 ha and 269 ha respectively, but only one plot has been sampled. • The sampling of some PCTs is skewed towards certain nominated areas e.g. GMAC for PCT 850. <p>There is concern that the variability of the data means the VI scores are not representative. With this in mind, it is noted that</p> <ul style="list-style-type: none"> • One assessment report, containing the components of a BCAR, has been prepared • Four BAM-Cs have been finalised (under parent case 00013050), and four credit summary reports provided in the assessment report • Sections 4.2 (Identify landscape features), 4.3 (Determining the site context) and 6.4 (Steps for identifying habitat suitability for threatened species) of the BAM have been applied separately to each nominated area, while sections 5.3.4 (Vegetation integrity survey plots) and 5.4 (Determining the vegetation integrity score) of the BAM have been applied by combining the nominated areas. <p>It seems likely that this concern would be much smaller (or perhaps even absent) if the assessment of vegetation integrity was done separately for each nominated area, as this would have led to a more robust assessment. The benefits of assessing the nominated areas separately is acknowledged in the BCAR with the following rationale for assessing native vegetation cover separately (page 11-9) <i>"Native vegetation cover was assessed within a 1,500 m buffer from the urban capable land footprint of each of the nominated areas separately, and entered into the BAM Calculator. This approach was undertaken in accordance with Section 6.4.1.3 of the BAM and to ensure that all ECS and SCS with a native vegetation cover class requirement lower than, or equal to that of each nominated area, were considered. This ensured accurate and area specific information was used, and that no species were excluded based on a higher overall value for native vegetation cover resulting from averaging across all nominated areas."</i></p> <p>In terms of vegetation integrity however, page 11-16 of the assessment report states <i>"To ensure consistency of data across the assessment area and to prevent over-complicating the assessment approach and data collection requirements, vegetation zones were not broken down by nominated area. For example, vegetation zone 849 (thinned) occurs across all four nominated areas, and all data collected from within that zone has been pooled to determine the vegetation integrity score, independent of where each plot was collected. This approach ensured that an accurate and consistent landscape scale vegetation integrity assessment for each vegetation zone was undertaken, which is considered the most suitable approach for an assessment of this scale."</i></p> <p>However, land access constraints appear to be the key driver of the sampling effort, as recently explained by the applicant: <i>"the limitation of property access (particularly lack of private property access) needs also to be acknowledged, as it was a major influencing factor in the final quantum and spatial layout of the plots collected"</i> (DOC22/46075). The following further justification from the applicant was also recently conveyed with regards to sections 5.3.4.3 and 5.3.4.4 of the BAM (DOC22/46075):</p> <ul style="list-style-type: none"> • The consultant's approach was to over-collect plots wherever possible. • There were instances where impacted vegetation zones in a nominated area were under-represented in terms of plot data, but a large portion of those were related to small areas of impact. A notable exception was PCTs 849 and 850 in GPEC, with the following justification given for PCT 849 in the thinned condition state <i>"PCT 849_Thinned impacts in GPEC represent 28% (83 ha) of the total project impacts (301 ha) to that vegetation zone. However the vegetation zone is substantially over-sampled through the remaining Nominated Areas. A total of 18 plots have been collected in this vegetation zone, 10 more than the minimum requirement for largest vegetation zone category (>1000</i>
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Report section	BAM Ref	Maps & data	Information	Comments <i>Have the maps/data/information been supplied? Are these adequate? Are the arguments reasonable?</i>
				<p><i>ha, minimum of 8 plots), and as such the data collected is considered suitable to sample any variation likely to occur within the project area, and aligned with the requirements of the BAM.” Similar arguments were given for PCT 850_Thinned and PCT 850_NOG.</i></p> <ul style="list-style-type: none"> <i>“To address this under-sampling one possible option is that additional plot data could be collected in Wianamatta RP, or publically (sic) accessible area mapped as NOG, to use as a comparison to existing data, to ensure consistency. However (excluding NOG) this would only be possible for PCT 849 Intact and Thinned vegetation zones (due to former and current land access limitation), each of which has already been substantially over-sampled (by 5 and 11 plots respectively), and it is expected that any data collected would sit well within the existing range of the data already collected. This is also the case for NOG vegetation zones, whereby 850 NOG has been oversampled with 9 plots collected in total, and 849_NOG with 18 plots collected, and any additional data collected is highly likely to fit within the current range of collected plot data.” (DOC22/46075-2)</i> <p>The pooling of plot data across all four nominated areas is considered to not clearly demonstrate that the plots were representative of the study area as a whole. It is acknowledged that the over collection of plot data demonstrates acute consideration of BAM requirements in terms of minimum number of plots, but it does not demonstrate that the plots collected were representative of all four nominated areas. It was conveyed to the applicant that data from the BioNet Atlas Flora Survey data module might assist in validating the representativeness of the plot data (DOC22/46075-1) but this was not undertaken (DOC22/46075-2).</p>
		<p>Where use of local data is proposed:</p> <ul style="list-style-type: none"> identify relevant vegetation type identify source of information for local benchmark data justify use of local data in preference to database values 		NA
		<ul style="list-style-type: none"> Table of habitats or habitat components and their sensitivity classes Table detailing the list of species credit species and presence status on site as determined by targeted survey, indicating also where presence was assumed and/or where presence was determined by expert report Species credit species polygons (as described in Paragraph 6.4.1.33) Table detailing species and habitat feature/component associated with species and its abundance on site (as described in Paragraph 6.4.1.34) Table detailing biodiversity risk weighting for species on site (as described in Section 6.6) For wind farm developments: maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site 		<p>Species credit species polygons – prepared using the knowledge-based method for 27 species</p> <p>The knowledge-based method was devised by the DPIE Green and Resilient Places (GRP) consulting team for the CPCP (DOC21/960040) to prepare species polygons to quantify impacts and generate credit liabilities for 27 species. There remain concerns regarding the application of this method in accordance with the BAM. This can partly be attributed to the use of section 6.1.1.2 of the BAM to develop habitat constraints (‘habitat parameters’) that were not in BioNet or in published, peer reviewed literature, and the use of these constraints to modify the ‘initial species polygons’. See Appendix 6 for an assessment of the knowledge-based method.</p> <p>Also see the next table of this appendix ‘BDAR/BCAR Checklist – Stage 2: Impact assessment (biodiversity values)’ for comments on the species polygons prepared for <i>Epacris purpurascens var. purpurascens</i>, Little Eagle and Square-tailed Kite.</p>

Threatened species	Chapter 6	<p>Identify ecosystem credit species associated with PCTs on both the development site and biodiversity stewardship site as outlined in Section 6.2, including:</p> <ul style="list-style-type: none"> list of species derived justification for exclusion of any ecosystem credit species predicted above. <p>Identify species credit species on both the development site and the biodiversity stewardship site as outlined in Sections 6.3 to 6.5, including:</p> <ul style="list-style-type: none"> list of candidate species justification for inclusions and exclusions based on habitat features indication of presence based on targeted survey or expert report details of targeted survey technique, effort, timing and weather species polygons biodiversity risk weighting for the species threatened species survey additional requirements for wind farm developments 	<p>Inclusion/exclusion of species from further assessment</p> <p>The following species should have been further assessed (for certain nominated areas) under Step 3 and/or Step 4 of section 6.4 of the BAM</p> <ul style="list-style-type: none"> <i>Callistemon linearifolius</i> (Netted Bottle Brush) for Wilton and GMAC <i>Cynanchum elegans</i> (White-flowered Wax Plant) for all nominated areas <i>Persoonia hirsuta</i> (Hairy Geebung) for all nominated areas <i>Phascolarctos cinereus</i> (Koala) for WSA and GPEC <i>Pilularia novae-hollandiae</i> (Austral Pillwort) for GMAC, WSA and GPEC <i>Pimelea curviflora</i> var. <i>curviflora</i> for Wilton, GMAC and WSA <i>Pomaderris brunnea</i> (Brown Pomaderris) for WSA and GPEC <i>Prasophyllum fuscum</i> (Slaty Leek Orchid) for Wilton, and perhaps for GMAC <i>Zannichellia palustris</i> for WSA and GPEC <p>The reasons for this are given in the table below titled 'The species that should have been further assessed for certain nominated areas under Step 3 and/or Step 4 of section 6.4 of the BAM, and the reasons why'.</p> <p>One reason given in 'Table A-1: Justification for removal of species credit species from requiring further assessment' for Gang-gang Cockatoo, Glossy Black-Cockatoo and White-Flowered Wax Plant was that it has never been recorded in the nominated area/s (for example see the entry for Gang-gang Cockatoo on page A-10). This is not an adequate reason for excluding species from further assessment because BioNet records do not necessarily reflect a species occurrence across its entire range. This reason is also not in accordance with the BAM (see sections 6.4.1.18, 6.4.1.12, 6.4.1.14 and 6.4.1.17 which stipulate when species can be excluded from further assessment). In the case of the cockatoos, the exclusion of these species from WSA is supported because "<i>Breeding microhabitats are considered substantially degraded within the WSA nominated area</i>" (pages A-10 and A-11, with the inference being that the species would not be able to use that habitat, which is in accordance with section 6.4.1.17(a) of the BAM). As mentioned above, the exclusion of White-Flowered Wax Plant is not supported because of the reasons given in the table below.</p> <p>Technique and effort for targeted flora surveys</p> <p>Parallel field traverses were used for targeted flora surveys. The transect separation distances used for each species, in each vegetation zone (where a vegetation zone is represented by a particular PCT in a particular condition state), were not stated. However, separation distances were listed according to life form (trEHG, shrubs, herbs, forbs, grasses, other) and condition state (intact, thinned, scattered trEHG, DNG).</p> <p>Two different sets of separation distances were used. Initial surveys carried out in 2017 and 2018 used 40 m for trEHG in all condition states; 20 m for shrubs, herbs, forbs, grasses and 'other' in intact condition states; and 40 m for shrubs, herbs, forbs, grasses and 'other' in thinned, scattered trEHG and DNG condition states. Targeted surveys carried out in winter and spring 2019 used 30 m for all growth forms, in all condition states. It is noted "<i>Where parallel transect lines were not appropriate (for example in areas of non-linear or patchy/sporadic habitat), targeted meander surveys were undertaken, targeting specific areas of mapped habitat.</i>" (page 11-39)</p> <p>The BCAR states: "<i>It is acknowledged that for some targeted species (those species with smaller plant growth forms, such as orchids and herbs), the separation distance between transects of 30 m was greater than that specified by the NSW Guide to Surveying Threatened Plants (OEH, 2016a) and Surveying threatened plants and their habitats (DPIE, 2020c). The NSW Guide to Surveying Threatened Plants requires transects to be separated from between 10 m for the smallest plant growth forms (in open vegetation) and 40 m for the largest growth form plants (in open vegetation).</i>" (page 11-39)</p> <p>These guidelines specify the following transect separation distances, for open and dense vegetation respectively: 40 m and 20 m for trEHG and tall shrubs (> 6 m); 20 m and 10 m for medium shrubs (1-6 m); 15 m and 10 m for sub-shrubs (< 1 m); and 10 m and 5 m for ferns (<1 m), grasses, sedges, rushes, other graminoids, orchids, epiphytes and climbers. Reference is made in these guides to Walker and Hopkins (1990) for definitions of open and dense vegetation, which are based on crown cover. The updated version of Walker and Hopkins (1990) refers to crown cover and foliage cover (Hnatiuk et al. 2009). The BAM plot data ('strucTree' in '26276.MASTER.IMPORT.BAM.Plots.FINAL.20211101.xlsx') shows it is reasonable to use the transect separation distances for open vegetation.</p> <p>For those species listed in Table 11-21 of the BCAR, a comparison is given below for the recommended transect separation widths (OEH 2016 and DPIE 2020) and those used by the proposal (see the table titled 'Comparison of the recommended transect separation distances in open</p>
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vegetation, and those used for the CPCP'). This table shows that, of the 23 species targeted for surveys in winter and spring 2019, the separation distances were:

- one and a half times the recommended distance for ten species (this includes *Epacris purpurascens* var. *purpurascens* and *Pimelea curviflora* var. *curviflora*, which fell into two recommended categories)
- double the recommended distance for seven species and
- triple the recommended distance for five species

One species, *E. benthamii*, was subject to a separation distance that was less than the recommended distance (30 m vs. 40 m).

Similarly, these figures for the 17 species targeted during the initial surveys in 2017 and 2018 are:

- 10 species had separation distances that were the same (only for intact condition states) and double (for thinned, scattered trEHG and DNG condition states) the recommended distance (this includes *Epacris purpurascens* var. *purpurascens* and *Pimelea curviflora* var. *curviflora*, which fell into two recommended categories)
- five species had separation distances that were nearly 1.5 times and more than double the recommended distance
- one species had separation distances that were double and quadruple the recommended distance and
- one species had the recommended distance.

Page 11-41 of the BCAR states:

"Justification for using increased (30 m) transect separation widths in the context of this project includes:

- *The very large size of the assessment area. Increased transect widths ensured greater survey coverage of mapped potential habitat. This was considered appropriate over an assessment area the size of this project*
- *Based on experience in the field for this project and the nature of the habitats being surveyed, the ecologists consider a high level of confidence has been achieved regarding targeted species presence/absence in surveyed areas, and that it likely that any larger populations were detected using transect widths of this size*
- *Species polygons were mapped based on assumed presence incorporating best available ecological data, or expert reports, and surveys were only used to refine species polygons by confirming presence / absence of species or habitats within the areas surveyed*
- *In areas of the species polygons not surveyed, the species presence remained assumed, and the conservative nature of the species polygons ensures that an underestimation of impacts to any species is highly unlikely, and that potential impacts to all potential populations have been adequately assessed under the BAM"*

However,

- the BAM states "6.5.1.3 A species survey must be undertaken in accordance with the OEH threatened species survey guidelines published by the Environment Agency Head including the Threatened species survey guidelines for amphibians and NSW Guide to Surveying Threatened Plants."
- ensuring "greater survey coverage of mapped potential habitat" is not consistent with the objective of targeted threatened plant surveys, which is to "establish, with a high level of confidence, the presence or absence of a threatened plant species at a site and, if the species is present, to collect data to determine the number of individuals or the habitat area. The survey aims to minimise 'false-negatives' (that is when a species is reported as absent from a site when it is actually present)" (page 2, OEH 2016)
- potential impacts to all population sizes of threatened species, not just "larger populations", need to be assessed under the BAM
- under section 6.4.1.21 of the BAM, assuming presence, undertaking a threatened species survey and obtaining an expert report, are mutually exclusive, and so refining (changing the size of) species polygons when presence has been assumed may not be in accordance with the BAM (also see section 6.4.1.30 of the BAM)
- for the most part, the species polygons did not use the habitat constraints listed in the TBDC (see Appendix 6) and they were not prepared according to section 6.4.1.30 of the BAM, and so it seems likely that the species polygons are not as "conservative" as required by the BAM

Page 11-41 of the BCAR also states:

"Furthermore, when the 30 m transect widths are compared to the survey coverage prescribed in the 'Two-phase grid based systematic survey approach for large areas' provided in Surveying threatened plants and their habitats (DPIE, 2020c) the method used covers substantially more area of potential habitat and can therefore be considered to achieve an equivalent or better outcome than that method. This is also the case when compared to surveying for plants that would usually require 10 m separated transects. For a 1 ha square (i.e. the internal square created by 4 x 100 m grid-intercept points), the grid method results in coverage of 1,600 m² (or 16% of 1 ha). When 3 x 10 m

wide search areas are undertaken at 30 m separated transects, across a 100 m x 100 m (1 ha) square, 3,000 m² (30%) is covered. Coverage then increases for each larger growth form as the prescribed transect widths (and resultant search areas) increase."

However, the comparison in terms of coverage achieved to the two-phase grid-based systematic survey approach has issues given:

- a) how different the two methods are, and
- b) targeted surveys require suitable habitat to be sampled at an appropriate intensity (for example see page 3 of DPIE 2020, and page 4 of OEH 2016)

so higher coverage of itself, is not necessarily always positive. In addition, trEHG, shrubs and ground layer species should have been surveyed separately as *Surveying threatened plants and their habitats* (DPIE 2020) states "Survey for multiple target species can occur within the area covered by the 100-square-metre grid, providing they occur in similar habitat, are of the same life form/habit, and have the same optimal survey time as specified by the TBDC" (page 13) but it is not clear if this happened.

Timing and weather for targeted flora surveys

No information has been given on when, exactly, the initial targeted surveys were carried out for each species i.e. Table 11-18 gives a very broad date range for each nominated area (e.g. the range for Wilton is Nov 2017 – Sept 2018) and Table 11-21 states "The initial survey period occurred from November 2017 to November 2018 with targeted species surveys within this period occurring according to applicable species survey timeframes." (page 11-50). When the information from Tables 11-19, 11-20 and 11-21 are considered together, more detailed information is gleaned for the subsequent surveys carried out in winter and spring 2019, largely because the date ranges are much smaller than those listed for the initial surveys. However, information on when, exactly, a survey was carried out for a species, is still lacking. As such, it is not always clear if the surveys have been carried out during the time specified in the TBDC (see the list below for more details).

In addition, page 11-42 states:

"Following analysis by the ecological consulting team and consultation with EHG, it was decided that further surveys were required. The purpose of these surveys was to confirm the presence or absence of species habitat, particularly in locations where access had been limited in the past and refine the species habitat maps based on these surveys (see sections 'Expert reports' and 'Assumed presence using a knowledge-based method' above). For the species polygons prepared by expert report, this process was undertaken in consultation with the experts. ... It was determined that two additional survey periods would be undertaken, a winter 2019 survey and a spring 2019 survey in order to cover the defined survey periods of the included targeted species under the BAM. These surveys included targeted flora searches as well as targeted fauna habitat assessments."

However, for many flora species, some or all of the surveys carried out during these times were outside of the times specified in BioNet. In summary:

- *Dillwynia tenuifolia* was targeted in the winter and spring surveys of 2019 in WSA and GPEC (Table 11-21). The months of survey listed in the TBDC are August, September and October. The TBDC also states "Survey: Use flowers to locate and differentiate from other *Dillwynia* species. However, will flower sporadically at other times of the year in response to rain." Given that the winter surveys for WSA and GPEC finished on the 02 August (Table 11-19), and the spring survey for GPEC started on the 17 October (Table 11-20), there was little opportunity for them to be done at the appropriate time of year (although from the information presented in the BCAR, it cannot be ascertained when, exactly, the surveys were done). The timing of the spring survey for WSA was outside the time specified in the TBDC. An expert report was prepared for this species.
- *Epacris purpurascens* var. *purpurascens* was targeted in the winter and spring surveys of 2019 in Wilton and GMAC (Table 11-21). The months of survey listed in the TBDC are September and October. None of the surveys were carried out during these times (see Tables 11-19 and 11-20). This species was subject to the 'knowledge-based method' (see Appendix 6).
- *Grevillea parviflora* subsp. *parviflora* was targeted in the winter and spring surveys of 2019 in all nominated areas (Table 11-21). The months of survey listed in the TBDC are August, September, October and November. Since the winter surveys finished on 02 August (Table 11-19), there was only a very small opportunity for them to be done within this period. Similarly, the spring survey for Wilton began on 27 November, providing only a small chance for the survey to be done at the appropriate time, while the timing of the spring survey for WSA was outside the specified time (Table 11-20). In short, the winter and spring surveys would have, at best, only captured the very beginning and ending of the flowering period for this species. This species was subject to the 'knowledge-based method' (see Appendix 6).
- *Hibbertia fumana* was targeted in the spring surveys of 2019 in all nominated areas (Table 11-21). The months of survey listed in the TBDC are October, November and December. The TBDC also states "Survey: Use flowers to identify. Flowers sporadically. Survey before 11am after rain in Oct - Dec. May require multiple surveys. Survey Oct, Nov, and Dec unless detected." The surveys met the timing specified in the

			<p>TBDC (Tables 11-19 and 11-20) but no information on rainfall (around the time of surveying) has been provided. An expert report was prepared for this species.</p> <ul style="list-style-type: none"> • <i>Hibbertia puberula</i> was targeted in the spring surveys of 2019 in all nominated areas (Table 11-21). The months of survey listed in the TBDC are October, November and December. The TBDC also states “Survey: Use flowers to locate and identify as species is cryptic. Survey when temperature is below 25 degrEHG (drops petals at higher temperatures). Use local reference site within 10 km and at similar elevation, to determine flowering period. Requires voucher confirmation from RBG, petals not required for voucher confirmation (will drop from sample once picked).” The surveys met the timing specified in the TBDC (Tables 11-19 and 11-20), however, no information on temperature (at the time of survey) and use of a local reference site, have been provided. An expert report was prepared for this species. • <i>Marsdenia viridiflora subsp. viridiflora</i> was targeted in the winter and spring surveys of 2019 for GMAC, GPEC and WSA (Table 11-21). The months of survey listed in the TBDC are November, December, January and February. The winter surveys were not done during these times (Table 11-19). Based on the information presented in the BCAR, it seems likely that most of the spring surveys were carried out at appropriate times (but not all of them) (Table 11-20). This species was subject to the ‘knowledge-based method’ (see Appendix 6). • <i>Maundia triglochinos</i> was targeted in the winter and spring surveys of 2019 in GPEC and WSA (Table 11-21). The months of survey listed in the TBDC are November, December, January, February and March. None of the surveys were carried out during these times (see Tables 11-19 and 11-20). This species was subject to the ‘knowledge-based method’ (see Appendix 6). • <i>Micromyrtus minutiflora</i> was targeted in the winter and spring surveys of 2019 in GPEC and WSA (Table 11-21). The TBDC indicates that survey can be carried out at any time of year, however, it also states “Multiple surveys may be required, as species only sporadically flowers throughout the year. Survey at least 3 times, each at least 1 month apart unless found.” While the surveys met the timing specified in the TBDC, there is no information on how many surveys at each nominated area were carried out, or the dates of each survey. This species was subject to the ‘knowledge-based method’ (see Appendix 6). • <i>Persicaria elatior</i> was targeted in the winter and spring surveys of 2019 for GMAC, GPEC and WSA (Table 11-21). The months of survey listed in the TBDC are December through to, and including, May. The TBDC also states “Survey: May die off above ground off in winter. It can be identified from its leaves without flowers by a skilled botanist.” and lists the habitat constraints as semi-permanent/ephemeral wet areas or within 50 m, swamps or within 50 m, and waterbodies, including wetlands or within 50 m. The winter surveys (Table 11-19), and the spring survey in WSA (Table 11-20), were not done during these times. Some of the spring surveys might have been carried out at appropriate times (Table 11-20). This species was subject to the ‘knowledge-based method’ (see Appendix 6). • <i>Pimelea curviflora var. curviflora</i> was targeted in the winter and spring surveys of 2019 for GPEC (Table 11-21). The months of survey listed in the TBDC are October through to, and including, March. The winter surveys were not done during these times (Table 11-19), but the spring ones were (Table 11-20). This species was subject to the ‘knowledge-based method’ (see Appendix 6). • <i>Pimelea spicata</i> was targeted in the winter and spring surveys of 2019 in all nominated areas (Table 11-21). All months are listed in the TBDC for surveys. The TBDC also states “Survey: Use flowers to locate and identify as species is inconspicuous. Flowering is unpredictable and rain dependent. Survey 4 weeks after at least a 30 mm rainfall event. In drier times plants are often not visible above ground unless soils remain moist. Multiple surveys may be required. Survey at least 3 times, each at least a month apart unless found.” The surveys met the timing specified in the TBDC (Tables 11-19 and 11-20) but no applicable information on rainfall was provided. An expert report was prepared for this species. • <i>Pomaderris brunnea</i> was targeted in the winter and spring surveys of 2019 in Wilton and GMAC (Table 11-21). The months of survey listed in the TBDC are August, September and October. The TBDC also states “Survey: Use mature buds or flowers to detect and identify, as easily confused with similar species.” The spring surveys were not done during the time specified in the TBDC (Table 11-20), and only some of the winter surveys would have been carried out at the appropriate time (Table 11-19). This species was subject to the ‘knowledge-based method’ (see Appendix 6). • <i>Pterostylis saxicola</i> was targeted in the spring surveys of 2019 in all nominated areas (Table 11-21). The month of survey listed in the TBDC is October. The TBDC also states “Survey: Use flowering material required to identify to species. Typically flowering late Sep - early Nov. Will sometimes flower later in Nov.” Only the survey/s carried out in GPEC might have met the timing requirements (Table 11-20), while none of the surveys carried out in the other three nominated areas met them (Table 11-20). An expert report was prepared for this species. • <i>Pultenaea parviflora</i> was targeted in the winter and spring surveys of 2019 in GPEC and WSA (Table 11-21). The months of survey listed in the TBDC are September, October and November. The TBDC also states “Survey: Use flowers and/or fruit to locate and identify. Peak flowering occurring in Sep, fruiting in Oct - Nov and maturing in Dec. Flowers generally appear sometime in Aug.” The winter surveys (Table 11-19), and the spring survey in WSA (Table 11-20), were not done during the time specified in the TBDC. Any spring surveys carried out in GPEC in October and November would have met the timing requirements (but not those carried out in December) (Table 11-20). This species was subject to the ‘knowledge-based method’ (see Appendix 6).
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- *Pultenaea pedunculata* was targeted in the spring surveys of 2019 in all nominated areas (Table 11-21). The months of survey listed in the TBDC are September, October and November. The TBDC also states “Survey: Use peduncles to identify.” The survey in WSA was outside this period (Table 11-20). Some of the surveys carried out in the other three areas might have been done within the specified times (but not all of them) (Table 11-20). This species was subject to the ‘knowledge-based method’ (see Appendix 6).

Species polygons for flora – using targeted surveys to ‘refine’ the polygons under the ‘knowledge-based method’

Under the ‘knowledge-based method’, targeted flora surveys were used to refine the species polygons, as explained on page 11-39 of the BCAR i.e. “Step 4: Integrate results from targeted ground validation surveys (see further detail below) within the nominated areas. The results of the ground validation surveys were used to further refine the species polygons prepared under Step 2 and Step 3. The species polygons were updated by excluding surveyed areas from the polygon where either:

- For fauna and some flora – the specific habitat components required by the species (tree hollows, leaf litter / woody debris, stick nests, undisturbed ground layer etc.) were found to be absent from the area surveyed, or
- For flora – the species was not detected within the area surveyed. It is important to note that where flora species were recorded or where species’ specific habitat requirements were confirmed present, the species polygon was either maintained or increased if the species or their habitat requirements were found to occur in areas not previously mapped (either by the species experts or based on species polygons).”

page 11-39 also states:

“The results of species surveys undertaken earlier in the project (November 2017 to November 2018) were also used to further refine species polygons as outlined above”

However, as discussed above, many of the surveys did not meet the requirements of the BAM in terms of timing, and although justification may be permitted in some instances, much of the BCAR is ambiguous when describing effort, timing and weather conditions and, to a lesser extent, the techniques used. Also, there is no information on which flora species were subject to assessments of specific habitat components and, as previously stated, there are no details on where a polygon was changed, and the information used to change it.

Furthermore, page 11-38 states:

“For some species no data was available that could be used to refine the GIS models and several initial species polygons were based solely on PCT and vegetation condition association, including for Eastern Pygmy-possum and *Epacris purpurascens* var. *purpurascens*. Surveys were used to refine the final species polygons for these species.”

However, for the *Epacris*, none of the surveys carried out were done during the time specified in the TBDC (see the discussion above).

Page 11-38 also states

“Several species were not able to be surveyed to a sufficient confidence level to refine species polygons based on the surveys (see below). These included Green and Golden Bell Frog, *Pimelea spicata* and Large-eared Pied Bat.”

It is noted that *P. spicata* was subject to an expert report.

The preparation of species polygons needs to be done in accordance with Step 5 of section 6.4 of the BAM. Using the knowledge-based method to change the size of species polygons is discussed further at Appendix 6.

Species polygons for flora – using targeted surveys to ‘refine’ the polygons prepared by experts

In relation to ‘Updates to expert report species polygons’ page 11-37 states

“Additional targeted species ground validation surveys were used to ground-truth and refine species polygons, including the expert report species polygons. Areas were excluded from the species polygons where either:

- For fauna and some flora – the specific habitat components or microhabitats required by the species were found not to be present or substantially degraded (in accordance with BAM Section 6.4) within the area surveyed, or
- For flora – the species was not detected (in accordance with BAM Section 6.5) within the area surveyed during the specific survey periods as outlined in BioNet”

However, as discussed above, there is uncertainty around whether the timing of surveys for some species subject to expert reports were in accordance with the TBDC. While it is noted that page 11-37 states that only those surveys which used the “specific survey periods as outlined in BioNet” were used to refine the species polygons in expert reports, there is still ambiguity about the timing and locations of these surveys (see

discussion above). Also, there is no information on which species polygons were modified, although the inference is that they were for *Dillwynia tenuifolia*, *Grevillea juniperina subsp. juniperina*, *Melaleuca deanei*, *Persoonia nutans* and *Pterostylis saxicola*. This is because the ones which were not modified are listed on pages 11-37 - 11-38 as *Acacia pubescens*, *Acacia bynoeana*, *Hibbertia fumana*, *Hibbertia puberula* and *Pimelea spicata*. It seems that the expert reports were not updated since the reports provided with the BCAR were the same as those exhibited with the draft in 2020.

Targeted fauna surveys

For several species, the targeted surveys were not carried out during the period specified in the TBDC and no descriptions have been given for the timing, methods and efforts used for the surveys. It is unclear if best practice methods were used because the methods are not explained in any detail, and no references are given. Regardless, the outcomes of the targeted surveys did not impact further consideration for the species (under step 4 of section 6.4 of the BAM) since they were either assumed present using the 'knowledge-based method' (where the habitat assessments were used to refine the species polygons, see Step 4 of the 'knowledge-based method' on page 11-39 of the BCAR), or they were the subject of an expert report. For completeness though, the limitations of these surveys are discussed below.

While some survey guidelines are referred to on page 11-41, the methods have not been described and no references have been provided for the survey types listed in Tables 11-14 and 11-15. There is some information on effort in Table 11-14 under 'Person hours/trap nights' but other information is lacking, such as, how many recorders (Anabats and Songmeters) were used each night and where were they used. The shape files provided with the final package contain an extremely large amount of data and information but it is not always clear how it relates to the information contained within the BCAR, for example, the targeted surveys carried out in 2018 for birds and mammals used an area based methodology but only the shape files for the 2019 surveys contain polygons (see 'CPCP_WinterSurveyHabAssessments_20210810' and 'CPCP_SpringSurveyHabAssessments_20210810').

No reference has been given for the '2 ha spotlight transect' and the method has not been explained. The inference is that spotlighting occurred within a strip transect that was 2 ha in size, although it is noted that no such transects are shown on a map or in a shape file, with only 'tracks' (or polylines) being shown. Other appropriate information, such as the dimensions of the transect, when the survey started and finished (e.g. 6pm, dusk, dawn), and the wattage of the light source, are also missing.

Southern Myotis and Large-eared Pied Bat were surveyed using Anabats. The '*Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method* (OEH 2018) identifies the 'total effort' and 'minimum number of nights' for both of these species to be 16 trap nights and four nights respectively. From the information in Table 11-14 it is not clear if these requirements were met, although it seems unlikely for the surveys in Wilton because only one person hours/trap nights is listed. For GPEC for Southern Myotis, if only one detector was used for seven nights (as Table 11-14 tends to suggest), then the total effort required was not met; it appears the total effort for WSA was 15 nights. Furthermore, the timing of the survey for Large-eared Pied Bat (mid-August) was well outside the time specified in the TBDC (Nov, Dec, Jan) and the guidelines (mid-Nov - end Jan). Most of the surveys for Southern Myotis were also outside of the times specified. No Anabat outputs (graphs and subsequent analysis) have been provided, and no information provided on who analysed the data.

The number of Songmeters used for each sampling date shown in Table 11-14 is not given, and the locations are not shown on a map. No information is given about how the data was analysed e.g. whether it partly automated or did someone listen to the entire recordings, or whether who analysed it e.g. was the person experienced in identifying frog calls. The number of nights surveyed in GPEC for koala (two), was well below the suggested survey effort of Law et al 2020 for the southern forests of NSW (four to five nights).

One camera trapping survey was completed for Greater Glider and Squirrel Glider in GPEC, over a period of six nights (see Table 11-14). Information on the number of cameras used, and their locations on a map, is not provided. The survey design and effort recommended in *Survey guidelines for Australia's threatened mammals* (Department of Sustainability, Environment, Water, Population and Communities 2011) were not met i.e. cameras should be deployed for at least 14 nights and approximately 10 cameras should be deployed per hectare.

Most of the surveys carried out for the Masked Owl and Powerful Owl in 2018 (Table 11-14) were not done during the time specified in the TBDC. Other surveys which did not meet the requirements of section 6.5.1.2 of the BAM were those for:

- Southern Myotis for all surveys in Wilton, WSA and GPEC (it was not surveyed in GMAC)
- Large-eared Pied Bat for the survey in Wilton (it was only surveyed in Wilton)
- Glossy Black-Cockatoo for Wilton, and for the October survey in GMAC

Report section	BAM Ref	Maps & data	Information	Comments <i>Have the maps/data/information been supplied? Are these adequate? Are the arguments reasonable?</i>
				<ul style="list-style-type: none"> • Masked Owl and Powerful Owl for the vast majority of surveys in all nominated areas (of the 17 entries in Table 11-14, only two were done during the time specified in the TBDC) • Green and Golden Bell Frog for all surveys in GMAC and WSA (it was not surveyed in the other two nominated areas) (noting too, that the surveys carried out in December and January of 2020 and 2021 in GPEC (see 'Part 8: Supporting documents'), were within the appropriate survey times) <p>Species polygons - inconsistent terminology While it is noted that page 11-34 of the BCAR states: <i>"To meet the requirements of the BAM and the ToR, species habitat maps have been prepared for all: NSW-listed candidate SCS within the nominated areas – these species habitat maps represent the 'species polygons' as required by the BAM"</i> a number of additional terms have been used to throughout the document to mean, or relate to, the species polygons for species credit species as used by the BAM i.e. "species mapping", "species habitat maps", "species habitat mapping", "species map" and "habitat polygons". As previously mentioned, using the terminology in the BAM would have prevented confusion during assessment of the report.</p>
		<p>Where use of local data is proposed:</p> <ul style="list-style-type: none"> • identify relevant species • identify aspect of species data • identify source of information for local data • justify use of local data in preference to database values 		NA
		<p>Where expert reports are used in place of targeted survey:</p> <ul style="list-style-type: none"> • identify the relevant species • justify the use of an expert report • indicate and justify the likelihood of presence of the species and information considered in making this assessment • estimate the number of individuals or area of habitat (whichever unit of measurement applies to the species/individual) for the development site or biodiversity stewardship site, including a description of how the estimate was made • identify the expert and provide evidence of their expert credentials 		<p>Expert reports and updated species polygons Page 11-37 explains the general process for updating expert reports (species polygons) following the winter and spring surveys carried out in 2019. However, it seems these changes have not been documented in the expert reports, since all of the reports pre-date those surveys.</p>


Report section	BAM Ref	Maps & data	Information	Comments <i>Have the maps/data/information been supplied? Are these adequate? Are the arguments reasonable?</i>
		Identify potential prescribed biodiversity impacts on threatened species, including: <ul style="list-style-type: none"> • karst, caves, crevices and cliffs • rock • human made structures and non-native vegetation • hydrological processes that sustain and interact with river, streams and wetlands mapped in 4.2.1.3. • wind farms • vehicle strikes • connectivity and movement patterns 		<p>Human made structures Human made structures were not mapped, noting the difficulty in this process across such a large area.</p> <p>Hydrological processes Volumes and seasonal patterns, flow paths and seasonal patterns and baseline water quality data have not been identified. However, areas of potential hydrological impacts were mapped for the nominated areas and summarised in Table 24-23.</p> <p>Also see the next table of this appendix 'BDAR/BCAR Checklist – Stage 2: Impact assessment (biodiversity values)' for comments on prescribed biodiversity impacts.</p>


BDAR/BCAR Checklist – Stage 2: Impact assessment (biodiversity values) (based on Table 26 of BAM)

Report section	BAM Ref	Maps & data	Information	Comment <i>Have the maps/data/information been supplied? Are these adequate? And are the arguments reasonable?</i>
Avoid and minimise impacts	Chapter 8	Table of measures to be implemented before, during and after construction to avoid and minimise the impacts of the project, including action, outcome, timing and responsibility <ul style="list-style-type: none"> • Map of final project footprint, including construction and operation • Maps demonstrating indirect impact zones where applicable 		Impacts (direct, indirect, prescribed and SAll) are assessed in Part 5B (Chapters 22 to 26) of the Cumberland Plain Assessment Report (the BCAR) while measures to avoid and minimise impacts are discussed in Part 4 (Chapters 14 to 16). Maps showing certified and non-certified land (including Avoided for Biodiversity Purposes) are provided in Figure 14-1 to 14-4. These maps show the location of direct impact (certified land). These maps and the associated spatial data can be used by proponents to determine whether impacts have been accounted for as a part of future planning approvals. Location of indirect impacts are not shown on these maps.
		Demonstration of efforts to avoid and minimise impact on biodiversity values (including prescribed impacts) in accordance with Chapter 8.		<p>Summary</p> <p>The BCAR includes measures to avoid and minimise impacts across several sections of the report, making analysis and synopsis of these measures difficult, and presents challenges to ensuring consistency across the report. Better alignment with the requirements of the BAM could have been achieved by breaking sections down into direct, indirect and prescribed impacts and then avoid/ minimise and mitigate.</p> <p>Avoiding and minimising impacts</p> <p>The BCAR outlines the processes used to avoid and minimise impacts on biodiversity values. This process includes strategic planning considerations, to locate nominated areas and transport corridors, and then detailed design, to determine actual footprint and impacts. It is noted that the avoidance process is not complete for transport corridors due to detailed design requirements.</p> <p>The strategic planning considerations, used to locate nominated areas and transport corridors, included consideration of “environmental constraints (p 14-6 of the BCAR) and “biodiversity” (p 14-11 of the BCAR). However, location seems to be driven largely by other, non-environmental considerations and limited information on biodiversity values given available information.</p> <ul style="list-style-type: none"> • The extent to which environmental and biodiversity constraints influenced the location of urban capable land and major transport corridors is not clear. As such, the initial step in the BAM of locating a project to avoid and minimise impacts on native vegetation and habitat (s.8.1.1) may not have been adequately considered. • The BCAR would benefit from more detailed consideration of how biodiversity issues were considered during this strategic planning process. <p>Table 14-1 sets out a prioritisation process for avoidance of impacts. This process ensures impacts are not considered avoided when the land could never be developed. A method to calculate avoidance outcomes, based on this prioritisation, is provided in Section 14.2.4. This process is considered sound and conservative as the BAM (s.8.1.1.3) considers “locating the project in areas where there are no biodiversity values”.</p> <p>However, there is little information detailing the evolution of the design for urban capable land and no summary of the changes from initial designs to final design. The BCAR would benefit from further comparison of versions of the plan to show how impact avoidance has evolved in response to information on biodiversity values.</p> <p>Avoidance criteria for urban capable land were “developed to identify priorities for avoidance of biodiversity values” based on three main categories: TECs and PCTs; threatened species; and, ecological processes (p 14-7 of the BCAR). These criteria were</p>

Report section	BAM Ref	Maps & data	Information	Comment <i>Have the maps/data/information been supplied? Are these adequate? And are the arguments reasonable?</i>
				<p>then applied through a series of workshops to modify the certified areas and avoid impacts to identified biodiversity values. This was followed by stakeholder consultation.</p> <ul style="list-style-type: none"> • The avoidance criteria allow for a process which avoids impacts to threatened species and communities at greatest risk of extinction. This process is considered sound. • However, concerns remain given the BCAR relies heavily on the knowledge-based method for assessing impacts, with limited target survey, and only known habitat for threatened species was prioritised for avoidance. • It is unclear how impacts on connectivity have been included in this avoidance process, if at all. Impacts to connectivity are substantive, particularly in relation to proposed transport corridors and further consideration is required here (see below) <p>As a result of the above, the BCAR makes a commitment to “avoid and minimise impacts to 4,505 ha of high biodiversity area through strategic planning of nominated areas” (p 14-10).</p> <p>The BCAR also makes a number of additional commitments (p14-10 to 14-11) including:</p> <ul style="list-style-type: none"> • retention of large trEHG and retention of Proteaceae shrubs along riparian areas wherever possible • the introduction of planning controls to protect avoided biodiversity values • a Ministerial direction to restrict zoning for avoided land • locating asset protection zones wholly within urban capable land • monitoring of impacts and reconciliation accounting (see below). <p>The BCAR includes these as commitments to avoid and minimise impacts. However, these are really mitigation measures. These measures provide an additional layer of protection and commitment to ensure measures to avoid and minimise impacts can be achieved.</p> <p>It is noted that a State Environmental Planning Policy will apply to land being avoided and will ensure a biodiversity overlay with associated planning provisions applies to this land. It is noted that avoided land will not be rezoned and will be subject to existing zoning. Although planning provisions will apply in the SEPP, this will not prevent these areas from future development. See Appendix 7 for further discussion of planning provisions. In the absence of conservation zoning, the SCA will be guided by the SEPP and s9.1 Direction that applies in the SCA and prevents rezoning incompatible uses.</p> <p>Riparian zones for Strahler order 1 and 2 streams have been included in land to be certified. Exceptions include “where the section of Strahler order 2 waterways contain mapped vegetation, are adjacent to avoided land or contribute to landscape connectivity” (p 14-10 of the BCAR).</p> <p>In line with previous comments from EHG, connectivity values have not always been addressed.</p> <p>Avoidance measures for transport corridors within the nominated areas have been driven as a part of the Strategic Environmental Assessment (SEA) process, and largely focussed on avoidance of reserves, gazetted reserves and Priority Conservation Lands (p 14-12 of the BCAR). For the purposes of the BCAR, “<i>the entire footprint of each major transport corridor is assumed to be impacted</i>” (p 14-13 of the BCAR).</p> <p>Major transport corridors will be subject to further measures to avoid and minimise impacts during the detailed design process, including through application of the avoidance criteria outlined for urban capable land and provision of Clearing Reconciliation Reports to outline how these criteria have been applied and outline final clearing (p 14-14 of the BCAR).</p> <p>While the intent of this commitment is supported, the avoidance outcomes for the OSO at Wianamatta Regional Park, which have been carried out under a different planning process may impact on a variety of high biodiversity values, including CRCIF,</p>

Report section	BAM Ref	Maps & data	Information	Comment <i>Have the maps/data/information been supplied? Are these adequate? And are the arguments reasonable?</i>
				<p>CPW and threatened species habitat. While Commitment 3 is supported as a way to respond to an avoidance issue created by another planning process for the OSO, the avoidance outcomes for the OSO would benefit from further consideration.</p> <p>Adequacy of measures to avoid and minimise impacts within the transport corridors is at present uncertain, due to a “future process of avoidance” proposed for proposed infrastructure. To date, consideration of biodiversity values has been minimal (see above). It is also unclear whether impacts to threatened species been adequately assessed during development of major transport corridors.</p> <p>Similar avoidance issues also apply with application of the knowledge-based method (KBM) for urban capable land. This is discussed in further detail at Appendix 6.</p> <p>As the entire footprint of the major transport corridors have been assumed to be impacted for the purposes of the BCAR, current impact assessments will be considered conservative. Should TfNSW or DPIE seek a “refund” on any offset obligations once Clearing Reconciliation Reports are provided, this will be limited to any financial arrangements for funding offsets between these two parties. Any application to formalise additional avoided areas is highly unlikely, and would require a formal modification to the certification footprint at a future time.</p> <p>The following works/activities are outside the scope of the proposed biodiversity certification under the BC Act:</p> <ul style="list-style-type: none"> • Major transport corridors outside of the nominated areas will be subject to future assessment in accordance with the BC Act and EPBC Act. A number of commitments to avoid and minimise impacts to TECs and threatened species are made. This is considered suitable as impacts will be assessed under a contemporary assessment framework and be subject to future review and approval. • Approval for essential infrastructure under the EPBC Act is being sought through the CPCP. However, these areas will be subject to future assessment under the BC Act. This is considered suitable as impacts will be assessed under a contemporary assessment framework and be subject to future review and approval. <p>Measures to minimise prescribed impacts are summarised in Table 14-6 of the BCAR (p 14-26), while measures to avoid and mitigate prescribed impacts are also discussed later in Chapter 24.6 to 24.12. As per previous comments, information required by the BAM 2017 is spread across the BCAR, and consolidation would be beneficial to the assessment. This is an example of this.</p> <p>It is noted that many of the prescribed impact features (eg. caves and rock) occur outside of urban capable land. Many of the general measures outlined above to avoid impacts to native vegetation and threatened species habitat will avoid and minimise prescribed impacts.</p> <p>It is unclear as to whether any assessment of human-made structures was undertaken. The BCAR (Table 14-6) notes the difficulty in assessing all human-made structures and this is recognised.</p> <p>Measures to avoid and minimise prescribed impacts to water quality, water bodies and hydrological processes that sustain threatened species and communities are considered inadequate. The BCAR provides no detail on what specific measures will be implemented to ensure water quality and quantity objectives of waterways intersecting urban capable land and transport corridors. Further mitigations in relation to prescribed impacts are required to address this matter.</p> <p>Avoidance outcomes for native vegetation are outlined on page 14-27 of the BCAR. This summary indicates that 50.7% of the native vegetation within the nominated areas has been avoided for biodiversity purposes, with a further 16.5% avoided for other purposes. Table 14-7 indicates that high condition PCTs have been avoided in slightly higher proportions (68%), indicating</p>

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				<p>siting of development in poorer condition area. GPEC is the exception, where transport corridors have a disproportionate impact. This section would benefit from a summary of impacts to native vegetation.</p> <p>Avoidance outcomes for threatened ecological communities (TECs) are outlined in Table 14-8. Across most TECs, avoidance is weighted towards higher condition areas (“Intact condition”) across all TECs, indicating practical implementation of the avoidance criteria previously outlined. However, the BCAR highlights higher levels of impact to several TECs, including:</p> <ul style="list-style-type: none"> • Freshwater Wetlands on Coastal Floodplains, where just 0.6% of the extent of the TEC within the nominated areas is avoided, albeit with a small area within the nominated areas; • Cooks River/Castlereagh Ironbark Forest in moderate (thinned) or poor (scattered trees) condition • Cumberland Plain Woodland in moderate (thinned) or poor (scattered trees) condition. <p>Several TECs should be added to this list, including:</p> <ul style="list-style-type: none"> • Shale Gravel Transition Forest, where just 50.5% of Intact condition vegetation is avoided; and • Castlereagh Scribbly Gum Woodland, where no avoidance has been achieved, albeit with a small area within the nominated areas. <p>Impacts to Cumberland Plain Woodland (931.5 ha) and Shale Sandstone Transition Forest (459.8 ha) are likely to be substantial. These impacts represent a significant portion of the remaining extent of these critically endangered Ecological communities within the Sydney Basin. Whilst it is acknowledged that the CPCP has attempted to avoid impacts to higher quality remnants date, the BCAR would have benefited from further consideration of whether all measures to avoid and minimise impacts to these TECs have been implemented.</p> <p>For example, the figure below shows an area of Freshwater Wetlands on Coastal Floodplains (blue outline) located in proximity to Avoided areas (green and blue) where this area could readily be included.</p> 

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				<p>Or the example below, where areas of Shale Gravel Transition Forest in Thinned condition (blue outline) are located in proximity to Avoided areas (green) where this area could readily be included.</p>  <p>Positive avoidance outcomes have been achieved for several TECs, including:</p> <ul style="list-style-type: none"> • Moist Shale Woodland, where nearly 100% avoidance has been achieved • River-flat Eucalypt Forest on Coastal Floodplains, where over 70% of Intact condition vegetation and 45% of Thinned condition vegetation has been avoided, reflecting retention of riparian areas • Shale Sandstone Transition Forest, where 97% of Intact condition vegetation and 80% of Thinned condition vegetation has been avoided • Swamp Oak Floodplain Forest, where 96% of Intact condition vegetation and 74% of Thinned condition vegetation has been avoided. <p>Avoidance outcomes for threatened species are summarised in Table 14-12 of the BCAR. It is noted that habitat contained within the nominated areas is based on the Knowledge Based Method or Expert Report, with limited targeted surveys (for flora) and limited habitat assessments (for fauna). Despite this, of note are the following species with low levels of avoidance (<50%):</p> <ul style="list-style-type: none"> • <i>Allocasuarina glareicola</i>: 46%; • <i>Dillwynia tenuifolia</i>: 36%; • Tall Knotweed (<i>Persicaria elatior</i>): 42%; • Nodding Geebung (<i>Persoonia nutans</i>): 41%; • <i>Pimelea curviflora</i> var. <i>curviflora</i>: 21%; • Spiked Riceflower (<i>Pimelea spicata</i>): 39.7%; • <i>Pultenaea parviflora</i>: 45%; • Green and Golden Bell Frog (<i>Litoria aurea</i>): 45.8%; and • Swift Parrot (<i>Lathamus discolor</i>): 48.2%. <p>Measures to avoid and minimise impacts on connectivity are outlined on pages 14-49 to of the BCAR, focusing on assessment of impacts and summary of avoidance outcomes.</p> <p>This was completed using the BIO Map data. The limitation of this data, in not identifying <u>all</u> significant corridors, is acknowledged but perhaps not addressed. Major impacts to connectivity will arise at a number of locations:</p> <ul style="list-style-type: none"> • The Outer Sydney Orbital (OSO) will have significant impacts on connectivity at Wianamatta Regional Park in GPEC, essentially severing the eastern and western portions of the Park. The park was zoned for conservation as part of the planning process for the redevelopment of Commonwealth land at St Marys, and subsequently established as a regional park.

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				<ul style="list-style-type: none"> • The OSO will impact on the South Creek corridor, at numerous locations in GPEC. This could render this corridor essentially ineffective as a biodiversity corridor. • Urban capable land in GPEC will impact on the upper reaches of Claremont Creek and an unnamed tributary of South Creek. These areas provide connectivity between the Orchard Hills Defence Establishment and avoided areas which will be retained. • The OSO will impact an area immediately east of the Orchard Hills Defence Establishment in GPEC, which provides connectivity between this Defence land and South Creek. • The OSO will impact on an area east of Luddenham Road in WSA, essentially severing connectivity between Cosgroves Creek and avoided (retained) vegetation in this area. • Urban capable land in WSA will impact on biodiversity corridors which link avoided (retained) vegetation along Badgerys Creek with possible offset areas and regional parks. • Urban capable land in GMAC South will impact on a north-south biodiversity corridor linking avoided (retained) vegetation along Ousedale and Elladale Creeks. • Urban capable land in Wilton will impact on a biodiversity corridor in the southern part of the nominated area. It is noted that connectivity will be retained through adjacent vegetation. <p>These are just examples from within WSA and GPEC. Some of these impacts are likely to be substantive, with potential to sever key linkages within the Cumberland Plain. This will have long term impacts to the ability of species and communities to disperse and consequent impacts on viability. Further consideration of impacts to connectivity and measures to retain key linkages within the nominated areas is required, particularly for the transport corridors.</p> <p>Managing indirect impacts</p> <p>Section 15 provides a framework for identifying and managing indirect impacts. It is unclear how this section interlinks with Stage 2 of the BAM.</p> <p>Some comments on this chapter include:</p> <ul style="list-style-type: none"> • The majority of indirect impacts outlined in Table 15-1 will be permanent, not “short term to long-term”. • The identification of whether indirect impacts are relevant to species and communities should not be based on whether they were identified in a “relevant profile, conservation advice or recovery plan (p 15-10 of the BCAR). The judgement of the assessor should be applied here. • Development Control Plans (DCPs) are not legally binding. There is a risk that controls outlined in DCPs may not be implemented in the manner intended. It is further noted that, in areas where state-led DCPs are not proposed, these controls will be in development guidelines. As such, a conservative assessment should be applied in the BCAR. <p>A best practice approach to addressing indirect impacts in the BCAR could have included:</p> <ul style="list-style-type: none"> • Assessment of the nature and extent of indirect impacts, particularly edge effects on retained vegetation, and calculation of an equivalent offset requirement using local data. • Provision of outcomes-based mitigation measures for retained value, such as water quality objectives for threatened frog habitat etc. <p>General measures to mitigate indirect impacts are outlined in Chapter 15.6. Measures outlined include implementation of development controls via DCPs for each nominated area. These will include a common set of controls and specific controls to address species and communities in specific locations. Development controls are outlined in Table 15-4 to 15-13. Many of these are broad, particularly with regard to locations, acknowledging that specific controls are difficult to specify at a strategic</p>

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				<p>planning stage. However, this lack of specificity could lead to ambiguity and therefore issues with effective implementation. These controls would benefit from the following:</p> <ul style="list-style-type: none"> • Table 15-5: Development controls to manage waterways and riparian corridors <ul style="list-style-type: none"> ○ Requires maintenance of second order or higher waterways in a natural state. This appears to conflict with previous statements that first and second order waterways and buffers have been included within certified land (see pg 14-10 of the BCAR). ○ Include additional mitigation for preparation of an erosion and sediment control plan (ESCP) for developments impacting on waterfront land. • Table 15-6: Development controls to manage the spread of infection/disease <ul style="list-style-type: none"> ○ Include reference to Chytrid in this section. ○ The recommendations should be aligned with the risk-based approach outlined in the <i>Hygiene guidelines: Protocols to protect priority biodiversity areas in NSW from Phytophthora cinnamomi, myrtle rust, amphibian chytrid fungus and invasive plants</i> (EHG 2020). This would include provision of mitigation measures to prevent spread of infection and disease. This can be addressed under Commitment 16 of the Plan relating to disease management. • Table 15-7: Development controls to manage the spread of weeds <ul style="list-style-type: none"> ○ The requirement for a weed eradication and management plan should make reference to site specific data, including pre-clearing surveys to document weeds across the site, and species specific control measures and targets, based on the Greater Sydney Regional Strategic Weed Management Plan 2017 – 2022 (LLS 2019). This can be addressed under Commitment 15 of the Plan relating to weed management. • Table 15-8: Development controls to manage the impacts from pest/domestic fauna <ul style="list-style-type: none"> ○ Given the CPCP is likely to increase the number of pest species at the peri-urban interface the plan should include regional measures to manage pest species. This is likely best achieved through additional annual funding to Local Land Services in the Greater Sydney Region to manage pest species, and Commitment 16 (Action 5) includes funding LLS to undertake this work. • Table 15-9: Development controls to manage impacts from altered fire regimes and increased fire risk <ul style="list-style-type: none"> ○ The BCAR makes a commitment to the locating of Asset Protection Zones (APZs) wholly within urban capable land. This requirement is a Commitment of the Plan and should be enforced by Local Councils during the development application process. • Table 15-10: Development controls to manage fauna mortality, fauna displacement and impacts from the introduction of linear barriers <ul style="list-style-type: none"> ○ The BCAR includes measures to minimise impact of traffic on species “adjacent to land with biodiversity values” including traffic calming measures, signposting, speed humps and audible surfacing. Key locations for installation of these measures would provide better certainty on the outcomes that can be achieved. Koala mitigations are proposed under the Plan in relation to this species. See Section 5.4 and Appendix 7 of the Recommendation Report for further discussion of planning provisions including traffic calming measures. ○ Fauna friendly fencing must be a confirmed objective for the OSO, particularly in areas of high connectivity value and thus high potential for impact. • Table 15-11: Development controls to manage fauna disturbance due to noise and light <ul style="list-style-type: none"> ○ The BCAR makes broad commitments to mitigate impacts of noise. Key locations for implementation should be identified, such as installation of noise barriers in key Koala habitat, and need to include measures to mitigate noise at certain times of year in CEMPs. ○ The commitment to avoid light spill should be amended from “<i>should be designed to avoid light spill into adjoining natural areas</i>” to “must be designed to avoid light spill into adjoining natural areas”. • Table 15-12: Development controls to manage inadvertent impacts on adjacent habitat or vegetation

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				<ul style="list-style-type: none"> ○ The measures outlined should include fencing and signage to prevent inadvertent impacts and a requirement for inclusion of these measures in a CEMP. These can be addressed in planning provisions. ● Table 15-13: Development controls to retain key habitat features <ul style="list-style-type: none"> ○ Setbacks for Raptor nests and Grey-headed Flying-fox camps are proposed. Setbacks should also be required for habitat features that have a high and very high sensitivity to gain. This would include features such as Microbat roosts, Owl breeding hollows, etc.
		<p>Assessment of direct impacts unable to be avoided at the development site in accordance with Sections 9.1 and 9.2. The assessment would include but not be limited to: type, frequency, intensity, duration and consequence of impact.</p>		<p>Chapter 23 provides a summary of the direct impacts on native vegetation and species habitat. The CPCP will result in direct impacts to 1,758 ha of native vegetation. Impacts to each PCT and condition are shown in Table 23-1.</p> <p>The CPCP will result in impacts to 1,753.6 ha of TECs. All native vegetation within the urban capable land and major transport corridors aligns with TECs. Impacts to TECs are summarised in Table 23-4.</p> <p>Further exploration of measures to avoid impacts to TECs, largely through the consolidation of remnant patches on the fringes of nominated areas into avoidance zones could have been achieved.</p> <p>The CPCP will impact on habitat for 41 species credit species. Large areas of habitat are predicted to be impacted for a number of species (see p 23-14 of the BCAR):</p> <ul style="list-style-type: none"> ● For the majority of species, presence is assumed based on modelled habitat using the KBM or expert reports. The BCAR states that the method is likely to <i>“greatly overestimate the amount of actual or known habitat for these species impacted by the development”</i> (p 23-14 of the BCAR). Whilst this is possible, the KBM may also miss important or unique habitats. Note previous comments about not using habitat constraints listed in the TBDC. ● 73.7 ha of <i>Hibbertia fumana</i> will be impacted. This critically endangered species, which has only recently been rediscovered, is a SAll species. The majority of these impacts occur within Wilton (28.3 ha) and the major transport corridors (31.5 ha). These areas should be subject to detailed and targeted surveys. ● Count estimates for <i>Epacris purpurascens</i> var. <i>purpurascens</i> were derived from assessment of BioNet records. The median value of 8 plants/ha was selected. This analysis is based on incomplete data and appears to assume that the entire 1 ha area around each record was surveyed. Given records ranged from 1 plant/ha to 27,500 plants/ha this method may grossly underestimate the number of plant/ha and is therefore not suitable. Better approaches (outside of an expert report) would have included: <ul style="list-style-type: none"> ○ Use of a reference site to measure density. ○ Use of a species appropriate density multiplier based on knowledge of the species/genus and any relevant data. ● Given both Little Eagle and Square-tailed Kite can use grassland areas for foraging, it is unclear on what basis these areas were excluded for the species credit calculations if within identified breeding habitat. This should be confirmed. If these are grasslands that have a vegetation integrity score of <15 then under BAM 2017 these impacts do not require offsetting. ● It is unclear why the stick nest observed in GPEC and the areas of grassland within the buffer, have been excluded from the species credit calculations, particularly given the nest is <i>“associated with grassed paddocks commensurate with the habitat mapped as potential forage habitat by the expert in Wilton and GMAC”</i> (BCAR p23-14).
		<p>Assessment of indirect impacts beyond the subject site, in accordance with 9.1.4.2, including nature, extent and duration</p>		<p>See above.</p>
		<p>Assessment of impacts on prescribed biodiversity values, in accordance with 9.2.1.1-9.2.1.9</p>		<p>Chapter 24 provides a summary of the prescribed impacts arising from the CPCP. Chapter 24.3 outlines the approach taken to the assessment for prescribed impacts. The overall assessment approach appears sound, noting this depends on how associations and presence/absence have been assessed in Step 1 and the veracity of this step.</p>

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				<p>Table 24-1 outlines the potential direct and indirect impacts associated with each type of prescribed impact.</p> <ul style="list-style-type: none"> • Removal of habitat can cause both a direct impacts as well as prescribed impact to connectivity. This is not included in this table. • Potential increase in weed species should be included as a possible indirect impact for waterbodies/hydrological process. Increases in weeds could render some aquatic environments unsuitable for some species. • Vehicle strike can impact on population fecundity, particular at the interface of some roads, having broader, indirect impacts to some populations. <p>Chapter 24.5 and Table 24-2 outline the presence/absence of relevant species with each prescribed impact type. It is unclear why some records have been excluded from some impact types. For example, there are records of <i>Dillwynia tenuifolia</i> in areas mapped as non-native vegetation, but this species is not included within this impact type. No birds are included as at risk of vehicle strike, yet birds can be impacted by vehicle strike.</p> <ul style="list-style-type: none"> • Further clarification on how each species was considered to be impacted by each prescribed impact type should have been provided. <p>Chapters 24.6 to 24.12 discuss each prescribed impact type in detail, including the nature, extent and duration of prescribed impacts, as required by Section 9.2 of the BAM 2017.</p> <ul style="list-style-type: none"> • Removal of bushrock in areas adjacent to development, as noted in Table 24-6, may be exacerbated by, particularly in areas such as GMAC where records of species such as Broad-headed Snake occur. Without these habitat species such as the Broad-headed Snake will not persist. Thus, it is unclear how the risk of residual impact is considered unlikely. • As outlined above, it is challenging to assess all human-made structures across the nominated areas. Mitigation measures outlined to manage this prescribed impact are considered generally suitable and easily implemented at the construction stage. <ul style="list-style-type: none"> ○ A commitment to stage removal of human made structures to allow relocation of microbats should be included. Human made structures should not be removed during torpor periods for microbats. ○ A commitment to a relocation strategy for the Green and Golden Bell Frog, which takes into account risk of Chytrid infection, should be included. <p>To ensure success it is important that Council's are aware of and enforce these requirements.</p> <ul style="list-style-type: none"> • Impacts to habitat provided by non-native vegetation for <i>Hibbertia fumana</i> require further consideration. This critically endangered and SAI species has recently been rediscovered and is know from a limited number of locations. Detailed and targeted surveys of habitat should be undertaken prior to clearance and seed collection undertaken before removal of any plants, with potential for translocation considered and discussed with EHG and the Saving our Species program. • As outlined above, impacts to connectivity are inadequately addressed in the CPCP. EHG does not agree that the commitment made to manage connectivity are adequate to address these issues. Impacts will be substantive. The BCAR identifies potential for residual risks: <ul style="list-style-type: none"> ○ arising from the OSO; ○ impacts to the Koala; and ○ impacts to Cumberland Plain Land Snail. • Loss of connectivity and fragmentation of habitat will impact on a much broader range of species and communities than this and has potential to include the majority of species and communities listed in Table 24-16. At this stage, the existing Commitments are considered inadequate to prevent severe impacts on connectivity in some locations, as discussed above. Additional mitigations to address this matter should be required. It is acknowledged that the assessment of prescribed impacts to waterbodies and hydrological processes over such a large area is difficult. However, the approach taken, of assessing potential impacts based on calculating the "total area of habitat for each group of ecological values (high/low risk species or TECs) within each nominated area" (p24-44) is concerning. Localised impacts based on changes in the direction and intensity of run-off will be important. This section would have benefitted

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				<p>from hydrological modelling showing potential changes in hydrology across the nominated areas pre- and post-development. This could then have informed the impact assessment.</p> <ul style="list-style-type: none"> It is unclear how the seven species identified in Section 24.12.1 as being at risk of vehicle strike have been identified. There are a number of species which could be significantly impacted by vehicle strike that are not included (eg Owls where loss of a single breeding adult can impact local viability). The BCAR uses a lack of records of species in the nominated areas to justify a low risk of impact. However, the BCAR has relied on expert reports and the KBM to model species habitat. This lack of survey should not be used to justify a lack of impacts. If the KBM assumes the distribution of the species in these areas then the BCAR should assume presence and assess impacts accordingly. The impact assessment uses terms like <i>"The likelihood of vehicle strikes on the important population of the species near Wilton is difficult to predict . . ."</i> but then concludes that the risk is low for most species with the justification focusing on lack of records and restricted habitat. Habitat models for species such as the Eastern Pygmy-possum and Spotted-tail Quoll do not indicate this is the case. Based on the above, the risk of residual impact should consider the items listed above.
		<p>Identification of measures to mitigate or manage impacts in accordance with the guidelines at 9.3.2. and 9.3.3, including:</p> <ul style="list-style-type: none"> techniques, timing, frequency and responsibility identify measures for which there is risk of failure evaluate the risk and consequence of any residual impacts document any adaptive management strategy proposed 		See previous sections.
		<p>Identification of measures for mitigating impacts related to the displacement of resident fauna, in accordance with 9.3.2.2</p>		No specific assessment of mitigation measures to address displacement of resident fauna is provided.
		<p>Identification of measures for mitigating indirect impacts on native vegetation and habitat, see 9.3.2.3</p>		See previous sections.
		<p>Identification of measures for mitigating prescribed biodiversity impacts, in accordance with 9.3.3.1</p>		See previous sections.
		<p>For major projects: details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (Section 9.4).</p>		<p>This section would have benefitted from further information.</p> <p>Adaptive management is addressed in Chapter 16 of the BCAR.</p> <p>Uncertainty around indirect impacts has not been adequately addressed, as outlined previously.</p> <p>Uncertainty around prescribed impacts, particularly related to connectivity, hydrology and vehicle strike, have not been adequately addressed. There are no measures provided to assess some of the assumptions made in the BCAR. See earlier discussion of prescribed impacts.</p> <p>One of the key uncertainties in the BCAR is the lack of survey and reliance on expert reports and the KBM to assessment impacts to threatened species. The BCAR states that this is addressed through a <i>"precautionary approach"</i> whereby <i>"habitat mapping for threatened species generally overestimates the amount of habitat in the Plan Area which means the impacts that are assessed are likely to be larger than what will ultimately occur on the ground"</i> (p. 16-4). Whilst this is likely correct, it also potentially insufficiently addresses key habitats, key impacts and then misinforms measures to avoid, minimise and mitigate impacts.</p> <p>The key measure outlined in the BCAR to address uncertainty is the evaluation program. Whilst this is acknowledged as important to assessing aspects of the plan, it does not fully address the uncertainty inherent in the assessment, particularly for key areas outlined above.</p>
Impact summary	Chapter 10	<p>Map showing the location of serious and irreversible impacts</p> <ul style="list-style-type: none"> Map of impacts requiring offset Map of impacts not requiring offset 		<p>Impacts requiring offsets and not requiring offsets are shown in Figure 26-1 (vegetation) and 26-2 (species).</p> <p>Areas not requiring assessment are identified in the CPA under the following categories:</p>

Report section	BAM Ref	Maps & data	Information	Comment <i>Have the maps/data/information been supplied? Are these adequate? And are the arguments reasonable?</i>
		<ul style="list-style-type: none"> Map of areas not requiring assessment 		<ul style="list-style-type: none"> Non-certified land Excluded land
		<p>Identification and an assessment of the impacts which are potential serious and irreversible impacts, in accordance with Subsections 10.2.2 for impacts on CEECs and 10.2.3 for threatened species</p>		<p>Overall approach SAll is assessed in Chapter 25 of the CPCP. This chapter a) assesses all species against the relevant criteria in Section 10.2 of the BAM to identify any species or communities at risk of SAll that are not listed and have potential to become SAll entities; and b) provides an assessment of identified SAll entities against the criteria listed in Section 10.2 of the BAM 2017.</p> <ul style="list-style-type: none"> It is good to see the proponent taking the additional step of looking at whether species and communities within the nominated areas could become SAll entities. However, no justification is provided in Table 25-3 for those species which are not listed as SAll species against Section 10.2 of the BAM, with Table 25-3 making a blanket statement of “No – unlikely to trigger SAll principles”. The CPCP would benefit from further explanation around these issues. Further species considered potential SAll entities have been considered by EHG as discussed at Section 5.5. <p>Regarding the additional impact assessment provisions for ecological communities (in this case CRCIF, CPW and SSTF):</p> <ul style="list-style-type: none"> The avoidance of indirect impacts has not been discussed (s.10.2.2.1(a)) (although it is not clear if the avoidance of indirect impacts can be planned for at this scale) The area and condition of vegetation to be indirectly impacted was not addressed (s.10.2.2.1(b)). Impacts on characteristic and functionally important species were not addressed (s.10.2.2.1(g)(ii)) (although there were implications for species generally, from the information given in this section of the report). Impacts to groundwater were not addressed (this should have been done under section 10.2.2.1(g)(i) for all three communities). <p>The BCAR assessed the following species at risk of SAll on the current list of species and threatened ecological communities that are at risk of a serious and irreversible impact:</p> <ul style="list-style-type: none"> <i>Allocasuarina glareicola</i> Large-eared Pied Bat (<i>Chalinobolus dwyeri</i>) <i>Hibbertia fumana</i> Swift Parrot (<i>Lathamus discolor</i>) <i>Micromyrtus minutiflora</i> <i>Melaleuca deanei</i> <p>This assessment identified five additional species, in addition to those species and communities already listed, which include:</p> <ul style="list-style-type: none"> Green & Golden Bell Frog (<i>Litoria aurea</i>) Red-crowned Toadlet (<i>Pseudophryne australis</i>) Raptors (White-bellied Sea-Eagle (<i>Haliaeetus leucogaster</i>), Little Eagle (<i>Hieraetus morphnoides</i>) and Square-tailed Kite (<i>Lophoictinia isura</i>)) <p>See Appendix 5 for a detailed assessment of SAll, which addresses sections 10.2.1.4, 10.2.2 and 10.2.3 of the BAM.</p>
		<p>Identification of impacts requiring offset in accordance with Section 10.3.</p>		<p>Further information required.</p> <p>Impacts requiring offsets are identified in Section 26.1 of the BCAR. Table 26-1 identifies the vegetation zones requiring offsets. The vegetation zones requiring offset in this table match spatial data provided. Tables 26-5 to 26-8 summarise the ecosystem credits required per nominated area (with major transport corridors included).</p> <ul style="list-style-type: none"> Direct impacts on TECs are outlined in Table 23-4 with a breakdown by nominated area and the major transport corridors. Comparison of impact areas in Tables 26-5 to 26-8 to Table 23-4 are difficult as Tables 26-5 to 26-8 do not break out major transport corridors.

Report section	BAM Ref	Maps & data	Information	Comment <i>Have the maps/data/information been supplied? Are these adequate? And are the arguments reasonable?</i>
				<ul style="list-style-type: none"> Based on current information, it is difficult to separate impacts required by the major transport corridors separate to urban capable land. The BCAR would benefit from these impacts being provided separately. <p>Table 26-2 identifies the species requiring offsets. The species requiring offset in this table match spatial data provided. Tables 26-9 to 26-12 summarise the species credits required per nominated area (with major transport corridors included).</p> <ul style="list-style-type: none"> Direct impacts on species are outlined in Table 23-5 with a breakdown by nominated area and the major transport corridors. Comparison of impact areas in Tables 26-9 to 26-12 to Table 23-5 are difficult as Tables 26-9 to 26-12 do not break out major transport corridors. A credit analysis of impacts required by the major transport corridors separate to urban capable land have not been provided, although an area breakdown of the urban capable and transport corridor land was provided. This makes detailed analysis more difficult. <p>No offsets are proposed for indirect impacts in the Plan's Commitments.</p> <p>Whether offsets are required for prescribed impacts is assessed in Section 26.1.3 of the BCAR. This section provides justification for why offset are not required for any prescribed impact.</p> <ul style="list-style-type: none"> As outlined previously, impacts to habitat provided by non-native vegetation for <i>Hibbertia fumana</i> require further consideration. This may include offsets for non-native vegetation, if the species is recorded in these areas, given the critically endangered status of this species. As outlined, impacts to connectivity are considered highly significant. Additional measures to address impacts to connectivity should be considered.
		Identification of impacts not requiring offset in accordance with Paragraph 10.3.2.2		<p>The BCAR would have been improved by minor amendments.</p> <p>Impacts not requiring offsets are identified in Section 26.2 of the BCAR and include Non-offsettable grassland. The vegetation zones that align with these non-offsettable grasslands, and thus not requiring offsets, are identified in Table 26-2 in Section 26.1.1. Note, no area calculations are provided.</p> <ul style="list-style-type: none"> The table would have been better placed at Section 26.2 and have included area calculations. <p>As per Table 23-2, the CPCP will result in impacts to 8,043 ha of grasslands that have a vegetation integrity score of <15 and thus do not require offsets. This is in accordance with Section 10.3.1.1 of the BAM 2017 and does not require offsets in accordance with Section 10.3.2.2 of the BAM 2017.</p>
		Identification of areas not requiring assessment in accordance with Section 10.4.		<p>Suitable.</p> <p>Impacts not requiring offsets are identified in Section 26.2 of the BCAR and include:</p> <ul style="list-style-type: none"> Urban native/exotic vegetation Cleared land and existing building <p>This land is considered land without native vegetation in accordance with Section 10.4 of the BAM 2017.</p>
Impact summary	Sub-sections 11.2.3 and 11.2.4	<ul style="list-style-type: none"> Table of PCTs requiring offset and the number of ecosystem credits required Table of threatened species requiring offset and the number of species credits required 		<p>Suitable.</p> <p>Tables 26-5 to 26-8 summarise the ecosystem credits required per nominated area (with major transport corridors included). Tables 26-9 to 26-12 summarise the species credits required per nominated area (with major transport corridors included).</p>
		<p>Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:</p> <ul style="list-style-type: none"> future vegetation integrity score for each vegetation zone at the development site (Equations 17 and 18 in Appendix 6) change in vegetation integrity score (Subsection 9.1.3) 		<p>Future vegetation integrity scores are shown in Table 23-3 and Tables 26-5 to 26-8 for each nominated area. The BCAR has assumed that the future vegetation integrity score for all vegetation zones within the major transport corridors and urban capable land will be 0. This is considered consistent with the future development within these areas.</p> <p>Tables 26-5 to 26-8 summarise the ecosystem credits required per nominated area (with major transport corridors included). Tables 26-9 to 26-12 summarise the species credits required per nominated area (with major transport corridors included).</p>

Report section	BAM Ref	Maps & data	Information	Comment <i>Have the maps/data/information been supplied? Are these adequate? And are the arguments reasonable?</i>
		<ul style="list-style-type: none"> • number of required ecosystem credits for the impact of development on each vegetation zone at a development site (Subsection 11.2.3) • number of required species credits for each threatened species that is impacted on by development (Subsection 11.2.4). 		No assessment of credit requirements for indirect or prescribed impacts is provided. In many circumstances these impacts will be significant.
Biodiversity credit report	Sub-section 11.3	Table of credit class and matching credit profile		Not provided.
		Credit classes for ecosystem credits and species credits at the development site.		Not provided.

The species that should have been further assessed for certain nominated areas under Step 3 and/or Step 4 of section 6.4 of the BAM, and the reasons why

Species	Justification for exclusion from the BCAR (DOC21/942262)	Reasons why the species should have been further assessed*	Should have been further assessed where?
<p><i>Callistemon linearifolius</i> Netted Bottle Brush</p>	<p>The justification included "... <i>The species was removed as a candidate species in all nominated areas because urban capable lands are outside the geographic extent of the species.</i>" (page A-9 in Part 3: Attachments)</p>	<ul style="list-style-type: none"> The TBDC indicates that the geographic extent includes Wilton and GMAC i.e. it states "Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. ..." The species is associated with PCTs 835 and 1395, which will be directly impacted in Wilton and GMAC (see Table 23-1 in the BCAR). 	<p>Wilton GMAC</p>
<p><i>Cynanchum elegans</i> White-flowered Wax Plant</p>	<p>The justification included "... <i>Within the nominated areas, the species is most likely to occur along streamlines and steeper shale lands. No records of the species occur in the nominated areas. The species was removed as a candidate species in all nominated areas because:</i></p> <ul style="list-style-type: none"> <i>Microhabitats are considered substantially degraded within the nominated areas</i> <i>It has never been recorded in the nominated areas (based on BioNet as-held data export)</i> <p><i>The urban capable lands are generally avoiding streamlines and steeper shale lands containing native vegetation where this species is most likely to occur. No dry rainforest vegetation occurs within urban capable land.</i>" (page A-13 in Part 3: Attachments)</p>	<ul style="list-style-type: none"> No reference has been given for this statement in the BCAR "<i>the species is most likely to occur along streamlines and steeper shale lands</i>" and this information is not in the TBDC. Instead, in relation to habitat the TBDC states "<i>The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree Leptospermum laevigatum – Coastal Banksia Banksia integrifolia subsp. integrifolia coastal scrub; Forest Red Gum Eucalyptus tereticornis aligned open forest and woodland; Spotted Gum Corymbia maculata aligned open forest and woodland; and Bracelet Honey Myrtle Melaleuca armillaris scrub to open scrub.</i>" It is not clear in the BCAR how section 6.4.1.17(a) of the BAM (which enables an assessor to determine that a candidate species credit species is unlikely to occur on the subject land after carrying out a field assessment of microhabitats) was applied for this species. This reason "<i>It has never been recorded in the nominated areas (based on BioNet as-held data export)</i>" is inadequate because BioNet records do not necessarily reflect a species occurrence across its entire range. Furthermore, this reason is not in accordance with the BAM (see sections 6.4.1.18, 6.4.1.12, 6.4.1.14 and 6.4.1.17, which stipulate when species can be excluded from further assessment). This species is associated with PCTs 835, 849 and 850, with PCT 835 proposed to be directly impacted in GMAC, WSA and GPEC, and PCTs 849 and 850 proposed to be directly impacted in all nominated areas (see Table 23-1). Commitment 4.1 (see Sub-Plan A) and page A-5 in 'Part 2: Attachments' of the BCAR refers to a known flora population for this species within the OSO and M7/Ropes Crossing Link Road corridors, where "<i>Known flora populations are mapped in the Cumberland Plain Assessment Report and will require confirmation of presence through survey or assessment</i>". The location of this known population is not shown in the "Bionet_PUBLIC_Thrflora_denatured", 'CPCP_Thr_Flora_sightings_20210810' or 'PUBLIC_ProjectSpecies_denatured' shape files, although the information on page 14-14 of the BCAR indicates it is likely located outside of the nominated areas (but immediately adjacent to the northern boundary of GPEC). A recent search of BioNet Atlas does not show records for this species in this area. It is noted that this species was assessed under the EPBC Act (e.g. see Table 11-22) and an offset target of two locations is proposed under the Strategic Environmental Assessment (e.g. see page 8-12 of the BCAR). 	<p>Wilton GMAC WSA GPEC</p>
<p><i>Persoonia hirsuta</i> Hairy Geebung</p>	<p>The justification included "...<i>Habitat comprises sandstone and sandstone-derived soils in dry sclerophyll open forest, woodland, and heath (OEH, 2017f). There are no records of the species within the Plan Area. The sole record within the Plan Area is a specimen that is misplaced and should correctly be located in 'Long Point, Macquarie Fields', approx. 3 km south-east of the mapped location. The species was removed as a candidate species in all nominated areas because:</i></p> <ul style="list-style-type: none"> <i>Species' microhabitats considered absent from urban capable lands</i> <i>Nominated areas occur outside species' known geographic extent</i>" (page A-44 in Part 3: Attachments) 	<ul style="list-style-type: none"> The TBDC states "<i>Persoonia hirsuta has a scattered distribution around Sydney. The species is distributed from Singleton in the north, along the east coast to Hilltop in the south west, Dombarton in the south east and the Blue Mountains to the west.</i>" As such, the known distribution for this species does encompass the nominated areas. Furthermore, the Accountable Officer for this species has stated "<i>I certainly agree that Persoonia hisuta (sic) in the Wilton and Appin areas are possible</i>" (DOC22/3576-3). It is not clear in the BCAR how section 6.4.1.17(a) of the BAM (which enables an assessor to determine that a candidate species credit species is unlikely to occur on the subject land after carrying out a field assessment of microhabitats) was applied for this species. 	<p>Wilton GMAC WSA? GPEC?</p>

		<ul style="list-style-type: none"> This species is associated with PCTs 835 and 1395, which are proposed to be directly impacted in GMAC, WSA and GPEC (for 835), and Wilton and GMAC (for 1395). Regarding the statement in the BCAR that “<i>There are no records of the species within the Plan Area</i>” (page A-44 in Part 3: Attachments), a lack of records is not sufficient justification for excluding a species from further assessment. 	
<p><i>Phascolarctos cinereus</i> Koala</p>	<p>The justification included “<i>The TBDC says the following in relation to important habitat for Koalas: “Important’ habitat (however this is not a mapped important habitat area) is defined by the density of Koalas and quality of habitat determined by on-site survey - contact OEH for more information”. ... The species was removed in WSA and GPEC because of limited records and a lack of important habitat within these nominated areas. See Section A.2 below this table for a detailed discussion about the justification for excluding koalas from WSA and GPEC.</i>” (page A-48 in Part 3: Attachments).</p>	<ul style="list-style-type: none"> When the agency is contacted for more information about ‘important’ habitat, the following forms part of the standard response “<i>Please note that while koalas are currently listed as a dual credit species in the TBDC, they should be treated as a species credit species. ... You are required to confirm the presence/absence of koalas within the potential koala habitat on the subject land. Where targeted survey is used, include justification for your level of survey effort in the BAR. Please note that scratch marks are not considered to be reliable indicators of koala presence. ... Please note, this represents the most recent advice, updated following the release in November 2020 of the State Environmental Planning Policy (Koala Habitat Protection) 2020. We are currently developing a BAM survey guide for the koala and as such this advice may change. You can contact us again before finalising the BAR or if you require further guidance specific to your site.</i>” (DOC22/233815) The number of records does not determine if there is potential koala habitat or the presence/absence of the species. EHG does not support the method used to map koala habitat in WSA and GPEC. The method used for Wilton and GMAC should have also been used in these two nominated areas but without the size thresholds for ‘core’ habitat and HQH, as these were specific to the Wollondilly and Campbelltown LGAs. 	<p>WSA GPEC</p>
<p><i>Pilularia novae-hollandiae</i> Austral Pillwort</p>	<p>The justification included “<i>...Despite the high occurrence and coverage of botanical surveys across the Cumberland subregion the species has not been recorded since a single record from 1966 in Doonside. It is expected that more recent records would exist if the species natural range included the Cumberland subregion. Potential habitat for the species (high order Strahler streams) within the nominated areas is likely to only occur in areas outside urban capable lands, with all mapped creek lines above Strahler order one, being excluded from the footprint. The species has been removed as a candidate in all nominated areas because:</i></p> <ul style="list-style-type: none"> <i>Species’ microhabitats considered absent from urban capable lands</i> <i>Species considered extinct within the geographic extent of the nominated areas</i>” (page A-49 in Part 3: Attachments) 	<ul style="list-style-type: none"> No reference has been given for this statement in the BCAR “<i>Potential habitat for the species (high order Strahler streams) ...</i>” and this information is not in the TBDC. Regarding the statement “<i>Despite the high occurrence and coverage of botanical surveys across the Cumberland subregion the species has not been recorded since a single record from 1966 in Doonside. It is expected that more recent records would exist if the species natural range included the Cumberland subregion.</i>” (page A-49 in Part 3: Attachments) it is noted that <ul style="list-style-type: none"> two of the threats identified in the TBDC are “<i>easily overlooked and difficult to survey for because of seasonal constraints - survey for this species would need to be done when soils are moist but not inundated</i>” and “<i>still only two known extant population locations recorded for this species, but likely to be more common and widespread</i>” and the TBDC also states “<i>Survey Oct - Dec in drying mud after inundation. Strongly recommend expert report to discount presence or absence if conditions do not meet requirements.</i>” Regarding the statement “<i>Species considered extinct within the geographic extent of the nominated areas</i>” (page A-49 in Part 3: Attachments) the Accountable Officer for this species has stated (DOC22/3576-2) “<i>I have no doubt the species could occur in western Sydney on clays derived from Wianamatta shales</i>”. This species is associated with PCTs 835 and 1800, with the former proposed to be directly impacted in GMAC, WSA and GPEC, and the latter in WSA and GPEC (Table 23-1 in the BCAR). It is noted that page 14-2 of the BCAR states that avoided lands include “<i>Land that is mapped as a riparian corridor associated with a Strahler order 3 stream or above (or Strahler order 2 streams with mapped vegetation, adjacent to avoided lands or that contribute to landscape connectivity).</i>” 	<p>GMAC WSA GPEC</p>
<p><i>Pimelea curviflora</i> var. <i>curviflora</i></p>	<p>The justification included “<i>...Habitat comprises shale, sandstone, and lateritic soils, on ridgetops and upper slopes in woodlands (OEH, 2019af). Records (dated 2000) occur in only two locations in the vicinity of the nominated areas. Despite extensive surveys at Bingara Gorge in suitable habitat, the species was not recorded, suggesting that the two records in the vicinity of the nominated areas may be misapplications for P. curviflora var. sericea which is recorded in that area. The species was retained as a candidate species in GPEC because records or suitable habitat potentially occur in the vicinity of urban capable lands. The species was</i></p>	<ul style="list-style-type: none"> Regarding the statement “<i>Records (dated 2000) occur in only two locations in the vicinity of the nominated areas. Despite extensive surveys at Bingara Gorge in suitable habitat, the species was not recorded, suggesting that the two records in the vicinity of the nominated areas may be misapplications for P. curviflora var. sericea which is recorded in that area.</i>” (page A-50 in Part 3: Attachments), it is noted that these two records were made by highly experienced botanists/ecologists and it is unlikely they misidentified the species (DOC22/3576-1). Furthermore, details of the ‘extensive surveys’ done at Bingara Gorge have not been provided. 	<p>Wilton GMAC WSA</p>

	removed in Wilton, GMAC and WSA because the nominated areas occur outside species' known geographic extent." (page A-50 in Part 3: Attachments)	<ul style="list-style-type: none"> Regarding the statement "The species was removed in Wilton, GMAC and WSA because the nominated areas occur outside species' known geographic extent." (page A-50 in Part 3: Attachments), the Accountable Officer for this species has stated "Wilton, GMAC and WSA all occur within the species' known distribution area in the Sydney part of its distribution" (DOC22/3576-1). This species is associated with PCTs 724, 849 and 1395, with PCT 724 proposed to be directly impacted in WSA and GPEC, PCT 849 in all nominated areas, and PCT 1395 in Wilton and GMAC (Table 23-1 in the BCAR). 	
Pomaderris brunnea Brown Pomaderris	<p>The justification included "...The species was retained as a candidate species in Wilton and GMAC because records or suitable habitat occurs in the vicinity of urban capable lands. The species was removed in WSA and GPEC because:</p> <ul style="list-style-type: none"> The nominated areas occur outside species' known geographic extent Of a lack of records and suitable clay and alluvial soils within urban capable lands" (page A-51 in Part 3: Attachments) 	<ul style="list-style-type: none"> In the TBDC, the distribution for this species is described as "a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands and in far eastern Gippsland in Victoria." As such, WSA and GPEC do occur within its known distribution. This species is associated with PCT 835, which is proposed to be directly impact in WSA and GPEC. This PCT has alluvial soils derived from shale (see Scientific Description in Bionet Vegetation Classification). Therefore, there is suitable clay and alluvial soils within the urban capable lands of these nominated areas. Regarding its habitat, the TBDC also states <ul style="list-style-type: none"> "Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines" and "The species has been found in association with Eucalyptus amplifolia, Angophora floribunda, Acacia parramattensis, Bursaria spinosa and Kunzea ambigua" As previously mentioned, a lack of records is not sufficient justification for excluding a species from further assessment. 	WSA GPEC
Prasophyllum fuscum Slaty Leek Orchid	NA	<ul style="list-style-type: none"> This species is not known or predicted to occur in the Cumberland IBRA subregion (see species profile in the TBDC). It is predicted to occur in the Sydney Cataract subregion, with Wilton and GMAC having a very small percentage of their areas in this subregion (see Table 18-1 of the BCAR). Previous OEH comments include (DOC18/346547-2) <ul style="list-style-type: none"> "Records just outside of GA to the south-east of Wilton GA just off Picton Rd, near intersection of Macarthur rd." and "Make candidate species for Wilton GA given its limited knowledge of species ecology and distribution in southern Sydney and record close to Wilton GA. SoS has identified a management site in this area. Also, cryptic species." This species is associated with PCT 1395, which is proposed to be directly impacted in Wilton and GMAC (see Table 23-1 in the BCAR). 	Wilton GMAC?
Zannichellia palustris	The justification included "Zannichellia palustris is a submerged aquatic plant. In NSW it is only known from the lower Hunter region and Sydney Olympic Park. It occurs in fresh or slightly saline stationary or slowly flowing water (OEH, 2017m). The species was removed as a candidate species in WSA because urban capable land is outside the geographic extent of the species." (page A-58 in Part 3: Attachments)	<ul style="list-style-type: none"> Regarding the statement "The species was removed as a candidate species in WSA because urban capable land is outside the geographic extent of the species.", the TBDC identifies one threat as "Insufficient understanding of distribution." This species is associated with PCT 781, which is proposed to be directly impacted in WSA and GPEC (see Table 23-1 in the BCAR). 	WSA GPEC

Comparison of the recommended transect separation distances in open vegetation, and those used for the CPCP

Species	Life form and height	Recommended separation distance in open vegetation*	Separation distances (and associated condition states) that were used in the initial surveys carried out in 2017 and 2018**	Separation distances used for the winter and spring 2019 surveys
<i>Acacia bynoeana</i>	shrub to 0.5 m	15 m	<ul style="list-style-type: none"> • 20 m (intact) • 40 m (thinned, scattered trees and DNG) 	30 m
<i>Acacia pubescens</i>	shrub 1–5 m	20 m	<ul style="list-style-type: none"> • 20 m (intact) • 40 m (thinned, scattered trees and DNG) 	30 m
<i>Allocasuarina glareicola</i>	shrub 1–2 m	20 m	<ul style="list-style-type: none"> • 20 m (intact) • 40 m (thinned, scattered trees and DNG) 	30 m
<i>Dillwynia tenuifolia</i>	shrub 0.6–1 m	15 m	<ul style="list-style-type: none"> • 20 m (intact) • 40 m (thinned, scattered trees and DNG) 	30 m
<i>Epacris purpurascens</i> var. <i>purpurascens</i> ***	shrub 50–150 cm	15 m or 20 m	<ul style="list-style-type: none"> • 20 m (intact) • 40 m (thinned, scattered trees and DNG) 	30 m
<i>Eucalyptus benthamii</i> ***	tree to 40 m	40 m	40 m (for all condition states)	30 m
<i>Grevillea juniperina</i> subsp. <i>juniperina</i> ***	shrub to 1, or rarely 1.5 m high	15 m	<ul style="list-style-type: none"> • 20 m (intact) • 40 m (thinned, scattered trees and DNG) 	30 m
<i>Grevillea parviflora</i> subsp. <i>parviflora</i> ***	shrub 0.3–1 m	15 m	<ul style="list-style-type: none"> • 20 m (intact) • 40 m (thinned, scattered trees and DNG) 	30 m
<i>Hibbertia fumana</i>	shrublet to 20 cm	10 m	Not surveyed	30 m
<i>Hibbertia puberula</i>	shrublet with few wiry branches to 30 cm long	15 m	Not surveyed	30 m
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> – endangered population	twining stems to 4 m	10 m	<ul style="list-style-type: none"> • 20 m (intact) • 40 m (thinned, scattered trees and DNG) 	30 m
<i>Maundia triglochoides</i>	perennial with rhizomes, leaves to 80 cm long	10 m	Not surveyed	30 m
<i>Melaleuca deanei</i> ***	shrub to 3 m	20 m	<ul style="list-style-type: none"> • 20 m (intact) • 40 m (thinned, scattered trees and DNG) 	30 m
<i>Micromyrtus minutiflora</i> ***	shrub to 2 m	20 m	<ul style="list-style-type: none"> • 20 m (intact) • 40 m (thinned, scattered trees and DNG) 	30 m
<i>Persicaria elatior</i>	herb to 90 cm	10 m	Not surveyed	30 m
<i>Persoonia bargoensis</i> ***	shrub, varied between 60 cm and 2.5 m****	20 m	<ul style="list-style-type: none"> • 20 m (intact) • 40 m (thinned, scattered trees and DNG) 	30 m
<i>Persoonia nutans</i> ***	shrub to 2.5 m	20 m	<ul style="list-style-type: none"> • 20 m (intact) • 40 m (thinned, scattered trees and DNG) 	30 m
<i>Pimelea curviflora</i> var.	subshrub or shrub, 20–120 cm	15 m or 20 m	<ul style="list-style-type: none"> • 20 m (intact) 	30 m

Species	Life form and height	Recommended separation distance in open vegetation*	Separation distances (and associated condition states) that were used in the initial surveys carried out in 2017 and 2018**	Separation distances used for the winter and spring 2019 surveys
<i>curviflora</i> ***			<ul style="list-style-type: none"> 40 m (thinned, scattered trees and DNG) 	
<i>Pimelea spicata</i>	shrub to 50 cm	15 m	Not surveyed	30 m
<i>Pomaderris brunnea</i> ***	shrub 2–3 m	20 m	<ul style="list-style-type: none"> 20 m (intact) 40 m (thinned, scattered trees and DNG) 	30 m
<i>Pterostylis saxicola</i>	terrestrial herb (ground orchid)	10 m	Not surveyed	30 m
<i>Pultenaea parviflora</i> ***	shrub to 1m, but up to 1.8 m when in competition with other shrubs****	20 m	<ul style="list-style-type: none"> 20 m (intact) 40 m (thinned, scattered trees and DNG) 	30 m
<i>Pultenaea pedunculata</i> ***	shrub that forms carpets 1 m or more wide****	15 m	<ul style="list-style-type: none"> 20 m (intact) 40 m (thinned, scattered trees and DNG) 	30 m

*based on the maximum distances between parallel field traverses recommended in OEH (2016) and DPIE (2020) (i.e. Table 1 in both of these guidelines), and the height of the species specified in PlantNET

<https://plantnet.rbgsyd.nsw.gov.au/>

** based on the information about these distances on page 11-39 of the BCAR, and the height of the species specified in PlantNET

*** it is not clear if these species were surveyed in the initial surveys in 2017 and 2018 (some species have a yes or a no in the 'Initial surveys' columns but these ones do not)

**** information from <https://www.environment.nsw.gov.au/threatenedspeciesapp/>

Appendix 5 – Assessment of Serious & Irreversible Impacts (SAII)

Appendix 5A – Serious & Irreversible Impacts – Ecological Communities

This appendix reviews the additional impact assessment for potential SAI entities, as per sections 10.2.2 and 10.2.3 of the BAM.

1. Cooks River/Castlereagh Ironbark Forest (CRCIF)

- **The action and measures taken to avoid the direct and indirect impacts on CRCIF (section 10.2.2.1(a) of the BAM)**

Table 25-4 shows that:

- 40.7% of CRCIF occurring within the nominated areas (excluding excluded lands) is proposed to be avoided
- 45.8% of the intact CRCIF (not including that in excluded lands) is proposed to be cleared
- of the ‘better’ condition (intact and thinned) CRCIF mapped for this project, 57.4% is proposed to be cleared (see below for information on the similarity of vegetation integrity scores for the intact and thinned condition states)

Page 25-14 refers to chapter 14 of the BCAR for the avoidance process. It is noted that virtually half of the direct impacts to CRCIF will be from major transport corridors (see Table 25-5), specifically the OSO in Wianamatta Regional Park. It is also noted that Chapter 14 states:

“For the major transport corridors and essential infrastructure, the avoidance process is not yet complete as detailed design will be undertaken in the future at the time the project is proposed (see Part 2). The Plan includes commitments to ensure this future process leads to acceptable avoidance outcomes for these developments.” (page 14-5) and

“Because infrastructure alignments within the transport corridors are not final (see Part 2), the major transport corridors will be subject to a future process of avoidance and minimisation as part of the detailed design phase of each project to determine the location of the infrastructure within the transport corridor footprints. Note that for the purposes of the Assessment Report, the entire footprint of each major transport corridor is assumed to be impacted.” (page 14-13)

However, it is noted that this ‘future process of avoidance’ will occur within certified land i.e. Commitment 3 of the Plan is *“Avoid and minimise impacts to threatened ecological communities, species and their habitat within certified- major transport corridors through detailed planning and design ...”* (page 113 of Sub-Plan A). While the intent of this commitment is supported, the avoidance outcomes for the OSO at Wianamatta Regional Park, which have been carried out under a different planning process (see <https://www.transport.nsw.gov.au/corridors/oso>), have not been refined beyond the concept design stage and will likely result in negative impacts on CRCIF, along with other ecological values such as Cumberland Plain Woodland (CPW), connectivity and threatened species habitats.

While action 3 is strongly supported i.e. locate APZs, if required, within the certified-major transport corridors, APZs may likely constrain further avoidance.

Regarding proposed direct impacts due to proposed certified urban capable land, and given the avoidance criteria in Box 1 Chapter 14 (page 14-7), it is not clear why the CRCIF identified in Figures 1 and 2 below (in the black circles and oval) could not have been avoided. Figure 1 shows: the thinned and scattered tree condition states are well connected to intact CRCIF that is proposed to be

avoided; the CRCIF proposed to be cleared is connected to associated TECs in riparian corridors; and many threatened flora and fauna records are located in close proximity.

Figure 2 shows: the eastern most patches (in the black oval) are well connected to the riparian corridor and to areas further away from the corridor, which are proposed to be avoided for biodiversity; the western most patches (in the black circle) are connected to an area proposed to be avoided for biodiversity. As discussed further down, approximately half of the proposed direct impacts to CRCIF result from urban capable land, and half from certified major transport corridors, and the intact and thinned condition states have very similar vegetation integrity scores.

The avoidance of indirect impacts has not been discussed. Reference has been made in this section to the commitments (mitigation measures) proposed for indirect impacts, as discussed on pages 25-16 – 25-21 of the BCAR but these measures do not constitute avoidance.

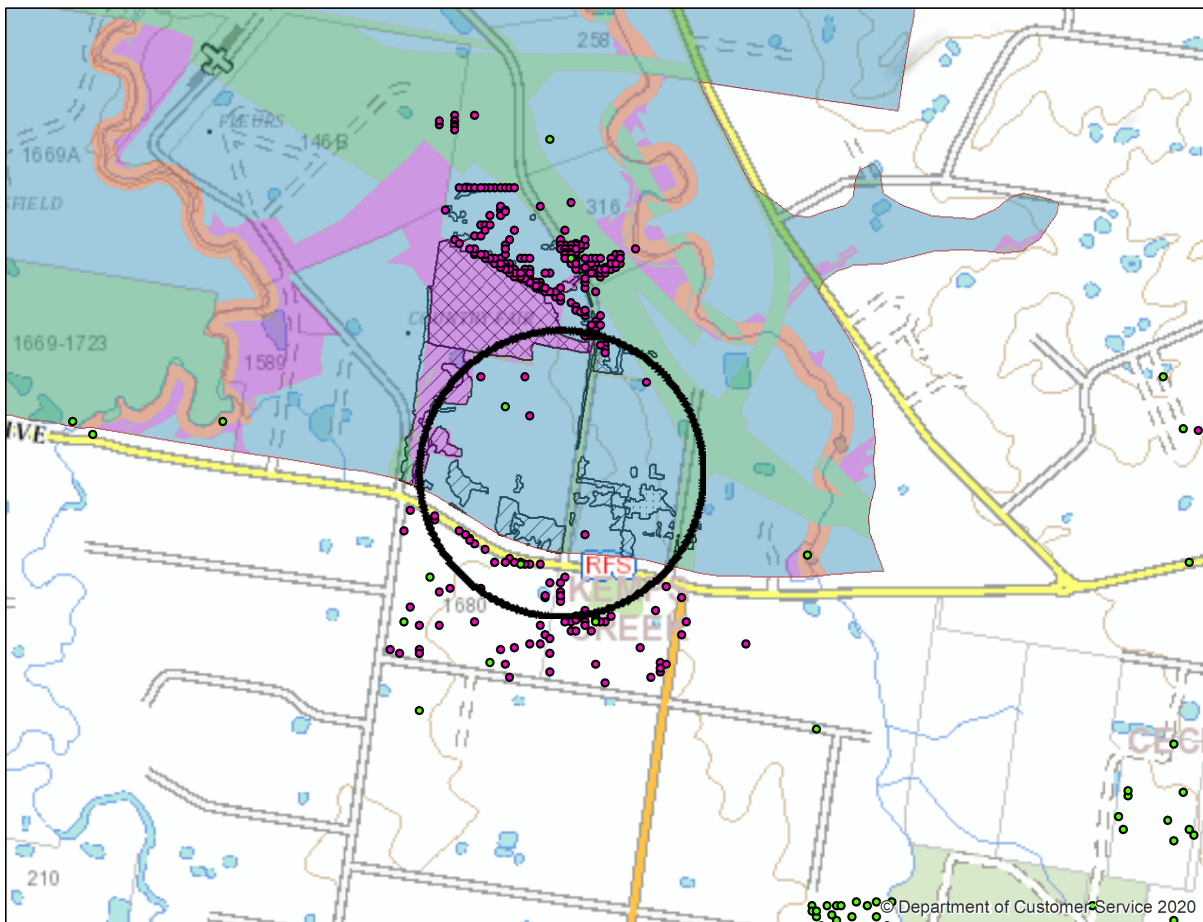


Figure 1. Direct impacts to CRCIF due to proposed certified urban capable land in WSA (shown by the hatched (thinned) and stippled (scattered trees) polygons in the blue areas). The crosshatched (intact) and hatched (thinned) polygons in the purple areas show proposed avoided land with CRCIF. The pink (flora) and green (fauna) dots show the location of BioNet records for threatened species. The area is along Elizabeth Drive, just to the north west of Kemps Creek Nature Reserve and to the west of Kemps Creek.

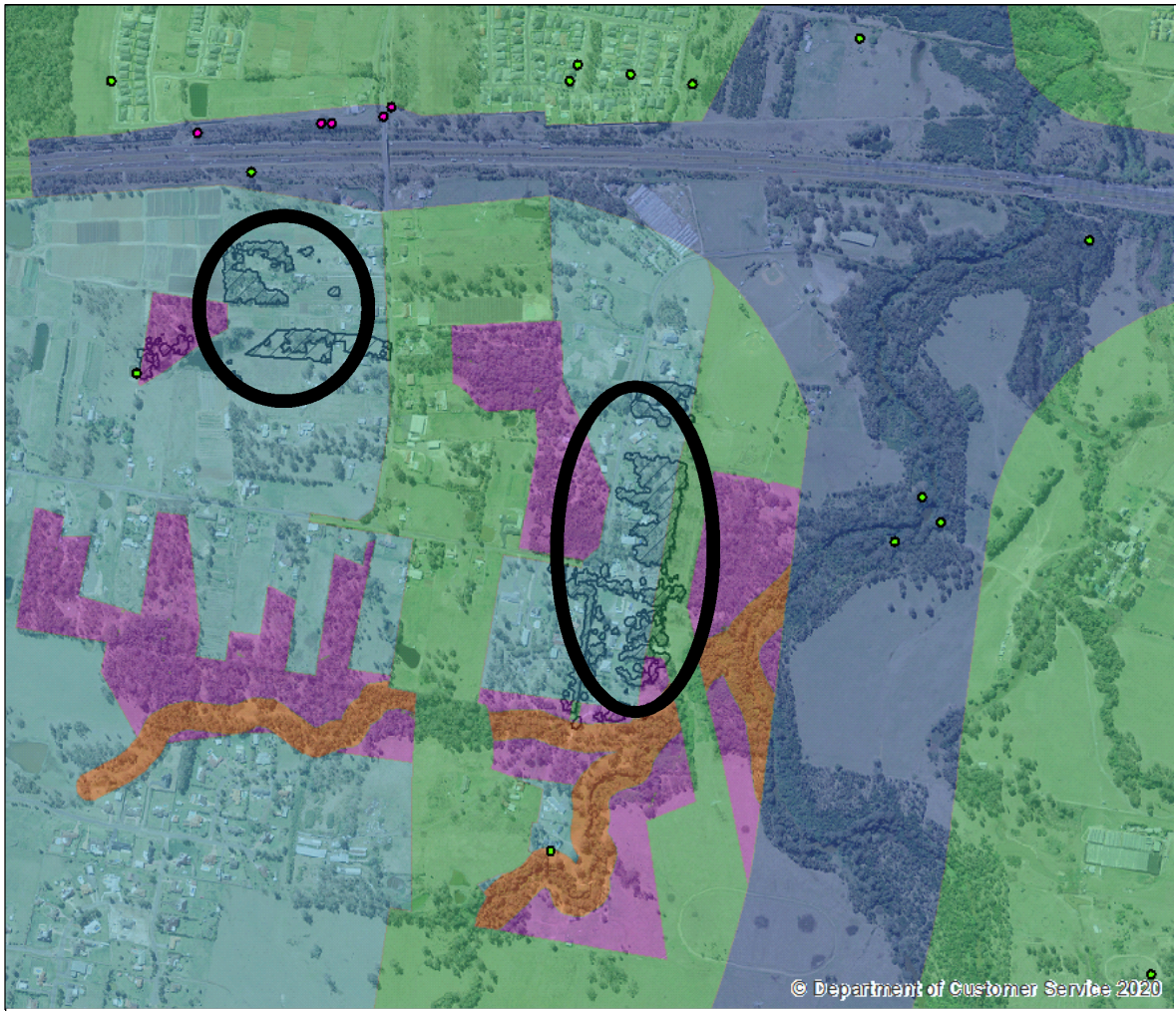


Figure 2. Direct impacts to CRCIF due to proposed certified urban capable land in GPEC (shown by the hatched (thinned) polygons in the blue areas). The purple and orange areas contain associated TECs (e.g. Shale Gravel Transition Forest and CPW) proposed to be avoided, with the orange areas being the riparian corridors for and near Blaxland and South Creeks. The pink (flora) and green (fauna) dots show the location of BioNet records for threatened species. The area is to the south of the M4 and to the west of South Creek.

- **The area (ha) and condition of CRCIF to be directly and indirectly impacted by the proposal (section 10.2.2.1(b) of the BAM)**

Tables 25-4 show that 59.3% (37.6 ha out of 63.4 ha) of CRCIF occurring in the nominated areas (excluding excluded areas) is proposed to be cleared.

Table 25-5 shows that:

- 37.6 ha of CRCIF will be directly impacted by the proposal, with 42.6% of this being intact vegetation
- the vegetation integrity scores for intact and thinned were very similar i.e. 49.2 and 43.3 respectively, with scattered trees having a much lower score of 19.6

- 92.3.4% of direct impacts will be to the 'better' condition CRCIF mapped for this proposal i.e. for intact and thinned combined

Page 25-14 states *"The direct impacts of the development are mainly associated with the transport corridors"* but Table 25-5 shows 18.9 ha will be from *"transport corridors across all nominated areas"* and 18.7 ha from *"impacts from urban development only within each nominated area"*. As such, the extent of the direct impacts from these two land categories will be virtually the same.

The area and condition of CRCIF to be indirectly impacted is not addressed.

- **A description of the extent to which the impact exceeds the threshold for CRCIF (section 10.2.2.1(c) of the BAM)**

No thresholds have been published.

- **The extent and overall condition of CRCIF within an area of 1000ha, and then 10,000ha, surrounding the proposed development footprint (section 10.2.2.1(d) of the BAM)**

Table 25-6 shows the extent (ha) and condition (intact, thinned and scattered trees) of CRCIF within 1000 ha, 10000 ha, 1000 m and 10000 m buffers surrounding the urban capable lands; noting that the BAM requires consideration within 1000 ha and 10000 ha buffers only. It is not clear if the buffers included the transport corridors proposed for certification (Table 25-6 only refers to urban capable lands and no spatial data for section 10.2.2 of the BAM was provided).

From Tables 25-5 and 25-6 it can be seen that 37.6 ha of CRCIF is proposed to be directly impacted, which represents 84.1% of the area of the community occurring in the 1000 ha buffer to urban capable lands, and 31% occurring in the 10000 ha buffer.

- **An estimate of the extant area and overall condition of CRCIF remaining in the IBRA subregion before and after the impact of the proposed development (section 10.2.2.1(e) of the BAM)**

Table 25-6 shows the extent (ha) and condition (intact, thinned and scattered trees) of CRCIF within 1000 ha, 10000 ha, 1000 m and 10000 m buffers surrounding the urban capable lands; noting that the BAM requires consideration within 1000 ha and 10000 ha buffers only. It is not clear if these buffers included the transport corridors proposed for certification (Table 25-6 only refers to urban capable lands and no spatial data for section 10.2.2 of the BAM was provided).

As previously mentioned, 37.6 ha of CRCIF will be directly impacted (page 25-14). This is equivalent to 84% of the area of CRCIF occurring in the 1000 ha buffer and 31% occurring in the 10000 ha (these percentages cannot be calculated, out of interest, for the additional buffers used by the proposal because the area covered by these buffers was not given).

- **An estimate of the area of CRCIF that is in the reserve system within the IBRA region and subregion (section 10.2.2.1(f) of the BAM)**

Page 25-15 states *"The development will result in a loss of 2.8 per cent of the remaining area of CRCIF in the Cumberland subregion."* Table 25-7 shows the extent (ha) and condition (intact, thinned and scattered trees) of CRCIF in the Cumberland subregion before and after development. It shows that the greatest loss will be to the thinned condition class, with 10% proposed to be cleared. It also shows that just under 2% of intact CRCIF will be lost. If intact and thinned are considered together (because their VI scores are so similar, as previously discussed), then 3.4% of the 'better' condition CRCIF mapped by this project will be lost.

- **The proposed certification's impact on (section 10.2.2.1(g) of the BAM):**

(i) abiotic factors critical to the long-term survival of CRCIF; for example, how much the impact will lead to a reduction of groundwater levels or the substantial alteration of surface water patterns

(ii) characteristic and functionally important species through impacts such as, but not limited to, inappropriate fire/flooding regimes, removal of understorey species or harvesting of plants

(iii) the quality and integrity of an occurrence of CRCIF through threats and indirect impacts including, but not limited to, assisting invasive flora and fauna species to become established or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species in CRCIF

Impacts on abiotic factors critical to the long-term survival of the community (point (i) above) were addressed in relation to inappropriate fire regimes and changes to surface water hydrology (runoff and erosion). Impacts to groundwater were not considered, even though CRCIF has been identified as having moderate potential for groundwater interaction by the Groundwater Dependent Ecosystem Atlas <http://www.bom.gov.au/water/groundwater/gde/map.shtml> and the BCAR identified CRCIF as being a 'higher risk TEC' for impacts from changes to hydrological processes (see Chapter 24 Prescribed Biodiversity Impacts, Table 24-22). There is scope too under this section of the BAM to consider the impacts of climate change on the long-term survival of impacted entities, although it is not a requirement of the BAM and this was not done.

Impacts on characteristic and functionally important species (point (ii) above) were not addressed, although there are implications for species generally, from the information given in this section of the report.

The discussion for this section of the BAM (10.2.2.1(g)) focused on indirect impacts (point (iii) above) and the proposed commitments to address them. The following are noted:

- Page 25-17 states "*The Plan includes commitments to mitigate indirect impacts from urban and industrial development, infrastructure, and intensive plant agriculture (Commitment 5) and from major transport corridors (Commitment 6) on TECs and species and their habitat, including meeting specific mitigation requirements in accordance with Appendix E of the Plan. This includes a requirement to undertake mitigation in accordance with the Best Practice Guidelines: Cooks River/Castlereagh Ironbark Forest (DECC, 2008) within and adjacent to the TEC.*" However, it is not clear what type of 'mitigation' this commitment is referring to. That said, DECC (2008) addresses a range of issues for CRCIF including protecting the seedbank, weed control and restoration, fire management and stormwater control, and while this guideline is somewhat dated, it still contains much useful information. That said, depending on the 'mitigation' being done, other sources may also need to be referred to, such as the *National Standards for the Practice of Ecological Restoration in Australia Edition 2.2* (September 2021), the outcomes of the ANPCs Healthy Seeds Project and the PCT 725 benchmarks for structure, function and composition (found in BioNet). The general nature of this requirement (see Table 28 of Appendix E of the Plan) makes it difficult to know if, how, when and where, CRCIF will benefit.
- Page 25-17 states there is "*A commitment (Commitment 17) to manage fire in strategic locations in the Cumberland subregion*" but given the general nature of this commitment, it is difficult to know if, how, when and where, CRCIF will benefit i.e. this commitment includes

identifying fire management priorities, partnering with Aboriginal knowledge holders, preparing a fire management strategy, entering into written agreements to deliver the strategy, and integrating fire management actions into stewardship agreements and reserve management plans.

- Page 25-17 states there is *“A specific requirement in Appendix E of the Plan under Commitments 5 and 6 to apply best practice guidelines for managing the TEC (DECC, 2008). This includes specifics around fire management for the TEC.”* However, the DECC (2008) guidelines are somewhat dated and more recent sources of information on fire management for this community needs to be followed, for example the information contained in the TEC profile <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10174> and the *Wianamatta Regional Park Fire Management Strategy 2020* (DPIE July 2020) <https://www.environment.nsw.gov.au/research-and-publications/publications-search/wianamatta-regional-park-fire-management-strategy>. That said, over the life of the Plan, best practice approaches for things like restoration (including reconstruction), weed control and fire management, may change.
- Page 25-17 states the new SEPP (Strategic Conservation Planning) will *“Set out development controls to avoid and minimise impacts of future development on biodiversity values in avoided land and the SCA. The SEPP requires the consent authority to be “satisfied that the development is managed to avoid adverse impacts to biodiversity values prior to granting approval. This would include consideration of risks to biodiversity values relating to managing fire risk.”* The proposed suite of planning measures are addressed at Section 5.4 and Appendix 7 of the Recommendation Report.
- The draft SEPP (Strategic Conservation Planning) has many positive aspects, including clause 18(2) which states *“Development consent must not be granted for development on certified—urban capable land unless the asset protection zone will be located wholly on certified—urban capable land”* (page 13). Regarding inappropriate fire regimes, the draft SEPP may result in consideration of this e.g. it could fall under consideration of adverse impacts to the integrity and resilience of the biophysical and ecological environments (section/clause 15(2)) but how the SEPP will be interpreted and applied will likely vary from one local council to another.
- Importantly for CRCIF and other potential SAI entities, consideration of cumulative impacts is key to arresting their clearing across the Cumberland Plain. Under the draft SEPP, cumulative impacts are mentioned in relation to development on land in the SCA but it is in a very limited sense i.e. clause 15(3) states *“Development consent must not be granted to development on land in a strategic conservation area unless the consent authority has considered whether the cumulative impact of the development and other development for which consent or an approval has been granted in relation to the land is likely to cause an adverse impact on the following ...”* (page 11). While this is a step in the right direction, cumulative impacts should not be considered solely in relation to the development land but rather, they should be considered for each development in terms of cumulative impacts across the entire avoided land and SCA. The provisions of the SEPP do not provide the same level of protection to avoided lands as the originally proposed E2 zoning.
- Page 25-17 states the new SEPP (Strategic Conservation Planning) will also *“Require asset protection zones (APZs) to be wholly within urban capable land.”* As stated above, this is strongly supported. However, this provision will not benefit CRCIF on avoided land or within the SCA where essential infrastructure is proposed for Part 5 activities. Separate guidelines are proposed as part of the planning package to mitigate the impacts of such infrastructure

on avoided lands, although this will not prevent all such impacts to SAIL entities on avoided land. See also discussion at Section 5.4 and Appendix 7 of the Recommendation Report.

- Page 25-18 states *“A commitment (Commitment 15) to manage priority weeds in strategic locations in the Cumberland subregion to reduce threats to land secured within the Strategic Conservation Area (SCA). This includes a number of actions, of which the following are the most relevant to the outcome for the TEC:*
 - *Preparation of a Weed Control Strategy, and entering into written agreements with delivery partners to implement the weed control program*
 - *Integration of weed control actions for conservation land into biodiversity stewardship agreements and reserve management plans*
 - *Provision of grants to relevant stakeholders to reduce weeds in the following locations: on public land adjoining or near conservation land, and on Aboriginal-owned land adjoining or near to conservation land”*

However, given the uncertainty of reaching the offset target for CRCIF (see comments below) and the general nature of this commitment, it is difficult to know if, how, when and where, CRCIF will benefit. Planning controls will be applied in relation to weed management, primarily by way of DCP’s and mitigation guidelines which are not legally binding environmental planning instruments such as SEPP’s/LEP’s.

- Page 25-18 states *“Introduction of a new SEPP (Strategic Conservation Planning) that will set out development controls to avoid and minimise impacts of future development on biodiversity values in avoided land and the SCA. The SEPP requires the consent authority to be satisfied that the development is managed to avoid adverse impacts to biodiversity values prior to granting approval. This would include consideration of risks to biodiversity values relating to the spread of weeds.”* The draft SEPP effectively prevents rezoning of avoided and SCA land in future precincts to uses other than environmental or essential infrastructure, but does not offer the same protection for avoided land as the originally proposed E2 zoning. It also does not impact the range of existing permissible uses for existing zones in the SCA that will not be rezoned under the precinct planning process.
- Also, the draft SEPP incorporates some consideration of cumulative impacts into its provisions, but this could have been extended much further, to help ensure better protections, and long term persistence, for all TECs and native vegetation generally, across avoided lands and the SCA.
- Page 25-18 states *“A specific requirement in Appendix E of the Plan under Commitments 5 and 6 to apply best practice guidelines for managing the TEC (DECC, 2008). This includes specifics around weed management for the TEC.”* However, these guidelines are somewhat dated and there may be newer techniques or approaches more suitable for weed management in CRCIF.
- Page 25-18 states *“Importantly for the TEC, weeds will be actively managed within the 110 ha to be added to conservation as part of the conservation program under the Plan.”* However, there is no certainty around achieving this target and no way of knowing if, how, when and where it will be achieved.
- Page 25-19 discusses commitments for managing inappropriate habitat disturbance from things like motorbikes, bicycles, 4WD vehicles, rubbish dumping, trampling and erosion. The measures are general in nature and include commitments with uncertain outcomes.
- Page 25-19 discusses general measures to mitigate the risks associated with changes to hydrology, such as *“Development must incorporate measures to minimise soil erosion and*

sedimentation during construction and following completion of development” (page 25-20). No consideration has been given to the potential for this community to be a groundwater dependent ecosystem (GDE), even though this community has been identified as having moderate potential for groundwater interaction by the Groundwater Dependent Ecosystem Atlas and has been identified by this proposal as being a ‘higher risk TEC’ for impacts from changes to hydrological processes (Table 24-22) (see comment above).

- Page 25-20 lists general measures to manage the risks associated with *Phytophthora cinnamomi*. This includes commitment 18 ‘*Support new or existing programs to control key diseases affecting threatened species and ecological communities in the Cumberland subregion*’ but with no details and uncertain outcomes, it is difficult to know if, how, when and where CRCIF will benefit.

- **Direct or indirect fragmentation and isolation of an important area of CRCIF (section 10.2.2.1(h) of the BAM)**

Page 25-21 states “*Direct loss of CRCIF may cause fragmentation and isolation of remaining patches of the TEC, which may increase the susceptibility of the TEC to weed invasion and other edge effects and reduce its long-term viability.*” However, it is EHG’s view that direct loss *will* cause these things. It will also impact other factors like connectivity, dispersal, recruitment, gene flow, and adaptability to climate change, for plant (and animal) species.

Page 25-21 states “*The most notable impact to CRCIF occurs within Wianamatta Regional Park. The patches of the TEC in this location form part of a larger, well-connected patch of native vegetation, and large parts of the patch are in intact condition. These impacts will lead to fragmentation of the TEC in this location, reducing the size and increasing the isolation of the areas that remain. This will increase the susceptibility of CRCIF in this location to weed invasion and other edge effects and reduce its long-term viability. The patch that is directly impacted is only marginally connected to the second occurrence of the TEC within Wianamatta Regional Park (to the east of Ropes Crossing) and as such, the development is not expected to increase the level of fragmentation to the TEC in this locality more broadly.*”

The statement that the “*development is not expected to increase the level of fragmentation to the TEC in this locality more broadly*” is not supported. Based on analysis of the existing plan of management for Wianamatta Regional Park and the proposed clearing for certified transport corridors reported in the BCAR, the OSO will reduce the largely contiguous and well-connected area of CRCIF in the regional park by approximately 20%. This will increase the level of fragmentation and connectivity for the community in this area. It will also produce a hostile gap (the OSO) between the remaining patches (Figure 3).

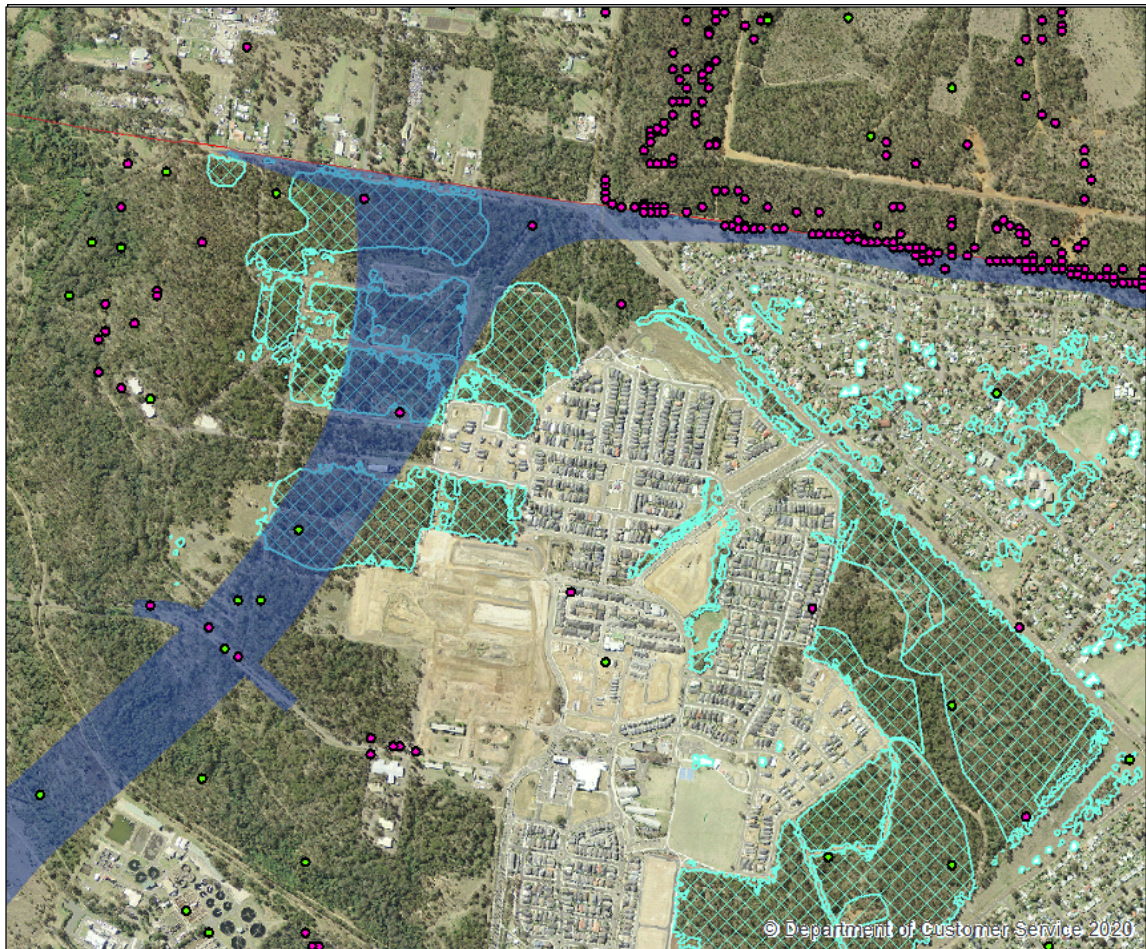


Figure 3. Direct impacts to CRCIF due to the proposed certified major transport corridor in GPEC for the Outer Sydney Orbital) (shown by the crosshatched (intact) and hatched (thinned) polygons in the purple area). The vast majority of CRCIF shown is in Wianamatta Regional Park. The pink (flora) and green (fauna) dots show the location of BioNet records for threatened species.

- **The measures proposed to contribute to the recovery of CRCIF in the IBRA subregion (section 10.2.2.1(i) of the BAM)**

Page 25-22 states “Secure an offset target of 115 ha of CRCIF (Commitment 8.2) in conservation lands within the Cumberland subregion. This would increase the area of TEC protected within the Cumberland subregion from approximately 30 percent to approximately 39 per cent”. However, there is no certainty that the offset target will be reached. Also, there is not enough of this community in the SCA to meet the target (see Table 41-13, which shows that 67 ha of CRCIF has been mapped in the SCA by the proposal), which suggests that reliance on reconstruction (see below) will be high. Furthermore, the extent and condition of the community currently within Wianamatta Regional Park will be directly and indirectly impacted by this proposal.

Page 25-22 states “As part of securing a minimum of 5,325 ha of native vegetation in the SCA, undertake ecological restoration of priority areas secured for conservation within the Cumberland subregion (Commitment 13). This includes restoring up to 1,330 ha of native vegetation, including targeting CRCIF”. It is noted however, that commitment 13 relates to the reconstruction of up to 1330 ha, with reconstruction being defined in the BCAR as “An ecological restoration approach

where the appropriate biota needs to be entirely or almost entirely reintroduced as they cannot regenerate or recolonise within feasible timeframes, even after expert assisted regeneration interventions” (page xxiii). It is not known how much of the 115 ha offset target for CRCIF could be, or will be, met using reconstruction, although it is likely to be high given the shortfall (48 ha) of this community in the SCA. Restoration/reconstruction is discussed further at Section 5.4 and Appendix 7 of the Recommendation Report.

Also, discussion in the BCAR about the feasibility of meeting the offset targets established under the EPBC Act strategic assessment process, states *“As discussed above and displayed in Table 41-8, 26 ha of restoration potential for PCT 725 is available in the SCA. This additional area of restoration would assist in meeting the offset requirement for Cooks River/Castlereagh Ironbark Forest, with further offsets potentially sourced outside the SCA for this TEC. This would be consistent with the selection steps in the conservation program.” (page 41-31).*

Furthermore, reconstruction is highly uncertain and the *Final Draft Ecological Restoration Strategy* (dated October 2021) does not meet principles 4 and 8 of the *Conservation measures in strategic applications for biodiversity certification Guidance for planning authorities* (DPIE 2020) (with these principle being ‘Conservation measures improve biodiversity values and landscape function in the long term’ and ‘The delivery of conservation measures is timely and certain’).

2. Cumberland Plain Woodland (CPW)

- **The actions and measures taken to avoid the direct and indirect impacts on CPW (section 10.2.2.1(a) of the BAM)**

Reference is made on page 25-23 to Chapter 14 for the avoidance process and terminology.

Table 25-9 shows that of the 1,252.8 ha of CPW occurring in the nominated areas (excluding excluded land), 25.6% (or 321.3 ha) has been avoided. In relation to this table, page 25-23 states *“The table shows that of the 147 ha of intact condition CPW (without excluded lands), the majority (109 ha or 74 per cent) has been avoided.”* However, the table shows there is 89.4 ha of intact CPW in the nominated areas (excluding excluded areas), with 31.5 ha being directly impacted and 57.9 ha being avoided. As such, 64.8% of intact CPW is proposed to be avoided (or, alternatively, 35.2% of intact CPW is proposed to be cleared).

The avoidance of indirect impacts has not been discussed. Reference has been made in this section to the commitments (mitigation measures) proposed for indirect impacts, as discussed on pages 25-27 – 25-32 of the BCAR however, these measures do not constitute avoidance.

- **The area (ha) and condition of CPW to be directly and indirectly impacted by the proposal (section 10.2.2.1(b) of the BAM)**

Page 25-24 states *“A total of 931.5 ha of CPW will be directly impacted by the development. This is approximately 62.6% per cent of the TEC in the nominated areas (without excluded lands).”* However, this is not what Tables 25-10 and 25-9 show. Instead, they show that 74.4% of CPW occurring in the nominated areas (excluding excluded areas) is proposed to be cleared.

From Table 25-10 it can be seen that:

- the direct impacts on each vegetation zone for CPW (PCTs 849 850 combined) will be 31.5 ha for intact, 345.5 ha for thinned, 132.2 ha for scattered trees, and 422.5 ha for DNG
- of the total amount of CPW proposed to be cleared, 3.4% will be intact, 37.1% will be thinned, 14.2% will be scattered trees and 45.3% will be DNG
- the vegetation zone with the largest direct impacts will be PCT 849 thinned, with 301.7 ha proposed to be cleared
- of the total amount of CPW proposed to be cleared, 5.6% will be due to the transport corridors in the nominated areas, with the largest impacts being to PCT 849 thinned (29.9 ha), then PCT 849 scattered trees (10.1 ha) and PCT 849 intact (9 ha)
- of the 931.5 ha of CPW proposed to be cleared, 72.7% will be for PCT 849
- the vegetation integrity score for PCT 850 scattered trees (38.1) is very similar to that for PCT 850 thinned (41.9) and PCT 849 thinned (42.3)
- the vegetation integrity scores for PCT 849 DNG and PCT 850 DNG were very similar (24.1 and 25.7 respectively), and higher than that for PCT 849 scattered trees (18.3)

The discussion on page 25-24 refers to the clearing of ‘relatively isolated’, ‘generally isolated’ and ‘scattered’ patches. However, the removal of these types of patches further fragments the community as a whole, reduces connectivity and removes ‘stepping stones’ that facilitate dispersal, gene flow, increases in area of occupancy, and adaptive capacity. Page 25-24 also states that the direct impacts to

- Wilton mainly occur *“to most remaining patches of the TEC, including several large patches.”*

- WSA mainly occur “to several moderate to large patches of mainly low to moderate condition TEC (DNG, scattered trees or thinned) in two main areas – the southern arm of the nominated area, and the northern part of the nominated area near Luddenham Road, which will be impacted by the transport corridors (Outer Sydney Orbital (OSO))”

The area and condition of CPW to be indirectly impacted is not addressed.

- **A description of the extent to which the impact exceeds the threshold for CPW (section 10.2.2.1(c) of the BAM)**

No thresholds have been published.

- **The extent and overall condition of CPW within an area of 1000ha, and then 10,000ha, surrounding the proposed development footprint (section 10.2.2.1(d) of the BAM)**

Table 25-11 shows the extent (ha) and condition (intact, thinned, scattered trees and DNG) of CPW within 1000 ha, 10000 ha, 1000 m and 10000 m buffers surrounding the urban capable lands; noting that the BAM requires consideration within 1000 ha and 10000 ha buffers only. It is not clear if the buffers included the transport corridors proposed for certification (Table 25-11 only refers to urban capable lands and no spatial data for section 10.2.2 of the BAM was provided).

From Tables 25-10 and 25-11 it can be seen that

- 931.5 ha of CPW is proposed to be directly impacted, which represents 89.6% of the area of the community occurring in the 1000 ha buffer to urban capable lands, and 47.4% occurring in the 10000 ha buffer
- 31.5 ha of intact CPW is proposed to be directly impacted, which represents 68.9% of the area of intact CPW occurring in the 1000 ha buffer, and 11% of the area occurring in the 10000 ha buffer
- 345.5 ha of thinned CPW is proposed to be directly impacted, which represents 84.2% of the area of thinned CPW occurring in the 1000 ha buffer, and 41.1% of the area occurring in the 10000 ha buffer
- 132.2 ha of scattered trees is proposed to be directly impacted, which represents 89.1% of the area occurring in the 1000 ha buffer, and 38.4% of the area occurring in the 10000 ha buffer
- 422.5 ha of DNG is proposed to be directly impacted, which represents 97.1% of the area occurring in the 1000 ha buffer, and 86.1% of the area occurring in the 10000 ha buffer

As mentioned above for CRCIF, these percentages cannot be calculated, out of interest, for the additional buffers used by the proposal because the area covered by these buffers was not given.

- **An estimate of the extant area and overall condition of CPW remaining in the IBRA subregion before and after the impact of the proposed development (section 10.2.2.1(e) of the BAM)**

Page 25-26 states “The development will result in a loss of 4.1 per cent of the remaining area of CPW in the Cumberland subregion.” Table 25-12 shows the extent (ha) and condition (intact, thinned, scattered trees and DNG) of CPW in the Cumberland subregion before and after the proposed development. When PCTs 849 and 850 are combined, it shows that the following will be lost from the current area of CPW:

- 0.5% of intact CPW
- 7.4% of thinned CPW

- 1.2% of scattered trees CPW and
- 78.2% of DNG

Page 25-26 contains information about a trend analysis done for PCT 849, as part of the strategic assessment process under the EPBC Act. The analysis examined long-term changes in the extent and condition of PCT 849 in the Cumberland subregion under various scenarios that approximate the development impacts of the nominated areas and the conservation benefits of the offsets under the Plan (see page 4 of the *Cumberland Subregion Conservation Plan — Vegetation Trend Analysis* (Gordon and Peterson 2019) in Supporting Document D (DOC21/942237)). Page 25-27 of the BCAR states “*The results of the trend analysis when considered in the context of the actual commitments of the Plan strongly indicate that PCT 849 will be substantially better off due to implementation of the Plan.*”

While this analysis has not been reviewed in any detail for this assessment, this statement may have misconstrued the main points that can be concluded from the analysis (see page 37 of Gordon and Peterson (2019) for these main points). These main points include:

- *“The landscape scale accounts for all parcels in the whole Cumberland subregion, including the parcels that are not part of the program and subject to ongoing declines due to typical private land activities. At this scale, only one scenario results in a gain of summed vegetation integrity of CPW relative to the current state over the whole Cumberland subregion (Figure 13). The gain occurs when offsets are implemented immediately with high intensity management and all parcels in the strategic offsets area are assumed to be secured. In this scenario, there are initial gains, but by the end of the 37-year time period, scenario 5 has dropped to be just above the initial value of the summed vegetation integrity score.”* (page 37 Gordon and Peterson (2019))
- *“The program scale accounts for only the parcels of land where development and offsetting occurs. At this scale, it is only possible to maintain the current state (or better) if all parcels in the strategic offset area are managed, and high intensity management or immediate offsets are implemented (scenarios 3, 5 and 6; Figure 14). If only half the offsets in the strategic offset area are implemented, all scenarios eventually fall below the current state (Figure 14(b)).”* (page 38 Gordon and Peterson (2019)).

It is also noted that there were many assumptions and limitations for the analysis (see pages 38-39 of Gordon and Peterson (2019) for a quick summary). This included excluding climate change from the analysis, and uncertainties in model inputs e.g. the spatial data characterizing the location and initial condition of CPW, and the expert predictions of how CPW will change over time.

- **An estimate of the area of CPW that is in the reserve system within the IBRA region and subregion (section 10.2.2.1(f) of the BAM)**

Table 25-13 shows there are 1609.6 ha of CPW in protected lands (lands reserved under the NPW Act) in the Cumberland subregion.

- **The proposed certification’s impact on (section 10.2.2.1(g) of the BAM)**

(i) abiotic factors critical to the long-term survival of CPW; for example, how much the impact will lead to a reduction of groundwater levels or the substantial alteration of surface water patterns

(ii) characteristic and functionally important species through impacts such as, but not limited to, inappropriate fire/flooding regimes, removal of understorey species or harvesting of plants

(iii) the quality and integrity of an occurrence of CPW through threats and indirect impacts including, but not limited to, assisting invasive flora and fauna species to become established or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species in CPW

Impacts on abiotic factors critical to the long-term survival of the community (point (i) above) were addressed in relation to inappropriate fire regimes and changes to surface water hydrology (runoff and erosion). Impacts to groundwater were not considered, even though CPW has been identified as having moderate potential for groundwater interaction by the Groundwater Dependent Ecosystem Atlas <http://www.bom.gov.au/water/groundwater/gde/map.shtml>. As previously mentioned, although not a requirement there is scope under this section of the BAM to consider the impacts of climate change on the long-term survival of impacted entities, but this was not done.

Impacts on characteristic and functionally important species (point (ii) above) were not addressed, although there are implications for species generally, from the information given in this section of the report.

As with CRCIF, the discussion for this section of the BAM focused on indirect impacts (point (iii) above) and the proposed commitments to address them. The same commitments, requirements and development controls that were referred to for CRCIF, were also referred to for CPW (with the same impacts being addressed). As such, the comments on planning measures (see pp5-8 above) made for CRCIF apply to CPW as well.

- **Direct or indirect fragmentation and isolation of an important area of CPW (section 10.2.2.1(h) of the BAM)**

Page 25-32 states *“Direct loss of CPW may cause fragmentation and isolation of remaining patches of the TEC, which may increase the susceptibility of the TEC to weed invasion and other edge effects and reduce its long-term viability.”* However, it is EHG’s view that the direct loss of CPW will do these things.

Page 25-33 states:

- *“Wilton: Development will remove most remaining patches of the TEC. Three larger patches of mostly moderate condition TEC will be reduced in size. ...”*
- *“GMAC: Development will mostly remove scattered patches of mainly low to moderate condition TEC. Patches of the TEC that will remain are already generally isolated and surrounded by farmland or existing urban development, particularly in the southern part of the nominated area and the development will not generally result in further isolation of remaining patches. ...”*
- *“WSA: In the northern part of the nominated area near Luddenham Road, the OSO will fragment a large patch of mainly low to moderate condition TEC. In the southern part of the nominated area, an area of relatively well connected patches of the TEC will be mostly removed and the TEC will only remain along a narrow riparian corridor. ...”*
- *“GPEC: In the northern part of the nominated area, a relatively narrow patch of the TEC that occurs within Wianamatta Regional Park will be fragmented by the OSO. ... In other parts of the nominated area, the development usually removes entire patches of the TEC and will not generally result in increased fragmentation or increased isolation of patches.”*

However:

- Given the avoidance criteria in Box 1 Chapter 14 (page 14-7), it is unclear this aligns with the proposal to clear 160.2 ha of thinned CPW (of which 154.4 ha is PCT 849) in WSA (see Figure 4) on land identified for agribusiness and employment land.
- Regarding the second and fourth dot points, the removal of entire patches will increase the isolation of remaining patches, because it will increase the distance between remaining patches.

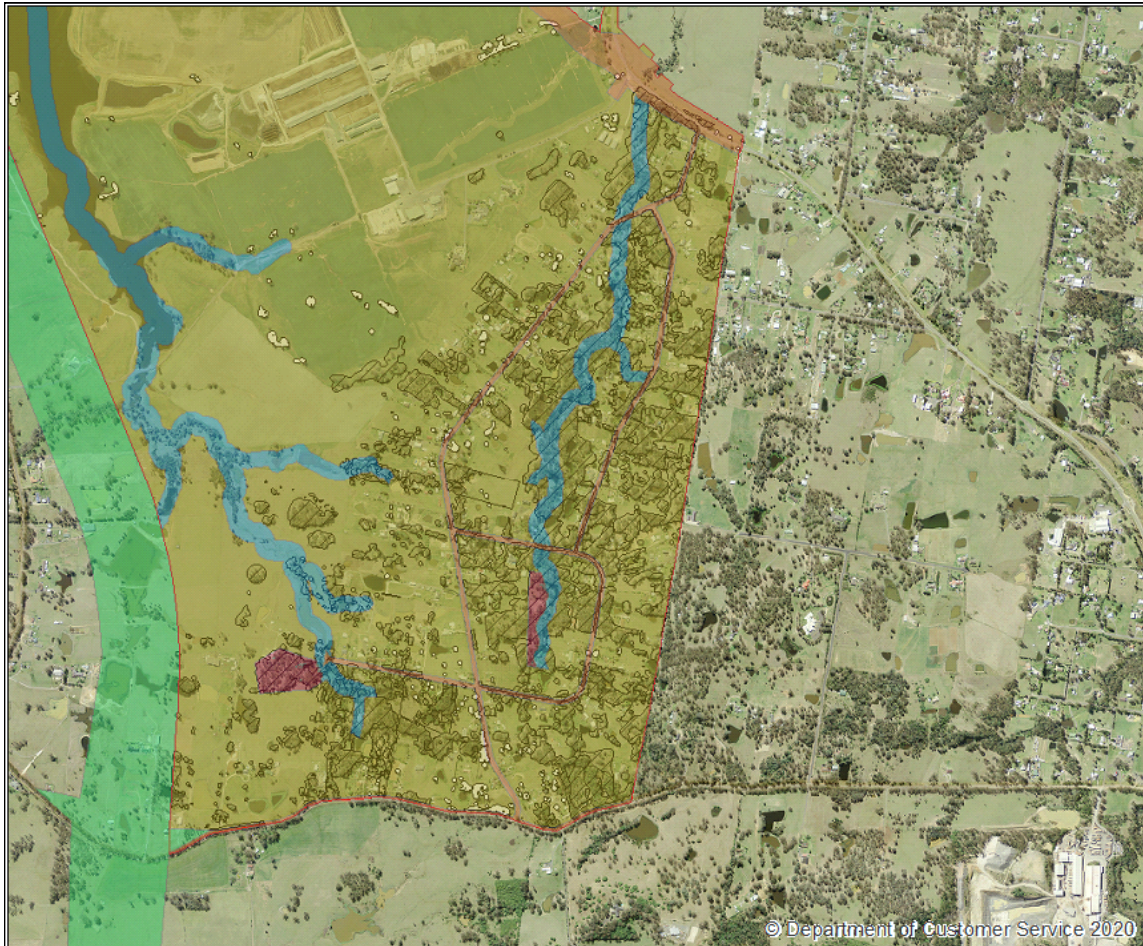


Figure 4. A large area of CPW (mostly thinned, as indicated by the hatched polygons) proposed to be cleared as a result of urban certified land in the southernmost part of WSA (in the yellowy areas).

- **The measures proposed to contribute to the recovery of CPW in the IBRA subregion (section 10.2.2.1(i) of the BAM)**

Page 25-33 states “TEC-specific commitments to secure an offset target of 2,885 ha of CPW (Commitment 8.2) in conservation lands within the SCA. This includes a target of 2,150 ha of PCT 849 and a target of 735 ha of PCT 850. This would increase the area of TEC protected within the Cumberland subregion from approximately 6.9 percent to 19.5 percent.” However, there is no certainty that these targets will be reached, and current and future funding for these commitments are unclear. Also, there is not enough PCT 849 in the SCA to meet this target, with a shortfall of 649.2 ha (see Table 41-8). In response to this, page 41-26 states “While restoration may negate the offset target shortfall for PCT 849, an additional option to address any residual shortfall for the PCT is

by securing the excess amount of PCT 850 in the SCA. PCT 849 and PCT 850 are both part of Cumberland Plain Woodland, meaning that PCT 849 may be addressed through commitments that secure PCT 850 under the offset rules under the BC Regulation. This option is likely to be feasible as the SCA contains over 2,950 ha of surplus PCT 850 (after the offset target for PCT 850 has been met (see Table 41-8))."

Page 25-33 states "*As part of securing a minimum of 5,325 ha of native vegetation in the SCA, undertake ecological restoration of priority areas secured for conservation within the Cumberland subregion (Commitment 13). This includes restoring up to 1,330 ha of native vegetation, including targeting CPW.*" As discussed above, the likely success of, and funding for this target, are unclear.

Also, reconstruction is highly uncertain and the *Final Draft Ecological Restoration Strategy* (dated October 2021) does not, in its current form, meet Principles 4 and 8 of the *Conservation measures in strategic applications for biodiversity certification Guidance for planning authorities* (DPIE 2020) (with these principle being 'Conservation measures improve biodiversity values and landscape function in the long term' and 'The delivery of conservation measures is timely and certain').

3. Shale Sandstone Transition Forest

- **The actions and measures taken to avoid the direct and indirect impacts on SSTF (section 10.2.2.1(a) of the BAM)**

Page 25-35 states that 82.6% of SSTF occurring in the nominated areas (excluding excluded land) is proposed to be avoided, including the vast majority (96.9%) of intact SSTF. Table 25-14 shows that the DNG and thinned condition states will receive the largest impacts, with 63.7% and 20.3% proposed to be cleared respectively (excluding excluded areas).

Page 25-34 refers to Chapter 14 for a detailed explanation of the avoidance process, noting there are no impacts from certified major transport corridors to this community. Given the avoidance criteria in Box 1 (on page 14-7) of the BCAR, it is not clear why 34.8 ha of intact SSTF is proposed to be directly impacted in GMAC (Table 25-15).

The avoidance of indirect impacts has not been discussed. Reference has been made in this section to the commitments (mitigation measures) proposed for indirect impacts, as discussed on pages 25-37 – 25-41 of the BCAR but these measures do not constitute avoidance.

- **The area (ha) and condition of SSTF to be directly and indirectly impacted by the proposal (section 10.2.2.1(b) of the BAM)**

Page 25-35 states that approximately 17.4% of SSTF occurring within the nominated areas (excluding excluded lands) will be directly impacted. Of the total direct impacts proposed to intact SSTF, 76.1% will occur within GMAC.

Table 25-15 shows the vegetation integrity score for intact and thinned SSTF were 72.9 and 63.9 respectively. It also shows that vegetation integrity scores for scattered trees and DNG were very similar (30 and 28.4 respectively).

The area and condition of CRCIF to be indirectly impacted is not addressed.

- **A description of the extent to which the impact exceeds the threshold for SSTF (section 10.2.2.1(c) of the BAM)**

No thresholds have been published.

- **The extent and overall condition of SSTF within an area of 1000ha, and then 10,000ha, surrounding the proposed development footprint (section 10.2.2.1(d) of the BAM)**

Table 25-16 shows the extent (ha) and condition (intact, thinned, scattered trees and DNG) of SSTF within 1000 ha, 10000 ha, 1000 m and 10000 m buffers surrounding the urban capable lands; noting that the BAM requires consideration within 1000 ha and 10000 ha buffers only. It is not clear if the buffers included the transport corridors proposed for certification (Table 25-16 only refers to urban capable lands and no spatial data for section 10.2.2 of the BAM was provided).

From Tables 25-16 and 25-15 it can be seen that

- 459.8 ha of SSTF is proposed to be directly impacted, which represents 80.1% of the area of the community occurring in the 1000 ha buffer to urban capable lands, and 19.8% occurring in the 10000 ha buffer
- 45.7 ha of intact SSTF is proposed to be directly impacted, which represents 53.3% of the area of intact SSTF occurring in the 1000 ha buffer, and 3.9% of the area occurring in the 10000 ha buffer

- 145.6 ha of thinned SSTF is proposed to be directly impacted, which represents 73.3% of the area of thinned SSTF occurring in the 1000 ha buffer, and 21.9% of the area occurring in the 10000 ha buffer
- 41.0 ha of scattered trees is proposed to be directly impacted, which represents 90.1% of the area occurring in the 1000 ha buffer, and 39.5% of the area occurring in the 10000 ha buffer
- 227.5 ha of DNG is proposed to be directly impacted, which represents 93.1% of the area occurring in the 1000 ha buffer, and 62.6% of the area occurring in the 10000 ha buffer

As mentioned above for CRCIF and CPW, these percentages cannot be calculated, out of interest, for the additional buffers used by the proposal because the area covered by these buffers was not given.

- **An estimate of the extant area and overall condition of SSTF remaining in the IBRA subregion before and after the impact of the proposed development (section 10.2.2.1(e) of the BAM)**

Table 25-17 shows that 3.7% of the current area of SSTF in the Cumberland subregion is proposed to be cleared. This table also shows that less than 1% of the current area of intact SSTF will be cleared, along with 8.9% and 56.6% of thinned and DNG SSTF respectively.

Page 25-36 states *“The largest percentage change relates to the TEC in very low condition (DNG).”* However, it is noted that this condition state has a vegetation integrity score of 28.4, which is very similar to that for the thinned condition state which has a score of 30 (Table 25-15).

- **An estimate of the area of SSTF that is in the reserve system within the IBRA region and subregion (section 10.2.2.1(f) of the BAM)**

Page 25-37 states *“The area of SSTF occurring within protected lands (land reserved under NPW Act) within the Cumberland subregion is 507.1 ha. This represents 4 per cent of the total area of the remaining TEC in the subregion.”* Consideration of Tables 25-15 and 25-18 shows that the area of SSTF to be directly impacted by the proposal (459.8 ha), is similar to the area of SSTF in protected lands.

- **The proposed certification’s impact on (section 10.2.2.1(g) of the BAM)**

(i) abiotic factors critical to the long-term survival of SSTF; for example, how much the impact will lead to a reduction of groundwater levels or the substantial alteration of surface water patterns

(ii) characteristic and functionally important species through impacts such as, but not limited to, inappropriate fire/flooding regimes, removal of understorey species or harvesting of plants

(iii) the quality and integrity of an occurrence of SSTF through threats and indirect impacts including, but not limited to, assisting invasive flora and fauna species to become established or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species in SSTF

Impacts on abiotic factors critical to the long-term survival of the community (point (i) above) were addressed in relation to inappropriate fire regimes and changes to surface water hydrology (runoff and erosion). Impacts to groundwater were not considered, even though SSTF has been identified as having moderate potential for groundwater interaction by the Groundwater Dependent Ecosystem Atlas <http://www.bom.gov.au/water/groundwater/gde/map.shtml> and the BCAR raised groundwater as an issue in Chapter 24 ‘Prescribed Biodiversity Impacts’ where it identified SSTF as

being a 'higher risk TEC' for impacts from changes to hydrological processes (Table 24-22). As previously mentioned, although not a requirement there is scope under this section of the BAM to consider the impacts of climate change on the long-term survival of impacted entities, but this was not done.

Impacts on characteristic and functionally important species (point (ii) above) were not addressed, although there are implications for species generally, from the information given in this section of the report.

As with CRCIF and CPW, the discussion for this section of the BAM focused on indirect impacts (point (iii) above) and the proposed commitments to address them. The commitments, requirements and development controls that were referred to for CRCIF and CPW, have also been referred to for SSTF (with very similar impacts being addressed). As such, the comments made for CRCIF and CPW apply to SSTF as well.

- **Direct or indirect fragmentation and isolation of an important area of SSTF (section 10.2.2.1(h) of the BAM)**

Page 25-41 states *“Direct loss of SSTF may cause fragmentation and isolation of remaining patches of the TEC, which may increase the susceptibility of the TEC to weed invasion and other edge effects and reduce its long-term viability.”* However, the direct impacts will cause fragmentation and will increase the susceptibility of SSTF to edge effects.

Page 25-41 also states, in relation to Wilton and GMAC, *“Urban development in these nominated areas mainly directly impacts the edges of the TEC and does not generally impact this connectivity. While direct impacts will reduce the size and width of some patches around the edges of the urban capable lands, it does not generally result in isolation of these patches.”*

- **The measures proposed to contribute to the recovery of SSTF in the IBRA subregion (section 10.2.2.1(i) of the BAM)**

Page 25-42 states

- *“TEC-specific commitments to secure an offset target of 1,455 ha of SSTF (Commitment 8.2) in conservation lands within the Cumberland subregion. This would increase the area of TEC protected within the Cumberland subregion from approximately 4 per cent to approximately 15.6 per cent.”*
- *“As part of securing a minimum of 5,325 ha of native vegetation in the SCA, undertake ecological restoration of priority areas secured for conservation within the Cumberland subregion (Commitment 13). This includes restoring up to 1,330 ha of native vegetation, including targeting SSTF”.*

However, as previously discussed, there is no certainty that these targets will be reached, and current and future funding is unclear. Additionally, in relation to the second point, Sub-Plan A does not identify SSTF as a target community. Instead, action 5 of commitment 13 identifies Cooks River Castlereagh Ironbark Forest, Cumberland Plain Woodland, River-flat Eucalypt Forest, Shale Gravel Transition Forest and Swamp Oak Forest, as being targeted for ecological reconstruction (page 123 of Sub-Plan A).

Appendix 5B – Serious & Irreversible Impacts – Flora and Fauna

Introduction

This appendix reviews the additional impact assessment for potential SAI entities, as per sections 10.2.1.4 and 10.2.3 of the BAM.

This assessment identified five additional species, in addition to those species and communities already listed on the current list of species and threatened ecological communities that are at risk of a serious and irreversible impact, considered at risk of SAI. These include:

- Red-crowned Toadlet (*Pseudophryne australis*)
- Raptors (White-bellied Sea-Eagle (*Haliaeetus leucogaster*), Little Eagle (*Hieraaetus morphnoides*) and Square-tailed Kite (*Lophoictinia isura*))
- *Micromyrtus minutiflora*

The SAI assessments rely heavily on potential habitat models to justify impacts. However, these potential habitat models may confound these assessments, particularly where surveys of potential habitat have not been completed. EES has applied a precautionary approach where unless potential habitat has been adequately surveyed in line with relevant guidelines these are used to indicate potential distribution. As such, potential habitat loss has been compared to these models.

SAI assessments

Allocasuarina glareicola

The BCAR states that *Allocasuarina glareicola* has a very limited geographic distribution (36 km² or 3,600 ha) and is unlikely to respond to management as the species reproduces clonally (page 25-42).

The BCAR modelled 200 ha of habitat within the nominated areas (using the knowledge-based method, see Appendix 6) and 32.3 ha without excluded land. 17.4 ha will be impacted by urban capable land and transport corridors, representing 53.9% of potential habitat within the nominated areas (without excluded land) and 8.7% of potential habitat within the nominated areas (including excluded land). However, the restriction of the modelled habitat to the intact and thinned condition states is not supported (see Appendix 6), with the knowledge-based method potentially underestimating the area of potential habitat.

Habitat within Wianamatta RP will be fragmented with edge effects likely to impact further habitat. Other key habitat areas that will be impacted include Orchard Hills.

No known occurrences will be impacted, and the species was not recorded during targeted surveys. However, the method used for targeted surveys was generally inadequate, with larger than recommended transect separation widths being used (see Appendix 4). The BCAR concludes “*There is a low likelihood the species occurs within this habitat.*” (p25-44). However, surveys were not completed in areas around Orchard Hills.

The BCAR concludes that the ecology of the local population is unlikely to be affected. However, further removal of habitat has the potential to disrupt lifecycle processes, particularly seed dispersal, in a species where limited seed is produced and the viability of that seed is unknown. The removal of stepping stones in the landscape could lead to further isolation of remnant populations and loss of viability in the long term.

Mitigation measures proposed to address key threats are not specific enough to address direct threats. The SCA will result in conservation of 453.7 ha of mapped habitat.

Overall, it is considered there is a residual increased risk of extinction for *Allocasuarina glareicola* given:

- the CPCP will impact on significant amounts of the modelled habitat for a species with an already restricted geographic distribution; and
- further fragmentation and removal of habitat may impact on the ecology of the species.

Large-eared Pied Bat (Chalinolobus dwyeri)

The Large-eared Pied Bat is unlikely to respond to management as the species is reliant of caves for breeding; a feature which cannot be readily recreated.

The BCAR modelled 1,093 ha of potential breeding habitat within the nominated areas (using the knowledge-based method, see Appendix 6) and 882.2 ha without excluded land. 5.8 ha will be impacted by urban capable land and transport corridors, representing 53.9% of potential habitat within the nominated areas and <1% of the distribution of the species.

No known breeding habitat will be impacted, although it is noted that the targeted survey in Wilton was done well outside the times specified in the TBDC and the '*Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method* (OEH 2018) (see Appendix 4). Generally, areas providing breeding habitat for the Large-eared Pied Bat are considered unsuitable for development due to steep terrain. However, adjacent foraging habitat may be impacted, reducing the ongoing viability of retained breeding habitat. Further, increased access to retained breeding habitat due to increased development could impact on viability of those sites. No specific mitigation measures for the Large-eared Pied Bat are proposed "*due to the low risk of direct impact*" (BCAR, p25-54). The conservation of 2,413 ha of mapped habitat is proposed.

Overall, the CPCP is considered a low increased risk of extinction for the Large-eared Pied Bat given:

- no known breeding habitat will be impacted, however noting that survey in Wilton occurred outside of the specified times in the TBDC only very small areas of potential breeding habitat will be impacted within the urban capable land and transport corridors; and
- significant areas of potential breeding and foraging habitat are proposed to be conserved within the SCA.

Hibbertia fumana

Hibbertia fumana has a very limited geographic distribution (4 km² or 400 ha) and was recently rediscovered in the Moorebank and Bankstown areas (NSW Scientific Committee, 2017). Recent surveys have indicated that the species is more widespread with records stretching from Richmond to Mittagong <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20323>. Little is known about the lifecycle and ecology of the species with work ongoing.

The BCAR modelled 1,716 ha of habitat within the nominated areas (through an expert report) and 1,299 ha without excluded land. 73.8 ha will be impacted by urban capable land and transport corridors, representing 5.6% of potential habitat within the nominated areas (without excluded land) and 4.3% of potential habitat within the nominated areas (including excluded land). Habitat within

Wianamatta RP will be fragmented with edge effects likely to impact further habitat. Other key areas include the southern boundary of WSA, a patch in GMAC South and the edges of Wilton.

No known occurrences will be impacted, and the species was not recorded during targeted surveys. That said, the adequacy of the surveys carried out in spring 2019 is not clear (see Appendix 4). The BCAR concludes “*the potential for the species to occur is low.*” (p25-58). However, surveys were not completed in most areas of suitable habitat in WSA, GMAC or Wilton and surveys undertaken as part of the expert report were highly limited in extent (Cumberland Flora and Fauna Interpretive Services 2019).

The BCAR concludes that the ecology of the local population is unlikely to be affected. However, any further removal of habitat for a species with such a restricted distribution could place the species at risk of extinction due to disruption in lifecycle processes. Fragmentation of potential habitat in Wianamatta Regional Park could be significant, noting surveys were conducted in this area and the species was not recorded.

Mitigation measures proposed to address key threats are not specific enough to address direct threats. The SCA may result in the conservation of up to 1,665 ha of mapped habitat, with a commitment to secure one offset location for the species (Commitment 9).

Overall, it is considered there is a residual increased risk of extinction for *Hibbertia fumana* given:

- the CPCP will impact on significant amounts of the modelled habitat for a species with an already restricted geographic distribution; and
- further fragmentation and removal of habitat may impact on the ecology of the species.

Swift Parrot (*Lathamus discolor*)

The Swift Parrot is considered to be in a rapid rate of decline with a >80% decline due to nest predation by the introduced Sugar Glider (*Petaurus breviceps*) in its Tasmanian breeding range. Habitat loss and alteration are also thought to be contributing to declines.

It is noted that the BCAR did not rely on the important area mapping by EHG, but undertook an updated assessment of this based on additional records (up to 2019) and the method used by EHG to map important areas for this species (referred to as ‘potential important areas’ in the BCAR). This updated mapping is commended, although there are some differences to the recently updated map produced by EHG (using records up to 2020), with an additional 10 ha to be directly impacted.

- combining the figures from Tables 25-25 and 25-26 in the BCAR gives the following

Avoidance of:	Total in nominated areas	Total in excluded lands	Total without excluded lands	Directly impacted	Avoided for biodiversity purposes	Avoided for other purposes	Total avoidance
Important areas and ‘potential’ important areas (ha)	573.6	487.2	86.5	46.1	19.9	20.6	40.4

- and an analysis using the updated map by EHG shows the following

Avoidance of:	Total in nominated areas	Total in excluded lands	Total without excluded lands	Directly impacted	Avoided for biodiversity purposes	Avoided for other purposes	Total avoidance
Mapped important areas by EHG (ha)	609.97	495.57	114.4	56.64	24.21	23.02	47.23

The BCAR documented 573 ha of important areas for the Swift Parrot within the nominated areas (both important areas and potential important areas) and 86.5 ha without excluded land. 46.1 ha will be impacted by urban capable land and transport corridors, representing 53% important habitat within the nominated areas (without excluded land) and 8% of important habitat within the nominated areas (including excluded land). It also represents <1% of the 5,631 ha of important habitat mapped across the Sydney Basin. These numbers do not change too much using the analysis with the updated map by EHG e.g. approximately 49.5% of important areas within the nominated areas (without excluded land) is proposed to be directly impacted (as opposed to 53%).

In addition to important areas, the BCAR documents potential foraging habitat, with 8,679 ha of potential foraging habitat for the Swift Parrot within the nominated areas and 4,514 ha without excluded land. 1,099.8 ha will be impacted by urban capable land and transport corridors, representing 24% of potential foraging habitat within the nominated areas (without excluded land) and 13% of potential foraging habitat within the nominated areas (including excluded land).

Overall, it is considered there is a residual increased risk of extinction for the Swift Parrot given:

- the CPCP will impact on significant amounts of important habitat for a species that has already undergone a rapid rate of decline; and
- the amount of habitat removal may lead to significant decline of the species within the Sydney Basin IBRA region.

Green and Golden Bell Frog (Litoria aurea)

The Green and Golden Bell Frog is not a previously listed potential SAI entity. The BCAR assessed the Green and Golden Bell Frog against the four principles and found it had potential to become a SAI entity due to the species' susceptibility to Chytrid (Principle 4).

There has been a decline in records of the species from western Sydney, with very limited records in the past 20 years. Records over the past 20 years come from:

- GPEC around St Marys. This area was surveyed and no records were observed. Habitat was identified as suitable for dispersal and foraging but "*not suitable for breeding*" (BCAR p. 25-72). Whilst it is acknowledged that suitable breeding habitat is limited given the amount of development in the area, not all suitable breeding habitat within the nominated areas was surveyed and the expert report notes "*areas of suitable habitat remain along the {Ropes Creek} corridor . . .*" (Lemckert 2019, p. 29). It is possible a population may persist in this area.
- GMAC at Blair Athol. Records here, centred around the Campbelltown Business Precinct and associated waterbodies, suggest a remnant population may persist in the area. The BCAR asserts these records are likely to be from an "*escaped captive colony*" (BCAR p. 25-72). Given the persistence of recent records, this population should be treated as remnant and

self-sustaining. Despite the assertion, habitat was modelled across GMAC. No habitat occurred within urban capable land or the transport corridors.

- WSA, with a single record at Luddenham. The BCAR considers this to be a “*transient individual dispersing from a non-natural population of the species in Riverston*” and “*does not equate to a natural or self-sustaining population of the species*” (BCAR p. 25-72). A lack of recent or historical records in the area and the expert report asserts that “*distance to the coast indicates it is unlikely the GGBF would persist*” in WSA (Lemckert 2019, p. 29).

The BCAR modelled (through an expert report) 1,654.5 ha of potential breeding habitat within the nominated areas and 1,629.9 ha without excluded land. 13.3 ha will be impacted by certified urban capable land and transport corridors associated with Ropes Creek within GPEC, representing <1% of potential habitat within the nominated areas. However, the majority of this land within GPEC includes highly hostile environments such as carparks and buildings at the St Mary’s Leagues Club (see below). Thus, the actual extent of habitat is likely much less, around 6-7 ha.



Impacts to hydrology, including water quantity and quality, may occur as a result of the development of urban capable land and transport corridors. However, given the limited amount of development occurring within modelled habitat, and the general mitigation measures proposed to address hydrology issues, this risk is considered low and manageable and unlikely to significantly alter habitat to the extent that the species will decline.

Commitment 3 of the CPCP aims to avoid areas of potential habitat connectivity within riparian lands. No other specific mitigation measures for the Green and Golden Bell Frog are proposed.

Overall, the CPCP is considered a low increased risk of extinction for the Green and Golden Bell Frog given:

- no known currently occupied habitat will be impacted;
- only small areas of modelled habitat will be impacted (<1%).

Melaleuca deanei

Melaleuca deanei is unlikely to respond to management as the species reproduces clonally, with only a small number of plants producing viable seed.

The distribution of *Melaleuca deanei* is restricted to Wilton and GMAC; WSA and GPEC are unlikely to provide suitable habitat. The BCAR modelled 14,395 ha of habitat (through an expert report), of which 2,321 ha of habitat occurs within the nominated areas and 571 ha without excluded land. 106.2 ha will be impacted by urban capable land and transport corridors, representing 19% of potential habitat within the nominated areas (without excluded land) and 4.6% of potential habitat within the nominated areas (including excluded land) and <1% of modelled habitat.

No known occurrences will be impacted, and the species was not recorded during targeted surveys (noting that larger than recommended transect separation widths were typically used, see Appendix 4). The BCAR concludes “*It is generally considered unlikely that potential habitat in this area contributes to the ongoing survival or viability of the species more broadly.*” (p25-82). However, not all suitable habitat was able to be surveyed, with only 10 ha of the 106.2 ha of suitable habitat subject to targeted surveys.

The BCAR concludes that the ecology of the local population is unlikely to be affected as the species has a “low likelihood” of occurring within potential habitat, loss of habitat “will not affect key life-cycle processes” and “potential habitat will not be fragmented by development” (p. 25-82). Whilst the evidence provided to demonstrate a low likelihood of occurrence within modelled habitat is considered inadequate, given the prevalence of the species outside the Nominated Areas within well connected habitats (particularly within Reserves and Protected Areas) conclusions around low likelihood of impact to life-cycle processes and impacts to fragmentation are supported.

Mitigation measures proposed to address key threats are not specific enough to address direct threats. The SCA may result in the conservation of up to 7,466 ha of mapped habitat, noting 5,325 ha of native vegetation is proposed to be targeted for offsets.

Overall, it is considered there is low increased risk of extinction for *Melaleuca deanei* given:

- no known occurrences of the species will be impacted;
- large amounts of well-connected occupied habitat and potential habitat remains in the region;
- large areas of occupied habitat and potential habitat are proposed to be conserved through the CPCP.

Micromyrtus minutiflora

Micromyrtus minutiflora is considered to be in a rapid rate of decline. However, the BCAR assesses *Micromyrtus minutiflora* against Principle 3, having a very highly restricted distribution.

The BCAR modelled 36,704 ha of habitat (using the knowledge-based method, see Appendix 6), of which 256 ha of habitat occurs within the nominated areas and 69 ha without excluded land. 31.7 ha will be impacted by urban capable land and transport corridors, representing 46% of potential habitat within the nominated areas (without excluded land) and 12% of potential habitat within the nominated areas (including excluded land) and <1% of modelled habitat. However, the habitat parameters used to model the potential habitat is not supported (see Appendix 6).

Habitat within Wianamatta RP will be fragmented with edge effects likely to impact further habitat.

No known occurrences will be impacted, and the species was not recorded during targeted surveys. The BCAR concludes that the species is absent within the OSO corridor within GPEC, and impacts in other areas will occur to “*small scattered patches of habitat*” (Orchard Hills) or to area on the edge of larger patches of potential habitat (WSA) (BCAR p. 25-88). However, not all suitable habitat was able to be surveyed, with no surveys of suitable habitat completed at Orchard Hills or Kemps Creek. Furthermore, the adequacy of the targeted surveys, including in the OSO corridor, cannot be determined as larger than recommended transect separation widths were used, and it is not clear if the survey requirements specified in the TBDC were met (see Appendix 4). The exclusion of potential habitat within the OSO corridor in GPEC potentially significantly underestimates the potential impacts of the CPCP on this species, particularly as this area represents the southern extent of the species’ stronghold at Londonderry.

The BCAR concludes that the ecology of the local population is unlikely to be affected as “*the potential for the species to occur is low*” (p. 25-89). This conclusion is not supported, because the loss of habitat along the southern margins of the species’ stronghold in Londonderry may impact on factors such as seed dispersal and recruitment.

Mitigation measures proposed to address key threats are not specific enough to address direct threats. The SCAs support an estimated 3,518 ha of potential habitat, with several SCAs supporting known occurrences.

Overall, it is considered there is low increased risk of extinction for *Micromyrtus minutiflora* given:

- the key population at Londonderry will not be directly impacted;
- large areas of occupied habitat and potential habitat is proposed to be conserved through the CPCP.

Raptors (White-bellied Sea-Eagle (Haliaeetus leucogaster), Little Eagle (Hieraetus morphnoides) and Square-tailed Kite (Lophoictinia isura))

The three Raptor species have been identified as candidates for SAIL due to the “*potential for the development to impact breeding habitat that cannot readily be created at a stewardship site*” (BCAR p. 25-94).

Modelled habitat within each area is based on both breeding and foraging habitat.

- The BAM focuses on breeding habitat. Whilst breeding habitat is referenced and mapped in the expert reports, data presented in the BCAR groups breeding and foraging habitat together, potentially confounding the ability to draw conclusions to breeding habitat.

Modelled habitat for each species is shown below. The following percentages of suitable land within the nominated areas (without excluded land) will be impacted by urban capable land and transport corridors

- Little Eagle: <1%
- Square-tailed Kite: 2%
- White-bellied Sea-eagle: 1.1%

Species	Nominated areas	Nominated areas (without excluded land)	Urban capable land and transport corridors
Little Eagle	4,090 ha	2,936 ha	28.2 ha
Square-tailed Kite	4,199 ha	2,192 ha	44.6 ha
White-bellied Sea-eagle	2,433 ha	1,617 ha	17.7 ha

There are numerous records of these species within the nominated areas, including 12 records of the Little Eagle and White-bellied Sea-eagle within the urban capable land and transport corridors. No Raptors nests were observed; however, suitable breeding habitat is considered to occur. The BCAR and expert reports conclude that breeding pairs are likely to be present within the nominated areas.

Modelled breeding habitat appears to largely occur within avoided lands (noting lack of mapping of breeding habitat outlined above). However, the expert reports for the Little Eagle and Square-tailed Kite in Wilton and GMAC note that *“protection of habitat within them {nominated areas} may be critical to the continued presence of the {species} in the area”* (Saunders and Debus 2018a, p. 32, Saunders and Debus 2018b, p. 30).

There are two mitigation strategies contained within the CPCP which are relevant to these species, including retention of large trees (Commitment 5) and establishment of ecological setbacks around Raptor nests. The SCA is proposed to support an estimated *“17,567 ha, 17,323 ha, and 13,700 ha of mapped potential breeding habitat in the SCA for the Little Eagle, Square-tailed Kite and White-bellied Sea Eagle respectively”* (BCAR p. 25-101).

Overall, the CPCP is considered a low increased risk of extinction for these Raptor species given:

- large areas of foraging habitat adjacent to mapped breeding habitat; and
- significant areas of potential breeding and foraging habitat will be conserved.

Red-crowned Toadlet (Pseudophryne australis)

The Red-crowned Toadlet is not a previously listed potential SAIL entity. The BCAR assessed the Red-crowned Toadlet against the four principles and found it had potential to become a SAIL entity due to the species’ susceptibility to Chytrid (Principle 4).

The BCAR modelled 1,082 ha of potential habitat within Wilton and GMAC (no habitat mapped within GPEC and WSA) and 869 ha without excluded land. 9.3 ha will be impacted by urban capable

land and transport corridors within Wilton and GMAC, representing 1.1% of potential habitat within the nominated areas (without excluded land).

No known occurrences of the Red-crowned Toadlet will be impacted by development of urban capable land and transport corridors, noting that minimal survey was completed for the species within Wilton and GMAC. Impacts to hydrology, including water quantity and quality, may occur as a result of the development of urban capable land and transport corridors. The Red-crowned Toadlet is particularly susceptible to changes in water quality, within significant urban development likely to occur adjacent to modelled habitat. Whilst generic water quality objectives will be incorporated into the DCP, no specific mitigation measures for the Red-crowned Toadlet are proposed.

Overall, the CPCP is considered to possibly represent a residual increased risk of extinction due to possible and even likely hydrological impacts to habitat of the Red-crowned Toadlet. In the absence of suitable surveys, modelled habitat should be considered occupied.

Appendix 5C – Entities with the Potential to Become a Serious & Irreversible Impact – Ecological Communities

This appendix summarises why EHG considers certain TECs in Table 25-2 of the BCAR could become potential SAI entities, as addressed by section 10.2.1.4 of the BAM.

Moist Shale Woodland (PCT 830)

Current status (from BioNet)	<ul style="list-style-type: none"> • NSW Endangered • Commonwealth Critically Endangered
Final determination	<p>NSW Scientific Committee (2011) includes the following information</p> <ul style="list-style-type: none"> • Paragraph 5 - Moist Shale Woodland usually occurs on soils derived from Wianamatta Shale on higher country in the southern half of the Cumberland Plain. Moist Shale Woodland is found in very similar environments to Western Sydney Dry Rainforest, but tends to occupy upper slopes while Western Sydney Dry Rainforest is often found on lower slopes and in gullies. • Paragraph 7 - Part of the Moist Shale Woodland is or has been known to occur in the Camden, Campbelltown, Fairfield, Holroyd, Liverpool, Penrith, and Wollondilly Local Government Areas, but may occur elsewhere in the Sydney Basin Bioregion. • Paragraph 9 - Moist Shale Woodland occurs in Mulgoa Nature Reserve and Western Sydney Regional Park. The area estimated in these reserves is less than 1% of the original distribution. • Paragraph 10 - Moist Shale Woodland has been extensively cleared for agriculture and urban development. NSW National Parks & Wildlife Service (2000a) estimate that about 480 ha or about 20% of the original distribution remains. Most of the remaining community has been disturbed, by tracks and clearing, weed invasion and soil disturbance. Continuing threats include invasion of exotic species, illegal dumping, fragmentation and clearing for urban, rural residential, rural and recreational development. • Paragraph 11 - In view of the originally restricted distribution of this community, its inadequate representation within conservation reserves, the extensive disturbance and weed invasion that has occurred to date, and the ongoing development and use threats, the Scientific Committee is of the opinion that Moist Shale Woodland in the Sydney Basin Bioregion is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.
Distribution (from BioNet)	<p>Moist Shale Woodland usually occurs on soils derived from Wianamatta Shale on high country in the southern half of the Cumberland Plain, and occurs mainly in Wollondilly local government area. Also occurs in smaller amounts further north in the Camden, Campbelltown, Fairfield, Liverpool and Penrith local government areas. There are 604 ha remaining intact. A small remnant can be seen in Western Sydney Regional Park.</p>
Threats (from BioNet)	<p>Threats include</p> <ul style="list-style-type: none"> • Clearing for rural, industrial and urban development. • Fragmentation • Underscrubbing • Inappropriate fire regimes • Mixed weed invasion, for example from Privet (<i>Ligustrum</i> sp.), Lantana (<i>Lantana camara</i>), Cat's Claw Creeper (<i>Dolichandra unguis-cati</i>), Asparagus Fern (<i>Asparagus aethiopicus</i>) and invasive scramblers and vines. • Erosion and landslip • Inappropriate access and illegal disturbance by recreational users, including track formation • Rubbish dumping • Livestock grazing • Increased nutrients and sedimentation from runoff. • Disturbance by feral animals such as deer, pigs, goats, rabbits etc. • Dieback of Eucalyptus canopy due to fragmentation, Psyllids and mistletoes.
Direct impacts to habitat from the CPCP (from Table 23-4 in the BCAR)	0.1 ha
Reasons why EHG considers this could be a future potential SAI entity	<p>This community has a restricted distribution in NSW, occurring only in the Sydney Basin Bioregion, with an extremely restricted area of occupancy (AOO) and extent of occurrence (EOO) within Western Sydney. In 2002 it was determined under the TSC Act that it was likely to become extinct unless the circumstances and factors threatening its survival or evolutionary development stopped operating. The CPCP will directly and indirectly impact this community, which will be in addition to other development and non-development related activities and impacts over the coming decades. While the habitats of this community are not commonly ideal development locations, the community may be heavily impacted by indirect impacts such as hydrological change, erosion, weed invasion, bushfire management, recreational disturbance and development encroachment. It is conceivable therefore, that this community could become a potential SAI entity in the future. At this point in time, it seems this would be most likely due to principles 1 and/or 2.</p>

River-flat Eucalypt Forest on Coastal Floodplains (PCT 835)

Current status (from BioNet)	<ul style="list-style-type: none"> • NSW Endangered • Commonwealth Critically Endangered
Final determination	<p>NSW Scientific Committee (2011) includes the following information</p> <ul style="list-style-type: none"> • Paragraph 3 - River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions is known from parts of the Local Government Areas of Port Stephens, Maitland, Singleton, Cessnock, Lake Macquarie, Wyong, Gosford, Hawkesbury, Baulkham Hills, Blacktown, Parramatta, Penrith, Blue Mountains, Fairfield, Holroyd, Liverpool, Bankstown, Wollondilly, Camden, Campbelltown, Sutherland, Wollongong, Shellharbour, Kiama, Shoalhaven, Eastern Capital City Regional, Eurobodalla and Bega Valley but may occur elsewhere in these bioregions. Bioregions are defined in Thackway and Cresswell (1995). Major examples once occurred on the floodplains of the Hunter, Hawkesbury, Moruya, Bega and Towamba Rivers, although many smaller floodplains and river flats also contain examples of the community. • Paragraph 9 - the remaining area of River-Flat Eucalypt Forest on Coastal Floodplains is likely to be considerably smaller and is likely to represent much less than 30% of its original range. Major occurrences include: about 2000 ha in the lower Hunter region in 1990s (NPWS 2000); less than 10 000 ha on the NSW south coast from Sydney to Moruya in the mid 1990s (Tindall et al. 2004), of which up to about three-quarters occurred on the Cumberland Plain in 1998 (Tozer 2003); and less than 1000 ha in the Eden region in 1990 (Keith and Bedward 1999). • Paragraph 10 - River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions has been extensively cleared and modified. Large areas that formerly supported this community are occupied by exotic pastures grazed by cattle, market gardens and other cropping enterprises (e.g. turf). In the lower Hunter region, about one-quarter of the original extent was estimated to have remained during the 1990s (NPWS 2000), while less than one-quarter remained on the Cumberland Plain in 1998 (Tozer 2003). • Paragraph 11 - The remaining stands are severely fragmented by past clearing and are further threatened by continuing fragmentation and degradation, flood mitigation and drainage works, landfilling and earthworks associated with urban and industrial development, pollution from urban and agricultural runoff, weed invasion, overgrazing, trampling and other soil disturbance by domestic livestock and feral animals including pigs, activation of 'acid sulfate soils', removal of dead wood and rubbish dumping (e.g. Benson and Howell 1990, Boulton and Brock 1999, Johnston et al. 2003). Anthropogenic climate change may also threaten River-Flat Eucalypt Forest on Coastal Floodplains if this affects future flooding regimes (IPCC 2001, Hughes 2003). Localised areas, particularly those within urbanised regions, may also be exposed to frequent burning which reduces the diversity of woody plant species. • Paragraph 12 - Very few examples of River-Flat Eucalypt Forest on Coastal Floodplains remain unaffected by weeds. • Paragraph 13 - The reserved examples are on localised, sheltered river flats between hills, rather than the large open floodplains that comprised the majority of the original habitat (Keith 2004). • Paragraph 14 - In view of the above the Scientific Committee is of the opinion that River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.
Distribution (from BioNet)	<p>Known from parts of the Local Government Areas of Port Stephens, Maitland, Singleton, Cessnock, Lake Macquarie, Wyong, Gosford, Hawkesbury, Baulkham Hills, Blacktown, Parramatta, Penrith, Blue Mountains, Fairfield, Holroyd, Liverpool, Bankstown, Wollondilly, Camden, Campbelltown, Sutherland, Wollongong, Shellharbour, Kiama, Shoalhaven, Palerang, Eurobodalla and Bega Valley but may occur elsewhere in these bioregions. Major examples once occurred on the floodplains of the Hunter, Hawkesbury, Moruya, Bega and Towamba Rivers, although many smaller floodplains and river flats also contain examples of the community. The remaining area is likely to represent much less than 30% of its original range. Recently recorded, major occurrences include: about 2,000 ha in the lower Hunter region; less than 10,000 ha on the NSW south coast from Sydney to Moruya, of which up to about three-quarters occurred on the Cumberland Plain in 1998; and less than 1,000 ha in the Eden region.</p>
Threats (from BioNet)	<p>Threats include</p> <ul style="list-style-type: none"> • Altered hydrology particularly from narrowing of corridors and the installation of infrastructure for flood mitigation and drainage causing: a lack of periodic flooding, water entering more quickly and in larger volumes, water not standing long enough or being inundated for too long leading to changes in floristics. • Reduced water quality via input of nutrients such as fertilisers from sports fields, market gardens, golf courses upstream. • Land clearing from urban and rural development resulting in fragmentation and narrowing of corridors. • Bell Miner associated dieback and other psyllids. • Alteration of habitat including hydrology following subsidence due to long wall mining. • Weed invasion, particularly from upstream and garden refuse being dumped from adjacent properties. • Human disturbance: rubbish dumping, motorbikes, bicycles, firewood collection, removal of woody debris, and mowing. • Agricultural activities such as grazing along creeklines, removing riparian vegetation, water harvesting and extraction from creeks. • Inappropriate fire regime leading to changes in ground and mid-storey composition. • Removal of dead wood • Rubbish dumping • Landfilling and earthworks associated with urban and industrial development • Grazing and trampling by stock and feral animals • Climate change

Direct impacts to habitat from the CPCP (from Table 23-4 in the BCAR)	185.9 ha
Reasons why EHG considers this could be a future potential SAI entity	<p>This community only occurs within the NSW North Coast, South East Corner and Sydney Basin Bioregions, and while it occurs over a rather large extent of occurrence (EOO), the area of occupancy (AOO) is restricted to inundated floodplains, river-flats and drainage lands. In 2004 it was determined under the TSC Act that it was likely to become extinct unless the circumstances and factors threatening its survival or evolutionary development stopped operating. A large percentage of the occurrence within Western Sydney is heavily disturbed due to past land practices and ongoing hydrological, weed incurrence and human activity continue to threatened the community now. This community is being heavily impacted by the CPCP which is likely to increase the pressures on the community within a landscape where it is already subject to additional pressures. It is conceivable therefore, that this community could become a potential SAI entity in the future. At this point in time, it seems this would be most likely due to principles 1 and/or 2.</p>

Shale Gravel Transition Forest (PCT 724)

Current status (from BioNet)	<ul style="list-style-type: none"> • NSW Endangered • Commonwealth Critically Endangered
Final determination	<p>NSW Scientific Committee (2011) includes the following information</p> <ul style="list-style-type: none"> • Paragraph 7 – Shale Gravel Transition Forest is or has been known to occur in the Auburn, Bankstown, Baulkham Hills, Blacktown, Fairfield, Hawkesbury, Holroyd, Liverpool, Parramatta and Penrith Local Government Areas, but may occur elsewhere in the Sydney Basin Bioregion. • Paragraph 9 – Shale Gravel Transition Forest has been cleared for agriculture and rural development. About 36% of the original distribution of about 7000 ha remains (NSW NPWS 2000a) and much of this is in a degraded state. • Paragraph 10 - Shale Gravel Transition Forest occurs in Agnes Banks Nature Reserve, Castlereagh Nature Reserve, Scheyville National Park and Windsor Downs Nature Reserve. The area in these reserves is about 3% of the original distribution. • Paragraph 11 - Much of the remaining area of Shale Gravel Transition Forest has been disturbed by clearing, tracks, weeds invasion and soil disturbance. Continuing threats include invasion of exotic species, illegal dumping, unauthorised access, fragmentation and clearing for urban, rural residential recreational and industrial development. • Paragraph 12 - In view of the originally restricted distribution of this community, its inadequate representation within conservation reserves, the extensive disturbance and weed invasion that has occurred, and the threats from ongoing development, the Scientific Committee is of the opinion that Shale Gravel Transition Forest in the Sydney Basin Bioregion is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate
Distribution (from BioNet)	<p>Mainly found in the northern section of the Cumberland Plain, western Sydney, in the Richmond, Marsden Park and Windsor districts. Also appears in the Liverpool/ Holsworthy area, and there are small occurrences at Bankstown, Yennora and Villawood and the Kemps Creek area. There are 1,721 ha remaining intact. Good examples can be seen at Windsor Downs Nature Reserve and Kemps Creek Nature Reserve.</p>
Threats (from BioNet)	<p>Threats include</p> <ul style="list-style-type: none"> • Clearing for rural, residential, and industrial development. • Fragmentation and edge effects • Underscrubbing • Invasion of exotic species African lovegrass, Coolatai grass, Whisky Grass, Tiger pear, Mother-of-Millions and Bridalcreeper. • Inappropriate fire regimes • 4WD vehicles and mountain bikes • Arson • Illegal dumping • Phytophthora infection (from the Kemps Creek Nature Reserve downstream to core TEC remnant) • Over browsing by feral deer.
Direct impacts to habitat from the CPCP (from Table 23-4 in the BCAR)	<p>108.3 ha</p>
Reasons why EHG considers this could be a future potential SAll entity	<p>This community has a restricted distribution in NSW as it only occurs in the Sydney Basin Bioregion. It has a restricted area of occupancy (AOO) and extent of occurrence (EOO), with the current extent being overestimated. The upcoming Eastern NSW PCT mapping splits this community into two PCTs that would form part of Cumberland Plain Woodland and Cook’s River/Castlereagh Ironbark Forest, which are both currently SAll entities. In 2002 it was determined under the TSC Act that it was likely to become extinct unless the circumstances and factors threatening its survival or evolutionary development stopped operating. It is noted that this community is located in areas subject to significant development, including certified areas within the North West Growth Area. The CPCP will directly and indirectly impact this community, which will be in addition to other development and non-development related activities and impacts over the coming decades. It is conceivable therefore, that this community could become a potential SAll entity in the future due to ongoing threats and development encroachment into the AOO and EOO. At this point in time, it seems this would be most likely due to principles 1 and/or 2.</p>

Appendix 5D – Entities with the Potential to Become an Serious & Irreversible Impact – Flora and Fauna

This appendix summarises why EHG considers certain species and populations in Table 25-3 of the BCAR could become at risk of SAIL, as addressed by section 10.2.1.4 of the BAM.

Species	Current status (from BioNet)	Final determination	Level of biodiversity concern (from BioNet)	Distribution, habitat and ecology (from BioNet)	Threats (from BioNet)	Direct impacts to potential habitat from the CPCP (from Table 23-5 in the BCAR)	Reasons why EES considers this could become at risk of SAIL
<i>Acacia bynoeana</i> Bynoe's Wattle	<ul style="list-style-type: none"> NSW Endangered Commonwealth Vulnerable 	<p>NSW Scientific Committee (1999) includes</p> <ul style="list-style-type: none"> Paragraph 2 - the species is currently known from about 30 locations, with the size of known populations being very small (1-5 plants), with only a few sites with 30-50 individuals. Paragraph 3 - most of the known sites are not reserved. Paragraph 4 - the main threats to this species are habitat disturbance (including road, trail and powerline maintenance, recreational vehicle use), clearing, weed invasion and too frequent fire. Due to the fragmented nature of the populations, their small size, fire mitigation activities and the proximity of urbanisation, the species is susceptible to catastrophic events and localised extinction. Paragraph 5 - in view of 2, 3 & 4 above the Scientific Committee is of the opinion that the species is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary development cease to operate. 	<ul style="list-style-type: none"> High level of biodiversity concern High sensitivity to loss High sensitivity to gain Biodiversity risk weighting 2.00 	<ul style="list-style-type: none"> Bynoe's wattle is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. The species is currently known from about 30 locations, with the size of the populations at most locations being very small (1-5 plants). It has recently been found in the Colymea and Parma Creek areas west of Nowra. Paddock trees are important habitat. Often found on trail margins. 	<ul style="list-style-type: none"> Habitat loss and fragmentation The species is susceptible to catastrophic events and localised extinctions due to fragmented and small population sizes. Road, trail and powerline maintenance. Recreational vehicles, horse riding and pedestrian use. Weed invasion. Response to fire is unknown, although it seems likely that more frequent fires could threaten the species' survival. 	434.3 ha	<p>This species has a restricted distribution and a high level of biodiversity concern. The CPCP will exacerbate its threats from direct and indirect impacts. This will be in addition to other development and non-development related activities and impacts. It is possible this species could become at risk of SAIL in the future. At this point in time, this would most likely be from principles 2 and/or 3.</p>
<i>Acacia pubescens</i> Downy Wattle	<ul style="list-style-type: none"> NSW Vulnerable 	NA	<ul style="list-style-type: none"> High level of biodiversity concern 	<ul style="list-style-type: none"> Concentrated around the Bankstown-Fairfield- 	<p>Threats include</p> <ul style="list-style-type: none"> Habitat loss 	1321.4 ha	<p>This species has a very restricted distribution, with a small area of</p>

Species	Current status (from BioNet)	Final determination	Level of biodiversity concern (from BioNet)	Distribution, habitat and ecology (from BioNet)	Threats (from BioNet)	Direct impacts to potential habitat from the CPCP (from Table 23-5 in the BCAR)	Reasons why EES considers this could become at risk of SAI
	<ul style="list-style-type: none"> Commonwealth Vulnerable 		<ul style="list-style-type: none"> High sensitivity to loss High sensitivity to gain Biodiversity risk weighting 2.00 Sensitivity to Loss: Based on the 2019 BioNet flora review, the sensitivity to loss has been increased above its listing status, to High, based on the recent rate in population decline. 	<ul style="list-style-type: none"> Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Recruitment: Little recruitment occurs due to seed dormancy. Strong seed dormancy, may require digestion to break. General: Hybridises with other wattle species (<i>A. baileyana</i> and <i>A. decurrens</i> and <i>A. jonesii</i>) Paddock trees are important habitat. 	<ul style="list-style-type: none"> Habitat degradation Disease Hybridisation Inappropriate fire regime Illegal and accidental clearing of individuals. Invasive grasses preventing recruitment. Canopy species including African Olive, Privet and Cootamundra Wattle may also be impacting on this species Management of road works Mechanical damage 		<p>occupancy (AOO < 10 km²) and a small extent of occurrence (EEO < 100 km²). It is known only from a few locations that are geographically separated from one another; in some locations, the species does not typically appear in discrete populations, but rather, it occurs as scattered individuals. The CPCP will exacerbate its threats from direct and indirect impacts. This will be in addition to other development and non-development related activities and impacts. It is possible this species could become at risk of SAI in the future. At this point in time, this would most likely be from principles 1, 2 and/or 3.</p>
<i>Eucalyptus benthamii</i> Camden White Gum	<ul style="list-style-type: none"> NSW Vulnerable Commonwealth Vulnerable 	NA	<ul style="list-style-type: none"> High level of biodiversity concern Moderate sensitivity to loss High sensitivity to gain Biodiversity risk weighting 2.00 	<ul style="list-style-type: none"> Occurs on the alluvial flats of the Nepean River and its tributaries. There are two major subpopulations: in the Kedumba Valley of the Blue Mountains National Park and at Bents Basin State Recreation Area. Several trees are scattered along the Nepean River around Camden and Cobbitty, with a further stand at Werriberri (Monkey) Creek in The Oaks. At least five trees occur on the Nattai River in Nattai National Park. Large 	<ul style="list-style-type: none"> Changes to fire intensity and frequency. Loss of regeneration opportunities. Impacts on genetic integrity. Competition from weeds including <i>Gleditsia tricanthos</i>, African olive, privet, <i>Acer negundo</i>, <i>Opuntia spp.</i>, <i>Cardiospermum grandiflorum</i>, <i>Asparagus asparagoides</i>, <i>Rubus spp.</i> & exotic grasses such as <i>Cynodon</i> & <i>Paspalum</i>. Potential for removal of key habitat via urban development. 	nil hectares*	<p>While the proposal will not likely result in direct impacts to the habitat for this species, but it will result in indirect impacts. This species has a very limited geographic distribution, with a small area of occupancy and a small extent of occurrence (AOO < 10 km² & EEO < 100 km²). This species is known from three locations that are geographically separated and are</p>

Species	Current status (from BioNet)	Final determination	Level of biodiversity concern (from BioNet)	Distribution, habitat and ecology (from BioNet)	Threats (from BioNet)	Direct impacts to potential habitat from the CPCP (from Table 23-5 in the BCAR)	Reasons why EES considers this could become at risk of SAI
				<p>areas of habitat were inundated by the formation of Warragamba Dam in 1933.</p> <ul style="list-style-type: none"> Paddock trees are important habitat. 	<ul style="list-style-type: none"> Threats from raising Warragamba Storage. 		<p>identified as SoS priority sites. The population size is rapidly declining with the total number of genetically distinct individuals being less than 2000, with extreme fluctuations seen in the number of mature individuals. The proposal to raise Warragamba Dam wall could have major impacts on the only known relatively large and independently viable population of this species at Kedumba. The IUCN has recently elevated the species from vulnerable to endangered, due to its restricted geographic range, ongoing declines and small number of locations. Currently, the NSW Scientific Committee is considering a nomination to elevate its threat level from vulnerable to endangered, or critically endangered, under the BC Act 2016. The species restricted distribution, high level of biodiversity concern, and other development related threats, could result in it becoming at risk of SAI in the future. At this point in time, it seems this would most</p>

Species	Current status (from BioNet)	Final determination	Level of biodiversity concern (from BioNet)	Distribution, habitat and ecology (from BioNet)	Threats (from BioNet)	Direct impacts to potential habitat from the CPCP (from Table 23-5 in the BCAR)	Reasons why EES considers this could become at risk of SAll
							likely be due to principles 1, 2 and/or 3.
<i>Grevillea juniperina subsp. juniperina</i> Juniper-leaved Grevillea	<ul style="list-style-type: none"> NSW Vulnerable Commonwealth Not listed 	<p>NSW Scientific Committee includes (2000)</p> <ul style="list-style-type: none"> Paragraph 3 - it is confined to Western Sydney and has been reported from the Blacktown, Hawkesbury, Liverpool, Parramatta and Penrith LGAs. It often persists along roadsides. Paragraph 4 – it has a restricted range occurring on red sandy to clay soils - often lateritic on Wianamatta Shale and Tertiary alluvium in Cumberland Plain Woodland and Castlereagh Woodland. It occurs as localised, often small populations, often on road verges. Paragraph 6 – it is threatened over most of its range due to habitat destruction including clearance for urban and industrial development, road upgrading, inappropriate fire regimes, weed invasion, rubbish dumping, trampling and vehicular damage. Paragraph 7 - in view of 3, 4, 5 & 6 above the Scientific Committee is of the opinion that <i>Grevillea juniperina</i> R. Br. subsp. <i>juniperina</i> is likely to become endangered unless the circumstances and factors threatening 	<ul style="list-style-type: none"> Moderate level of biodiversity concern Moderate sensitivity to loss Moderate sensitivity to gain Biodiversity risk weighting 1.50 	<ul style="list-style-type: none"> Endemic to Western Sydney, centred on an area bounded by Blacktown, Erskine Park, Londonderry and Windsor with outlier populations at Kemps Creek and Pitt Town. Recorded from Cumberland Plain Woodland, Castlereagh Ironbark Woodland, Castlereagh Scribbly Gum Woodland and Shale/Gravel Transition Forest. Paddock trees are important habitat. 	<ul style="list-style-type: none"> A major threat is the degradation and reduction of habitat following clearing and fragmentation of native vegetation. Other threats include disturbance by rubbish dumping, trampling, road works, dumping of fill, changes in drainage, and recreational activities. Potential risk of the entry of exotic pathogens Arson causing frequent and intense fires Invasion from exotic perennial grasses, particularly African lovegrass (<i>Eragrostis curvula</i>). Current or potential future land management practices that do not support conservation Inappropriate fire regime 	467.5 ha	<p>This species has a very restricted distribution, with a small area of occupancy (AOO < 10 km²) and a small extent of occurrence (EOO < 100 km²). It is known only from a few locations that are geographically separated from one another; in some locations, the species does not typically appear in discrete populations, but rather, it occurs as scattered individuals. The CPCP will exacerbate its threats from direct and indirect impacts. This will be in addition to other development and non-development related activities and impacts. This species could become at risk of SAll in the future. At this point in time, it seems this would most likely be due to principles 2 and/or 3.</p>

Species	Current status (from BioNet)	Final determination	Level of biodiversity concern (from BioNet)	Distribution, habitat and ecology (from BioNet)	Threats (from BioNet)	Direct impacts to potential habitat from the CPCP (from Table 23-5 in the BCAR)	Reasons why EES considers this could become at risk of SAIL
		its survival cease to operate.					
<i>Marsdenia viridiflora</i> R. Br. subsp. <i>viridiflora</i> population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	<ul style="list-style-type: none"> NSW Endangered population Commonwealth Not listed 	<p>NSW Scientific Committee (2002) includes the following</p> <ul style="list-style-type: none"> Paragraph 6 – the habitat of this population has been reduced from past clearing for agriculture and more recently from urban expansion. The population is threatened by future residential and infrastructure development. It is also threatened due to its small size and stochastic events. Paragraph 6 - its numbers have been reduced to such a critical level, or its habitat has been so drastically reduced, that it is in immediate danger of extinction, and it is disjunct and at or near the limit of its geographic range. 	<ul style="list-style-type: none"> High level of biodiversity concern High sensitivity to loss Moderate sensitivity to gain Biodiversity risk weighting 2.00 	<ul style="list-style-type: none"> Grows in vine thickets and open shale woodland. Paddock trees are important habitat. 	<ul style="list-style-type: none"> Clearing of habitat due to urban development. Threatened by stochastic events (e.g. fire) due to small population size. 	425.3 ha*	This population has a restricted distribution, with a high level of biodiversity concern. The CPCP will exacerbate its threats from direct (mainly through the clearing of shale communities in certain LGAs) and indirect impacts. This will be in addition to other development and non-development related activities and impacts. This population could become at risk of SAIL in the future. At this point in time, it seems this would most likely be due to principles 1, 2 and/or 3.
<i>Meridolum corneovirens</i> Cumberland Plain Land Snail	<ul style="list-style-type: none"> NSW Endangered population Commonwealth Not listed 	<p>NSW Scientific Committee (1997) includes</p> <ul style="list-style-type: none"> Paragraph 1 – this species is found in pockets of urban bushland, in areas associated with Wianamatta Shale and old Nepean river gravels. Paragraph 3 - collections in the Australian and Queensland Museums indicate that the species was formerly common throughout the Cumberland Plain, but recent records indicate that only small remnant disjunct populations remain. 	<ul style="list-style-type: none"> High level of biodiversity concern High sensitivity to loss High sensitivity to gain Biodiversity risk weighting 2.00 	<ul style="list-style-type: none"> Lives in small areas on the Cumberland Plain west of Sydney, from Richmond and Windsor south to Picton and from Liverpool west to the Hawkesbury and Nepean Rivers at the base of the Blue Mountains. Known from over 100 different locations, but not all are currently occupied, and they are usually isolated from each other as a result of land use patterns. Primarily inhabits Cumberland Plain Woodland and is also known from Shale Gravel 	<ul style="list-style-type: none"> Clearing and degradation of Cumberland Plain Woodland remnants. Fires at inappropriate times, or too frequently. Heavy grazing by domestic stock. Removal of coarse woody debris e.g. logs. Predation by carnivorous snails. Slashing Weed invasion and seral shift. A poor understanding of other threats to this species. 	720.1 ha	This species has a restricted distribution and a high level of biodiversity concern. It is data-deficient and cryptic. The CPCP will exacerbate its threats from direct and indirect impacts. This will be in addition to other development and non-development related activities and impacts. This species could become at risk of SAIL in the future because any significant impacts occurring to the shale based communities of

Species	Current status (from BioNet)	Final determination	Level of biodiversity concern (from BioNet)	Distribution, habitat and ecology (from BioNet)	Threats (from BioNet)	Direct impacts to potential habitat from the CPCP (from Table 23-5 in the BCAR)	Reasons why EES considers this could become at risk of SAIL
		<ul style="list-style-type: none"> Paragraph 4 – within the present disjunct populations, several morphotypes exist suggesting that there might be considerable genetic differences between extant populations. Paragraph 5 - the habitat of this species has been drastically reduced with clearing of bush and is subjected to major current development pressures, which further threaten the remaining populations. Paragraph 6 - in view of 3, 4 and 5 above, the Scientific Committee is of the opinion that the numbers of <i>i</i> have been reduced to such a critical level and its habitats have been so drastically reduced that it is in immediate danger of extinction and that <i>M. corneovirens</i> is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival cease to operate. 		<p>Transition Forests, Castlereagh Swamp Woodlands and the margins of River-flat Eucalypt Forest.</p> <ul style="list-style-type: none"> Lives under litter of bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish. Little is known of its biology, including breeding biology. 			<p>the Cumberland Plain also have the potential to commensurately contribute to the risk of extinction of the Cumberland Land Snail. At this point in time, it seems this would most likely be due to principles 1 and 2.</p>
<i>Persoonia bargoensis</i> Bargo Geebung	<ul style="list-style-type: none"> NSW Endangered Commonwealth Vulnerable 	<p>NSW Scientific Committee (2000) includes</p> <ul style="list-style-type: none"> Paragraph 3 – this species is restricted to a small area south-west of Sydney within the area bounded by Picton, Douglas Park, Yanderra and Cataract River. 	<ul style="list-style-type: none"> High level of biodiversity concern High sensitivity to loss High sensitivity to gain Biodiversity risk weighting 2.00 	<ul style="list-style-type: none"> This species is restricted to a small area south-west of Sydney on the western edge of the Woronora Plateau and the northern edge of the Southern Highlands The historical limits are Picton and Douglas Park (northern), Yanderra (southern), Cataract River 	<ul style="list-style-type: none"> Loss of habitat through clearing for urban and small-rural-lot development. Inappropriate fire regime Slashing Road maintenance Subsidence (from mining) Small populations with inbreeding depression. 	83.5 ha*	<p>This species has a restricted distribution and a high level of biodiversity concern. The CPCP will exacerbate its threats from direct and indirect impacts. This will be in addition to other development and non-</p>

Species	Current status (from BioNet)	Final determination	Level of biodiversity concern (from BioNet)	Distribution, habitat and ecology (from BioNet)	Threats (from BioNet)	Direct impacts to potential habitat from the CPCP (from Table 23-5 in the BCAR)	Reasons why EES considers this could become at risk of SAIL
		<ul style="list-style-type: none"> • Paragraph 4 – this species grows in woodland to dry sclerophyll forest, on sandstone and clayey laterite on heavier, well-drained, loamy, gravelly soils of the Hawkesbury Sandstone and Wianamatta Shale in the catchments of the Cataract, Cordeaux and Bargo Rivers. • Paragraph 5 – local populations are very small (mostly less than 8 plants) and scattered, with a total population likely to be less than 250 (in 1999). • Paragraph 6 - factors threatening the survival of this species include: the very small population sizes and their scattered distribution and absence from formal conservation areas, slashing of vegetation along fire trails, inappropriate fire regimes, off-road vehicle use, and rural and rural-residential development. • Paragraph 7 - in view of the above the Scientific Committee is of the opinion that <i>Persoonia bargoensis</i> P.H. Weston & L.A.S. Johnson is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate. 		<p>(eastern) and Thirlmere (western).</p> <ul style="list-style-type: none"> • General rate of decline noted in recent years. • Paddock trees are important habitat. 	<ul style="list-style-type: none"> • The European honeybee <i>Apis mellifera</i> may be a factor in the rarity of Bargo Geebung; although it is able to collect pollen, its method of pollen transport makes effective pollination of geebung unlikely. • Many <i>Persoonia</i> species are killed following infection by Cinnamon Fungus <i>Phytophthora cinnamomi</i>. • Grazing and agricultural activities • Powerline maintenance • Illegal dumping • Recreational vehicles 		<p>development related activities and impacts. This species could become at risk of SAIL in the future because any significant impacts occurring to the shale based communities of the Cumberland Plain also have the potential to contribute to the risk of extinction of this species. At this point in time, it seems this would most likely be due to principles 1, 2 and/or 3.</p>

Species	Current status (from BioNet)	Final determination	Level of biodiversity concern (from BioNet)	Distribution, habitat and ecology (from BioNet)	Threats (from BioNet)	Direct impacts to potential habitat from the CPCP (from Table 23-5 in the BCAR)	Reasons why EES considers this could become at risk of SAIL
<i>Persoonia nutans</i> Nodding Geebung	<ul style="list-style-type: none"> NSW Endangered Commonwealth Endangered 	NA	<ul style="list-style-type: none"> High level of biodiversity concern High sensitivity to loss Moderate sensitivity to gain Biodiversity risk weighting 2.00 	<ul style="list-style-type: none"> Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. Core distribution occurs within the Penrith, and to a lesser extent Hawkesbury, local government areas, with isolated and relatively small populations also occurring in the Liverpool, Campbelltown, Bankstown and Blacktown local government areas. The southern and northern populations have distinct habitat differences. Occurs in a range of sclerophyll forest and woodland vegetation communities, including Agnes Banks Woodland, Castlereagh Scribbly Gum Woodland, Cooks River/Castlereagh Ironbark Forest, and Shale Sandstone Transition Forest. Seed germination is promoted by fire and physical disturbance. Much of its ecology is poorly understood. Paddock trees are important habitat. 	<ul style="list-style-type: none"> Habitat loss, fragmentation and degradation Inappropriate fire regimes Competition with exotic grasses and shrubs, and the naturalised shrub <i>Acacia baileyana</i>. 	142.0 ha	This species is very rare and has a highly disjunct distribution. The majority of mature individuals are known to exist at no more than five locations, and the total number of genetically distinct individuals is less than 2500. The CPCP will exacerbate its threats from direct and indirect impacts. This will be in addition to other development and non-development related activities and impacts. This species could become at risk of SAIL in the future. At this point in time, it seems this would most likely be due to principles 1, 2 and/or 3.
<i>Pimelea spicata</i> Spiked Rice-flower	<ul style="list-style-type: none"> NSW Endangered Commonwealth Endangered 	NA	<ul style="list-style-type: none"> High level of biodiversity concern High sensitivity to loss High sensitivity to gain Biodiversity risk weighting 2.00 	<ul style="list-style-type: none"> Once widespread on the Cumberland Plain, this species occurs in two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Landsdowne to 	<ul style="list-style-type: none"> Loss of habitat to urban development. Inappropriate fire regime Mowing, grazing, spraying and slashing Illegal rubbish dumping Weeds including African olive, African boxthorn, Lantana, privets, green cestrum, blackberry, crofton weed, 	870.4 ha	This species has a restricted distribution and a high level of biodiversity concern. The CPCP will exacerbate its threats from direct (mainly through the clearing of CPW) and indirect impacts. This will be in

Species	Current status (from BioNet)	Final determination	Level of biodiversity concern (from BioNet)	Distribution, habitat and ecology (from BioNet)	Threats (from BioNet)	Direct impacts to potential habitat from the CPCP (from Table 23-5 in the BCAR)	Reasons why EES considers this could become at risk of SAIL
				Shellharbour to northern Kiama). <ul style="list-style-type: none"> Paddock trees are important habitat. 	bridal creeper and exotic grasses. <ul style="list-style-type: none"> Changed hydrology and soil movement. Nutrient-rich run-off/run-on. 		addition to other development and non-development related activities and impacts. This species could become at risk of SAIL in the future. At this point in time, it seems this would most likely be due to principles 1, 2 and/or 3.
<i>Pomaderris brunnea</i> Brown Pomaderris	<ul style="list-style-type: none"> NSW Endangered Commonwealth Vulnerable 	NSW Scientific Committee (2014) includes <ul style="list-style-type: none"> Paragraph 4 - the geographic distribution of <i>P. brunnea</i> is estimated to be highly restricted. Paragraph 5 - even with the uncertainty in the estimates of populations and numbers within populations, it is likely that the estimated number of mature individuals of <i>P. brunnea</i> is low. Paragraph 6 - populations of <i>Pomaderris brunnea</i> are subject to a number of current threats. Populations along the Nepean River have been severely disturbed by extraction of sand and gravel in the past. Invasion of the riparian zone of the Nepean River by woody weeds such as <i>Ligustrum spp.</i> (Privet) and <i>Olea europaea subsp. cuspidata</i> (African Olive). Paragraph 8 – this species is facing a very high risk of extinction NSW in the near future due to a restricted geographic 	<ul style="list-style-type: none"> High level of biodiversity concern High sensitivity to loss High sensitivity to gain Biodiversity risk weighting 2.00 	<ul style="list-style-type: none"> Brown Pomaderris is found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands and in far eastern Gippsland in Victoria. 	<ul style="list-style-type: none"> Clearing of habitat Inappropriate fire regime Forestry activities Trampling Illegal rubbish and car dumping Weed invasion (e.g. African lovegrass) and canopy thickening in areas of the southern Cumberland Plain. Grazing by native, exotic and domestic animals 	39.0 ha*	This species has a restricted distribution and a high level of biodiversity concern. The known populations contain about 600 plants, with the majority of these in south-west Sydney (Wollondilly and Camden LGAs), plus others in the Hawkesbury-Wollemi region north of Sydney and in Tuggolo State Forest south of Walcha in the northern tablelands. Only two populations are known to contain more than 100 plants, with the remainder having small numbers of plants or are of unknown size. The CPCP will exacerbate its threats from direct and indirect impacts. This will be in addition to other development and non-development related activities and impacts. This species could become at risk of SAIL in the future. At this point

Species	Current status (from BioNet)	Final determination	Level of biodiversity concern (from BioNet)	Distribution, habitat and ecology (from BioNet)	Threats (from BioNet)	Direct impacts to potential habitat from the CPCP (from Table 23-5 in the BCAR)	Reasons why EES considers this could become at risk of SAI
		distribution and low numbers of mature individuals of species.					in time, it seems this would most likely be due to principle 2.
<i>Pterostylis saxicola</i> Sydney Plains Greenhood	<ul style="list-style-type: none"> NSW Endangered Commonwealth Endangered 	<p>NSW Scientific Committee (1997) includes</p> <ul style="list-style-type: none"> Paragraph 4 – this species is known from only five current localities: Georges River National Park, Ingleburn, Holsworthy, Peter Meadows Creek and St Marys Towers near Douglas Park. Paragraph 5 - the total known population is approximately 500 individuals, and individual populations are small. Paragraph 6 - the largest known population occupies an area of only 20 x 15 metres. The localised habitat requirements mean that entire populations could be eliminated by events such as track creation, treefall or a single inappropriate fire. Part of one population has been destroyed by a track created by horse riders. Paragraph 7 - developmental pressures, and increased access and use of sites, are likely to result in habitat loss and degradation, directly threatening existing populations and reducing the area of available habitat. Paragraph 8 - in view of 5, 6 and 7 above the Scientific Committee is of the opinion that 	<ul style="list-style-type: none"> High level of biodiversity concern High sensitivity to loss Moderate sensitivity to gain Biodiversity risk weighting 2.00 	<ul style="list-style-type: none"> Restricted to western Sydney between Freemans Reach in the north and Picton in the south. There are very few known populations and they are all very small and isolated. Two populations occur within a conservation reserve (Georges River and Scheyville National Parks). 	<ul style="list-style-type: none"> Habitat loss due to clearing for development. Grazing Unauthorised collection Weed invasion Inappropriate fire regime Given extremely small population size and restricted distribution, susceptible to local extinction due to environmental and demographic stochasticity and catastrophic events. Rubbish dumping, including garden waste Slashing Trampling and unauthorised access Trail bike riding Lack of knowledge about the species distribution and ecology, including seed ecology 	47.1 ha	This species has a highly restricted area of occupancy (AOO) and is only known from a select few locations in Sydney, with only two populations occurring within conservation areas. One of the primary impacts to this species is unintentional clearing due to human disturbance. The CPCP will exacerbate its threats from direct and indirect impacts. This will be in addition to other development and non-development related activities and impacts. This species could become at risk of SAI in the future. At this point in time, it seems this would most likely be due to principles 1, 2 and/or 3.

Species	Current status (from BioNet)	Final determination	Level of biodiversity concern (from BioNet)	Distribution, habitat and ecology (from BioNet)	Threats (from BioNet)	Direct impacts to potential habitat from the CPCP (from Table 23-5 in the BCAR)	Reasons why EES considers this could become at risk of SAIL
		<i>Pterostylis saxicola</i> is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary development cease to operate.					
<i>Pultenaea parviflora</i>	<ul style="list-style-type: none"> NSW Endangered Commonwealth Vulnerable 	NA	<ul style="list-style-type: none"> High level of biodiversity concern High sensitivity to loss Moderate sensitivity to gain Biodiversity risk weighting 2.00 	<ul style="list-style-type: none"> Endemic to the Cumberland Plain. Core distribution is from Windsor to Penrith and east to Dean Park. Outlier populations are recorded from Kemps Creek and Wilberforce. Paddock trees are important habitat. Populations range in number between 10 and more than 5000 individuals, with disturbance history often important in numbers at a site. 	<ul style="list-style-type: none"> Habitat fragmentation Rural, residential and industrial development Slashing and spraying Invasive grasses, including African Lovegrass Inappropriate fire regimes disturbance from recreational users Illegal dumping, including green waste Uncontrolled vehicular access 	Table 23-5 shows that 105.5 ha* of habitat will be directly impacted. However, this does not include impacts to CPW, since this community has only recently been added to the associated vegetation types in BioNet for this species.	This species is only found on the Cumberland Plain and has a high level of biodiversity concern; its area of occupancy (AOO) is < 10 km ² and its extent of occurrence (EOO) is < 100 km ² . The species is only known from 4 locations, with a total number of genetically distinct individuals less than 2500. The CPCP will exacerbate its threats from direct and indirect impacts. This will be in addition to other development and non-development related activities and impacts. This species could become at risk of SAIL in the future. At this point in time, it seems this would most likely be due to principles 1, 2 and/or 3.

* The habitat parameters used to map the species polygon (using the knowledge-based method) are not supported by EHG (see Appendix 6).

Appendix 6 – Assessment of Knowledge-Based Method

Appendix 6 Assessment of knowledge-based method

The knowledge-based method

The knowledge-based method was devised by the Applicant for the CPCP (DOC21/960040). It was used to prepare species polygons to quantify impacts and generate credit liabilities for 27 species. The key factors driving its development and use were:

- the large size of the nominated areas
- landholder access constraints, as most of the land is in private ownership, and
- to reduce reliance on assuming presence for those 27 species.

The four key steps for the preparation of species polygons under this method are described on pages 11-38 – 11-40 of the BCAR. The knowledge-based method combines elements of the BAM process in a different sequence. In summary, they were:

- step 1 – collate information on records and habitat parameters for each species
- step 2 – assume presence for each species in certain vegetation zones i.e. in the vegetation condition states listed in the rule set (Table B-1 in Part 3 Attachments of the BCAR), with these areas forming the ‘initial species polygon’
- step 3 – change the size of the initial species polygon using the rule set for habitat parameters, which was developed under section 6.1.1.2 of the BAM
- step 4 – change the size of species polygon developed under step 2 or step 3, using the outcomes of targeted surveys (for flora species) and/or surveys of habitat components (for fauna species, and some flora species) (see Appendix 4 for a discussion of how, in most cases, the methods used to carry out targeted flora surveys were inadequate)

This approach may not be in accordance with the BAM because:

- assuming presence and carrying out targeted surveys are mutually exclusive under the BAM (sections 6.4.1.21 and 6.5.1.1)
- when assuming presence, the entire vegetation zone/s where the species is predicted to use/occur must be used for the species polygon (section 6.4.1.30)
- the requirements of section 6.1.1.2 were not met, see below for more details
- habitat suitability is assessed before the decision is made to assume presence or to carry out targeted surveys, with this decision determining how species polygons are prepared (step 5 of section 6.4)
- surveys of habitat components (steps 2 and 3 of section 6.4 of the BAM) precede the decision to assume presence and forms part of the process to further refine the list of candidate species on the subject land; they are not carried out to change the size of species polygons once presence has been assumed

Importantly however:

- it is understood that the BAM can be variously interpreted, and the BAM has had limited application to large scale strategic assessments such as the CPCP. Learning will be used to inform the 5-year review of the BAM
- difficulties in gaining access to privately owned land, or land with multiple stakeholders, is acknowledged, however, the extent of efforts made to gain access to private land early on in the project is unclear

- In applying sections of the BAM, such as those that provide for the use of additional information to inform assessments, clear justifications based on published peer-reviewed literature, are required. The BCAR would benefit from such documentation, without which it is difficult to interpret the validity of the results.

This last point is expanded below.

The use of section 6.1.1.2 of the BAM

Section 6.1.1.2 of the BAM states “An assessor may use additional information about a threatened species, in BioNet (e.g. the profile of a threatened species) or published, peer reviewed literature, when assessing the habitat suitability of a site.” Here additional information can be used to inform the assessment of habitat suitability. However, it is restricted to the use of valid sources such as in BioNet or in published, peer reviewed literature. The table below provides an analysis of information sources, in accordance with section 6.1.1.2 of the BAM, as presented in the BCAR to justify the steps taken to assess the impact of the proposal on threatened species. In general, the habitat parameters used to map the species polygons were not from valid sources.

Importantly, with the most recent version of the BAM (i.e. BAM 2020), section 6.1.1.2 has been reworded and incorporated into another section (5(2)) with the aim being to make it clear what additional information can be reviewed by assessors, and for what purpose, and to eliminate the use of section 6.1.1.2 for the development of habitat constraints not supported by the TBDC and/or published, peer reviewed literature.

The GIS modelling process

It is also noted that some of the justifications provided in the BCAR for the rule set include reference to iterations of model outputs and/or the GIS modelling process i.e. see *Persoonia bargoensis*, *Pimelea curviflora* var. *curviflora*, *Pomaderris brunnea* and *Pultenaea pedunculata* in the table below. However, the explanation for the development of the GIS model does not include information on iterations, so it is not known how they were done or how it is known they led to improvements in the model e.g. was the model tested with newly collected data?

Furthermore, while the rule set describes what the habitat parameters are, it is not explicit in what has been left out. For example, while the rule set for *Grevillea parviflora* subsp. *parviflora* appears to be quite detailed and complex, it is not clear if all appropriate ‘soils’ and ‘rock units’ were considered for inclusion.

In addition, the limitations of the various data sets used to develop the rule set have not been discussed. For example, soil landscapes and geology are typically mapped at 1:100 000 and 1:250 000 and need to be ground truthed. This type of ground truthing did not occur for the CPCP.

This makes it difficult to determine the adequacy of the method and its outputs.

The rule set (habitat parameters) used in the knowledge-based method to refine species polygons within the nominated areas (from Table B-1 in Part 3 Attachments of the BCAR), with a series of comments explaining why the parameters are, or are not, supported by EHG.

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
<i>Allocasuarina glareicola</i>	-	BioNet PCT associations: Intact, Thinned	-	-	SOILS: (Blacktown, Agnes Banks, Berkshire Park, Gynea) Justification: Existing records occur within these soils	-	-	-	Reject <ul style="list-style-type: none"> The TBDC does not list any habitat constraints and identifies paddock trees as important habitat, so restricting the suitable habitat to intact and thinned is not supported. Restricting the suitable habitat to areas underlain by the specified soil landscapes is not supported because the existing records within BioNet do not reflect the results of surveys for this species across all soil landscapes in the subject area. The parameters are not supported by the TBDC or published, peer reviewed literature about the species. 	<ul style="list-style-type: none"> Removal of Scattered Trees condition state was applied largely to exclude isolated trees throughout suburban areas in GPEC which do not support habitat for the species. It is acknowledged that in doing so there is a small risk that areas of scattered trees in more natural situations (i.e. 'paddock trees'), that may provide potential habitat for the species were excluded, but the precautionary nature of mapping all intact and thinned condition vegetation as habitat mitigates the risk that the species' habitat has been under-mapped. The total area of the scattered trees condition of associated PCTs in GPEC is 43 ha, of which a single 28 ha polygon occurs on one site that was mapped as such post public submission, with the site surveyed by a BAM accredited assessor and the species was not recorded, of the remainder, 9.5 ha occurs throughout suburban areas and is not considered habitat for the species. TBDC states Grows in Castlereagh woodland on lateritic soil and soil landscapes selected represent lateritic soils in the project area. Soil restriction is justified by SPRAT profile: This species grows on tertiary alluvial gravels, with yellow clayey subsoil and lateritic soil. These soils are low in fertility and are strongly to very strongly acidic. ... (Wilson & Johnson 1989; Matthes et al. 1996). The vast majority of associated PCTs occur on these soils, and where suitable habitat spanned the mapped change in soils the species habitat was mapped as present. 	<ul style="list-style-type: none"> Concerns remain The TBDC does not list any habitat constraints and identifies paddock trees as important habitat, so restricting the suitable habitat to intact and thinned is not supported.
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	BioNet PCT associations: Intact	> 25 ha Justification: Medium BAM patch size. Favours old growth forest and woodland attributes for	-	-	-	-	Tree height >20 m (CHM) Justification: Breeding habitat information (Higgins, 1999)	Reject <ul style="list-style-type: none"> the patch size in the TBDC is less than 5ha the full quotation for OEH (2019c) is "Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts" the restriction of suitable habitat to trees taller than 20m ignores the assessment data in the TBDC, which incorporates height of hollows (that have an opening greater than or equal to 10cm in diameter) above the ground in eucalypts, for the identification of breeding sites the Higgins (1999) handbook is insufficient justification to rule out trees less than 20m tall 	<ul style="list-style-type: none"> TBDC patch size relates to minimum patch size to be included as a predicted (ecosystem credit) and potential candidate (species credit) species. The habitat model is only looking to map breeding (species credit) habitat, therefore an increase in patch size is justified as species will forage in much smaller patches that it will breed. Within the study area patches of vegetation that could be considered close to 'old growth forest' would occur in larger patches of vegetation, as such a medium sized BAM patch size was used to differentiate suitable potential breeding habitat. Furthermore, Marchant and Higgins states: Breed in hollow, often near water, usually within tall mature sclerophyll forest with dense shrubby understorey, often in secluded 	<ul style="list-style-type: none"> Concerns remain the restriction of suitable habitat to the intact vegetation condition is not supported since the habitat constraints for breeding (see below) could occur within the thinned and scattered trees vegetation conditions; this parameter is not supported by published, peer reviewed literature Regarding the justification for increasing the patch size <ul style="list-style-type: none"> for the habitat constraint for breeding in the TBDC states "Hollow bearing trees" and "Eucalypt tree species with hollows greater than 9 cm diameter", with no mention of patch size

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
			nesting and roosting (OEH, 2019c)							<ul style="list-style-type: none"> valleys, which is not represented by small patches of vegetation in the study area The restriction of trees to 20 m high complements the TBDC requirement for hollows 9 m above the ground, as it is not possible to model hollow height, and 10cm hollows do not occur at the top of tree canopies which is the required parameter to be used in a GIS model. Data from Higgins 1999 is valid, the source is a published scientific reference that references and summarises peer reviewed literature, and when used in combination with the remaining parameters outputs a conservative and appropriate species polygon. 	<ul style="list-style-type: none"> no reference has been given for the comment "as species will forage in much smaller patches than it will breed" the TBDC states that the species "favours old growth forest and woodland attributes for nesting and roosting" and not that these are essential the patch size in the TBDC is less than 5ha Regarding "The restriction of trees to 20 m high complements the TBDC requirement for hollows 9 m above the ground ..." the TBDC states "The identification of breeding habitat will require survey or an expert report. For clearing or development assessments, presence can be assumed."
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	BioNet PCT associations: Intact	> 25 ha Justification: Medium BAM patch size. Breed in hollows, often near water, usually within tall mature sclerophyll forest with dense shrubby understorey, often in secluded valleys	-	-	-	-	Tree height >15 m (CHM) Justification: Breeding habitat information (Higgins, 1999)	Reject <ul style="list-style-type: none"> There is no connection between the referenced breeding habitat requirements and patch size; no published, peer reviewed literature has been provided to support the reduction in patch size (the TBDC lists patch size as <5ha). While it is accepted that glossy black-cockatoos require large trees with suitably sized hollows, the use of tree height >15 m is not supported without further evidence from published literature. The Higgins (1999) handbook is insufficient justification to rule out all vegetation under 15m as potential breeding habitat. Further information on the LiDAR data used and its ability to identify accurate tree height would be required to support its use for reducing species polygon area. Further information on how the LiDAR data is used would also be required e.g. if there is one tree >15m within a vegetation patch/zone/area, what area is included in habitat polygon? The TBDC identifies paddock trees as important habitat. 	<ul style="list-style-type: none"> TBDC patch size relates to minimum patch size to be included as a predicted (ecosystem credit) and potential candidate (species credit) species. The habitat model is only looking to map breeding (species credit) habitat, therefore an increase in patch size is justified as species will forage in much smaller patches that it will breed. Within the study area patches of vegetation that could be considered close to 'secluded' would occur in larger patches of vegetation, as such a medium sized BAM patch size was used to differentiate suitable potential breeding habitat. Garnett, Pedler, Corwley (1999) states nest trees on Kangaroo Island were an average of 300 m from the 'habitat edge', which based on a circular area with a 300 m radius equates to a patch of approximately 28 ha Info on LiDAR is presented below in Section B.5. LiDAR used to refine existing vegetation polygons to trees with canopy over 15m, a 1m buffer was applied to all >15m polygons to increase canopy, these polygons were then merged and used to clip the vegetation polygons to determine suitable habitat. Use of LiDAR has resulted in a conservative and appropriate species polygon. Species does not breed in paddock trees, paddock trees may be essential refuge/stepping stones, hence the removal of Scattered Trees condition from breeding habitat polygons is justified. 	<ul style="list-style-type: none"> Concerns remain The increase in patch size is not supported by published, peer reviewed literature. There is nothing in the statement "Breed in hollows, often near water, usually within tall mature sclerophyll forest with dense shrubby understorey, often in secluded valleys" that supports the increase in patch size. The inference that "secluded" would mean the "medium sized BAM patch size" is not supported. It is not appropriate to apply an inferred patch size from Kangaroo Island to the Cumberland Plain given their vastly different natural and built environments. While it is accepted that Glossy Black-Cockatoos require large trees with suitably sized hollows, the use of tree height >15 m is not supported without further evidence from published literature. The Higgins (1999) handbook is insufficient justification to rule out all vegetation under 15m as potential breeding habitat. The restriction of habitat to the Intact condition state is not supported by published, peer reviewed literature.

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
			(Higgins , 1999)								
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	BioNet PCT associations: Intact	-	-	-	-	-	-	Reject No published literature has been cited to support restricting suitable habitat to the 'intact' vegetation condition used by this project.	<ul style="list-style-type: none"> Thinned and scattered tree vegetation zones lack an intact shrub layer, and thus the species' preferred food resources. As of 07/07/21 only one record exists for the species within the entire project area (and relates to a WIRES record) despite heavy biodiversity survey coverage over the past decades. If this species occurs within the CPCP as it has been conservatively assessed to do, and for it to remain undetected, it is only likely to occur in the highest quality, undisturbed, intact habitats, hence restricting to intact vegetation only. Records of the species are heavily skewed towards large intact areas of habitat, nearly 300 records (<20 years old) occur within the drinking water catchment to the east of GMAC. Similar conclusions can be made for other areas where the species has been recorded. 	<ul style="list-style-type: none"> Concerns remain The restriction of habitat to the Intact condition state is not supported by published, peer reviewed literature.
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	BioNet PCT associations: Intact, Thinned, Scattered Trees	-	-	ROCK UNIT: ('Hawkesbury Sandstone', 'Minchinbury Sandstone')	-	-	<u>Final BCAR</u> Habitat restricted to within a 2000 m buffer on "Cliffline" DEM layer. Justification: Species roost predominantly in caves and overhangs in sandstone cliffs and forage in nearby high-fertility forest or woodland near watercourses (DERM, 2011) <u>Draft BCAR</u> Habitat restricted to within a 200	Reject <ul style="list-style-type: none"> DERM (2011) does not address buffers to roosting habitat, although it does state that "Almost all records of the species are within several kilometres of clifflines or rocky terrain, although extensive trapping and call data indicates that bats do not usually forage in sandstone habitat. Modelling based on presence-only data indicates that bats forage in fertile valleys and plains, as well as areas with moderately-tall to taller trees along water courses. The majority of records are from canopied habitat, suggesting a sensitivity to clearing, although narrow connecting riparian strips in otherwise cleared habitat are sometimes quite heavily used (DECC 2007)." (page 9) The DEM layer may be appropriate to identify clifflines but a reference is needed for exactly which layer is being used, and as per the TBDC, high resolution aerial imagery and topographic maps must be used to identify habitat. The TBDC and Species Credit Bat Survey Guide outlines the approach to create a species polygon as follows: Use high resolution aerial imagery and topographic maps to identify potential roost habitat features on the subject land when it is within 2km caves, scarps, cliffs etc. Species polygon boundary should align with PCTs on the subject land to which the species is associated (listed in the TBDC) that are within 2km of identified potential roost habitat features. Polygon must be at least 100m wide (or 50m radius for point locations such as caves) with the breeding habitat features (may be multiple) as the centroid (see Threatened Bat Survey Guide). All breeding habitat on 	<ul style="list-style-type: none"> Info on clifflines DEM layer is presented at the end of this table. Clifflines located in sandstone geologies have been used for the base of the 2 km habitat buffer based on suitable habitat surrounding the project area 	<ul style="list-style-type: none"> Concerns addressed They have modified their buffer from 200 m to 2000 m. The TBDC requires the "Use high resolution aerial imagery and topographic maps to identify potential roost habitat features on the subject land when it is within 2km caves, scarps, cliffs etc"

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
								m buffer on "Cliffline" DEM layer. Justification: Species roost predominantly in caves and overhangs in sandstone cliffs and forage in nearby high-fertility forest or woodland near watercourses (DERM, 2011)	or within 100m of the subject land and the area immediately surrounding the feature must be identified.		
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	Epacris purpurascens var. purpurascens	BioNet PCT associations: Intact, Thinned	-	-	-	-	-	-	Addressed separately	Whilst the species is known to benefit from some disturbance to regenerate the level of historical and ongoing disturbance associated with the Scattered Trees condition state is considered more intense than would benefit the species.	<ul style="list-style-type: none"> Concerns remain Restriction to the Intact and Thinned condition states is not in BioNet and is not supported by published, peer reviewed literature.
<i>Eucalyptus benthamii</i>	Camden White Gum	BioNet PCT associations: Intact, Thinned, Scattered Trees	-	Habitat restricted to within a 350 m buffer of the 'NEPEAN RIVER' Hydro Area Justification: Requires a combination of deep alluvial sands and a flooding regime to recruit seedlings (OEH, 2019c) and captures extent of species records	RockUnit IN ('Alluvium', 'Bringelly Shale', 'Hawkesbury Sandstone')	Between 25 to 300 m (OEH, 2019c)	-	-	Reject <ul style="list-style-type: none"> regarding the 350m buffer, this information is not in the TBDC and no published, peer reviewed literature about this species is cited for this the justification includes the "extent of species records" but Bionet records cannot be used to justify restrictions as they do not represent complete presence/absence data for the species this should be referred to the Accountable Officer 	<ul style="list-style-type: none"> The project area does not support the species' characteristic riverbank and alluvial floodplain habitat (required to facilitate seedling recruitment) in the vicinity of proposed certified land. Certified land occurs within 800 m of Mulgoa Creek and a species record; however the certified land occurs 30-40 m higher in elevation than the watercourse, and vegetation in that area is mapped as PCT 850, illustrating the non-floodplain nature of the habitat. Certified land occurs near Manangle Park but this is over 1.5 kms from the watercourse and is surrounded by unsuitable PCT 850 habitat. A 350 m buffer was determined as appropriate through numerous iterations of the habitat model and is considered suitable to represent an area supporting "a combination of deep alluvial sands and a flooding regime to recruit seedlings". It is acknowledged that BioNet records do not represent complete presence/absence data for the species, however the 763 records dataset is best available and its application and use in this instance is considered appropriate. 	<ul style="list-style-type: none"> Concerns remain This should be referred to the Accountable Officer "numerous iterations of the habitat model" is referred to but it is not known what this means; in the description of the knowledge-based method in the BCAR, reference is made to "habitat parameters applied to the GIS model" (page 11-38) and no mention is made of verifying the habitat parameters in the field, or through the addition of more data. As such, it is not clear what the iterations were based on and how numerous iterations for this species resulted in an "appropriate" buffer of 350 m. No published, peer reviewed literature is cited for the 350 m buffer.

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower Grevillea	BioNet PCT associations: Intact, Thinned	-	-	SOILS: ('Berkshire Park', 'Lucas Heights', 'Wianamatta (South Creek) ROCK UNIT: ('Alluvial Channel deposits-in-channel bar', 'Alluvial Floodplain deposits', 'Alluvium', 'Mittagong Formation', 'Alluvial terrace deposits') Justification: Sydney region occurrences are usually on Tertiary sands and alluvium, and soils derived from the Mittagong Formation. Soil Landscapes include Lucas Heights or Berkshire Park (OEH 2018c) Habitat also present where PCTs occur on or w/in 200 m of Hawkesbury soils AND sandstone geology (Hawkesbury Sandstone) (i.e.	Between 25 to 300 m (OEH, 2019c)	-	-	Reject The restriction of suitable habitat to "Intact, thinned" vegetation is not supported because the TBDC identifies paddock trees as important habitat. The soil/geology restrictions are not supported because <ul style="list-style-type: none"> no published, peer reviewed literature about the distribution of this species has been cited the justification includes reference to records of the species, however Bionet records cannot used to justify restrictions as they do not represent complete presence/absence data for the species this species is in the Data Deficient stream of the Saving our Species program because "little is known about its distribution or the management techniques required to secure it in the wild" https://www.environment.nsw.gov.au/savingourspeciesapp/Project.aspx?results=c&ProfileID=10373 	<ul style="list-style-type: none"> TBDC notes the species often occurs in open, slightly disturbed sites such as along tracks. Scattered trees vegetation zones are considered highly disturbed (and often not representing 'paddock trees') and thus not suitable for the species. TBDC states that Sydney region occurrences are usually on Tertiary sands and alluvium, and soils derived from the Mittagong Formation. Soil landscapes include Lucas Heights or Berkshire Park. The Soil / geology restriction applied is based on interpretation of TBDC information to model the species transitional soil habitat requirements in a way that can be used in a GIS habitat model. It is acknowledged that BioNet records do not represent complete presence/absence data for the species, however the >1400 records dataset (proximal to the project area) is best available and its application and use in this instance is considered appropriate. It is acknowledged that the species is considered data deficient and "little is known about its distribution, or the management techniques required to secure it in the wild", however in modelling habitat polygons for the species we have used best available data and feel the outputs are conservative and appropriate to use as the species polygon 	<ul style="list-style-type: none"> Concerns remain Regarding paddock trees <ul style="list-style-type: none"> the TBDC identifies paddock trees as important habitat, and the BAM defines paddock trees on page 76 the BCAR defines the scattered tree vegetation condition as (page 11-14) "This condition state includes a single tree or small group of trees surrounded by native or exotic pasture or areas of cultivation. Other structural components of the vegetation have typically been removed. This condition state was assigned during the desktop mapping to areas where the Nearmap imagery and LiDAR canopy polygons indicated one or a few likely native trees surrounded by cleared land" the scattered tree condition state could include paddock trees as listed in the TBDC It is not known which soil landscapes were eliminated from their 'Soil/Geology Restrictions' habitat parameters, along with the reasons why this species is in the Data Deficient stream of the Saving our Species program because "little is known about its distribution or the management techniques required to secure it in the wild"

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
					must satisfy both criteria) Justification: at least 80 of the 97 records of the species that occur outside Lucas Heights soils (around Wilton and GMAC) meet the above criteria						
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	BioNet PCT associations: Intact	>5 ha Justification: Exclude small isolated patches of vegetation from habitat model	Habitat restricted to within 350 m around (Strahler order >3 or any waterbody include hydronametype IN ('BRANCH', 'DAM', 'LAKE', 'LAKES', 'RESERVOIR', 'RIVER', 'ARM')) Justification: Selection of nest site data (Dennis, McIntosh et al., 2011)	-	-	-	-	Reject The reference provided for exclusion of smaller patch sizes from habitat polygons (Dennis, McIntosh et al, 2011) is a publication specifically in relation to White-bellied sea-eagles in South Australia and the effects of human disturbance. The report focuses on the breeding success with different levels of habitat disturbance and finds that increased levels of disturbance impact on the proportion of successful fledging. It doesn't predict a minimum patch size for breeding habitat and doesn't support the change in patch size. The TBDC specifies that breeding habitat is live large old trees within 1km of rivers, lakes, large dams, creeks, wetlands and coastlines. There is no justification provided for restricting habitat to within 350m around waterbodies. Use of strahler order >3 and waterbodies restricted to 'branch', 'dam' 'lake' etc. may also exclude appropriate habitat such as wetland and coastal areas. The TBDC identifies paddock trees as being important habitat.	<ul style="list-style-type: none"> • TBDC patch size relates to minimum patch size to be included as a predicted (ecosystem credit) and potential candidate (species credit) species. The habitat model is only looking to map breeding (species credit) habitat, therefore an increase in patch size is justified as species will forage in much smaller patches that it will breed. • Dennis, McIntosh et al, 2011 is used to justify an appropriate buffer from watercourses not patch size. The paper notes all but one nest (~350 m) was within 250 m of the coastline, this data in combination with Debus (2008) that states the nests monitored in that study were all within 425 m of a watercourse, was used to derive 350 m as a realistic breeding habitat buffer in the context of the CPCP. • TBDC breeding constraint notes Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines therefore paddock trees are not considered important for breeding, but for essential refuge/stepping stones. Therefore, the removal of the Scattered Trees condition state from breeding habitat polygons is considered justified. • No wetlands were excluded based on the GIS selection of waterbodies as detailed, 'coastal areas' are not mapped within/surrounding the CPCP. 	<ul style="list-style-type: none"> • Concerns remain • The TBDC states that paddock trees are important habitat "within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines" • The TBDC identifies patch size as less than 5 ha. No published, peer reviewed literature has been cited for the increase in patch size. • No relevant published, peer reviewed literature has been cited to support the waterways parameter i.e. <ul style="list-style-type: none"> ○ Dennis, McIntosh et al 2011 is about the effects of human disturbance on White-bellied Sea-eagles in South Australia (Kangaroo Island) and it highlights a unique factor about nest locations in SA "These results indicate that to mitigate further Sea-Eagle population decline in South Australia, site-specific habitat management prescriptions, which include buffer-zone refuge provisions, are required to minimise the effects of human activity on breeding outcomes. Such prescriptions need to take into account that, unique to South Australia, most nests are on cliffs in open coastal landscapes with little visual screening over long distance, thus refuge dimensions should be double those prescribed elsewhere for nests in tall forest habitat." (page 179) ○ Debus (2008) is a study in northern, inland NSW. This paper states "The

Habitat parameters									EHG CPCS Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
											<p>nests of all four pairs in this study were in living trees in woodland within 1 km of water, in positions varying from near a lake or river margin, to on a ridge overlooking a river or lake (Table 2)" (page 169) and "At Jervis Bay, the nests of four pairs were all in large living Blackbutts Eucalyptus pilularis in open forest: variously 150 m, 400 m, 800 m and 900 m from the nearest major water body (lagoon, estuary or sea); three were in or on the flank of a minor gully." (page 169).</p>
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	BioNet PCT associations: Intact	>5 ha Justification: Exclude small isolated patches of vegetation from habitat model	Habitat restricted to within 300 m of 1st, 2nd, and 3rd order watercourses, excluding overlapping areas within 300 m from a 4th (or higher) order watercourse Justification: Burrows in the creek bank. Eggs are laid in burrows or under vegetation in small pools. Breeding habitat of this species is generally soaks or pools within first or second order streams. (up to 300 metres from breeding site (first and second order	ROCK UNIT: ('Hawkesbury Sandstone', 'Minchinbury Sandstone') and SOILS not in ('Blacktown', 'Glenorie', 'Luddenham', 'Picton', 'West Pennant Hills') Justification: Found in vegetation on a variety of soil types except those that are clay based (OEH, 2019c)	-	-	-	<p>Partially supported</p> <p>It is unclear why the patch size within the TBDC has not been used, which limits the patch size to 5-<25 ha. Using > 5 ha will likely result in a larger species polygon area. Recommend using the patch size in the TBDC.</p> <p>Accept restriction of habitat polygon to within 300 m of 1st, 2nd, or 3rd order watercourses (this is supported by information in NSW Survey Guide for Threatened Frogs and DPIE Threatened Species Profile). In addition to wetland PCTs, constructed dams and other waterbodies also need to be included.</p> <p>It is unclear what it means by overlapping areas within 300m from a 4th (or higher) order watercourse are excluded. Does this mean that areas that are within 300m of a 1st, 2nd or 3rd order watercourse and that are also within 300m of a 4th (or higher) order watercourse are excluded? If this is the case, this is not supported by DPIE information and further information on why these areas are excluded is required.</p> <p>Exclusion based on soil features has been justified by the DPIE Threatened Species Profile, which states that the species is not found on clay-based soils. The draft Recovery Plan for the species (2009) suggests that while looser soils that would be easier to burrow into are likely to be preferable, there is not sufficient data on soil types to assess if soils contribute significantly to the frog's distribution.</p> <p>Further information is required on the soils layer being used. The species has been recorded on over 30 geological units.</p>	<ul style="list-style-type: none"> Breeding habitat of this species is generally soaks or pools within first or second order streams, and the frog spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites. Areas within 300m of 4th or higher watercourses associated with non-clay-based soils within the project area represent steep slopes not characteristic of the species preferred habitat of small slow flowing clear water courses, broad upland gullies, stream headwaters and permanently moist soaks and pondages are preferred (NSW NPWS 2001b). No certified land occurs within 300 m of >4th order streams, no dams occur within suitable vegetation, no other waterbodies are relevant. Soil restrictions represent non-clay soils within the CPCS. 	<ul style="list-style-type: none"> Concerns remain The soils exclusions cannot be accepted without further justification and information on accuracy of the soils layer being used (noting too, that soil landscape are typically mapped at 1:100 000 and were not ground truthed for this assessment).

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
				streams) (OEH, 2019d)							
<i>Hieraetus morphnoides</i>	Little Eagle	BioNet PCT associations: Intact, Thinned	>5 ha Justification: Exclude small isolated patches of vegetation from habitat model	-	-	-	Habitat excluded from within 215 m of a dwelling and 65 m from industrial building Justification: Little Eagle expert report for WGA and GMGA (Saunders and Debus, 2018)	Minimum tree height restricted to 20m Justification: Nest trees height determined in WSG and GMGA expert report (Saunders and Debus, 2018)	Reject An expert report was prepared for the Wilton and GMAC areas, but not for the WSA and GPEC areas. The expert report for the Wilton and GMAC areas references C. Larkin et al. unpublished data that suggests that a nest-tree height of 20.5m is a minimum criteria for active nest-site characteristics in the Armidale area. It appears the expert report uses multiple criteria to assess breeding habitat though and does not restrict the breeding habitat to trees greater than 20m. The criteria used in the expert report includes "Site contains tall open forest or woodland" and "Site has tall or emergent trees suitable for nesting". The Expert Report also states in relation to the minimum requirements detailed in C. Larkin's unpublished data that the Greater Macarthur and Wilton growth areas are more similar to Canberra than to Armidale and that the minimum nesting requirements for Canberra are more relevant to this study. Elsewhere, the expert report states that Little Eagles will nest in tall living eucalypts between 5 and 30 m tall. As such, there is insufficient justification to limit breeding habitat within the WSA and GPEC areas to a minimum tree height of 20m. Further information on LiDAR data utilised and its ability to identify accurate tree height would also be required to support its use for reducing species polygon area. The patch size in the TBDC is < 5ha. No published, peer reviewed literature has been cited to justify the alteration to this. The habitat exclusion of within 215m of a dwelling and 65m from an industrial building appears to come from Rae et al. 2018. It is not clear whether the expert report for Wilton and GMAC utilised this criteria in creating the species polygons. Further justification would be required for use of this criteria with information on the details of the published paper and its relevance to the WSA and GPEC areas. The TBDC identifies paddock trees as important habitat and states "Paddock trees can provide important breeding (sic) habitat (there are examples of nest trees in ACT)."	<ul style="list-style-type: none"> Relevant parameters detailed in the expert report prepared for the Wilton and Greater Macarthur growth areas have been used in the preparation of this habitat model. It is acknowledged that the report states the species will nest in tall living eucalypts between 5 and 30 m tall in open forest, woodland, and remnant woodland in farmland, however this is considered to be provided for background context and the report then states clearly that the minimum nesting requirements as per a review of the literature are provided in Tables 1 and 2 below. Table 1 states setbacks from development and Table 2 states minimum criteria for nest site characteristics. The GIS habitat model considered both "Site contains tall open forest or woodland" and "Site has tall or emergent trees suitable for nesting" through PCT associations and the use of LiDAR to determine trees 20 m tall and higher. The report states that "the minimum nesting. Requirements for Canberra in Table 1 are more relevant to this study". Table 1 has been used for setbacks from development, Table 2 has been used for nest tree height. TBDC patch size relates to minimum patch size to be included as a predicted (ecosystem credit) and potential candidate (species credit) species. The habitat model is only looking to map breeding (species credit) habitat, therefore an increase in patch size is justified as species will forage in much smaller patches that it will breed. Furthermore, the expert reports states Nests are typically in an emergent eucalypt, the tallest in the stand and often with the largest girth, in woodland patches at least 4.8 ha in size (average 85 ha), this 4.8 ha criteria was rounded up to 5 ha, but is still well below the average size noted. It is acknowledged that the TBDC states Paddock trees can provide important breeding habitat however this is generic statement relevant to the species' range across all of NSW and is not supported by the expert reports prepared for the project area. Therefore, the removal of the Scattered Trees 	<ul style="list-style-type: none"> Concerns remain Regarding the expert report for Wilton and GMAC, the criteria listed in Table 1 and Table 2 were not used to develop their species polygons. The report lists seven criteria used to identify important habitat (see PDF page no. 885/1583 in DOC21/942237), none of which were distances from a dwelling or industrial building, or tree height. Also, PDF page no. 888/1583 states "Details of each site's location, their PCTs and which of the criteria were satisfied are listed below (see Table 3) and a more-detailed description of each site can be found in Appendix 1." (Table 3 is on PDF page no. 889). Furthermore, a quick look at some of the mapping shows that 'breeding and foraging habitat' (coloured red) occurs immediately adjacent to (i.e. within 215 m of a dwelling) urban development e.g. see Figure 4 on PDF page no. 903/1583, where the northern most 'square' of this type of habitat occurs right next to Broughton St and Almond St, Wilton. The patch size in the TBDC is < 5ha. As stated in the adjacent column, the expert report states nests are typically in woodland patches at least 4.8 ha in size. The TBDC identifies paddock trees as important habitat and states "Paddock trees can provide important breeding (sic) habitat (there are examples of nest trees in ACT)."

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
										condition state from breeding habitat polygons is considered justified. Furthermore, this is supported by the expert mapped habitat polygons.	
<i>Lophoictinia isura</i>	Square-tailed Kite	BioNet PCT associations: Intact	>5 ha Justification: Exclude small isolated patches of vegetation from habitat model	Habitat restricted to within 350 m around Strahler order 3+ watercourses or any waterbody include hydronametype IN ('BRANCH', 'DAM', 'LAKE', 'LAKES', 'RESERVOIR', 'RIVER', 'ARM')) Justification: Species shows a particular preference for timbered watercourses, with nest sites generally located along or near watercourses (OEH, 2019c)	-	-	-	-	Reject An expert report has been prepared for the Greater Macarthur and Wilton areas but not for WSA and GPEC areas. The DPIE Threatened Species Profile outlines that the species shows a particular preference for timbered watercourses, with nest sites generally located along or near watercourses. The Expert Report for the Greater Macarthur and Wilton areas outlines that the species shows a preference for timbered watercourses and the records in the areas support that timbered watercourses are an important habitat requirement for the Square-tailed kite. The watercourse restriction may be appropriate, but further discussion with the Accountable Officer is required. Further justification is also required on why 350m has been chosen as the buffer and why only strahler order 3+ watercourses have been included. No justification with reference to published literature has been provided to support alteration to the patch size in the TBDC.	<ul style="list-style-type: none"> • TBDC patch size relates to minimum patch size to be included as a predicted (ecosystem credit) and potential candidate (species credit) species. The habitat model is only looking to map breeding (species credit) habitat, therefore an increase in patch size is justified as species will forage in much smaller patches that it will breed. • Furthermore Table 2 of the expert report states the minimum requirement for forest/woodland patch size is 5 ha and <i>in fragmented landscapes with much larger patches nearby</i>. • "Timbered watercourses" present within the GPEC and WSA growth areas are generally represented by Strahler order 3+ watercourses. There are a limited number of 2nd order streams in Orchard Hills and Wianamatta RP, however these areas not subject to certification. • A 350 m setback was developed through the iterative development of the habitat model process and with reference to the habitat requirements outlined in the expert report of <i>the site is near or along a timbered watercourse</i>. 	<ul style="list-style-type: none"> • Concerns remain • Further discussion with the Accountable Officer is required • Regarding the 350 m setback for the waterways parameter <ul style="list-style-type: none"> ○ as mentioned for Camden White Gum, it is not understood what the iterative development of the habitat model was and how this resulted in improved habitat parameters ○ no published, peer reviewed literature has been cited for the 350 m setback
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> - endangered population	Marsdenia viridiflora subsp. <i>viridiflora</i> - endangered population	BioNet PCT associations: Intact, Thinned	-	-	-	-	LGAs IN ('BANKSTOWN', 'BLACKTOWN', 'CAMDEN', 'CAMPBELLTOWN', 'FAIRFIELD', 'HOLROYD', 'LIVERPOOL', 'PENRITH')	-	Reject The TBDC identifies paddock trees as important habitat.	<ul style="list-style-type: none"> • Removal of Scattered Trees condition state was applied largely to exclude isolated trees throughout suburban areas in GPEC which do not support habitat for the species. It is acknowledged that in doing so there is a small risk that areas of scattered trees in more natural situations (i.e. 'paddock trees'), that do provide potential habitat for the species were excluded, but the precautionary nature of mapping all intact and thinned condition vegetation as habitat mitigates the risk that the species' habitat has been under-mapped. Inclusion of Scattered Trees would have over-mapped the species' habitat by approximately 120 ha. 	<ul style="list-style-type: none"> • Not supported • The TBDC identifies paddock trees as important habitat and no published, peer reviewed literature has been cited for the Veg condition parameter.

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
<i>Maundia triglochmoides</i>	-	BioNet PCT associations: Intact, Thinned	-		SOILS: (Berkshire Park, Birrong, Blacktown, Deep Creek, Freemans Reach, Glenorie, Lane Cove, Monkey Creek, Picton, Richmond, Wianamatta (South Creek), Teresa Park, Upper Castlereagh) Justification: Grows on heavy clay (OEH, 2019c)	-	-	-	Reject OEH (2019c) states "Grows in swamps, lagoons, dams, channels, creeks or shallow freshwater 30 - 60 cm deep on heavy clay, low nutrients", which does not, in itself, support the restriction of suitable habitat to the soil landscapes listed under 'Soil/Geology restrictions'. The TBDC states "Species is unpredictable. Appears to be somewhat dependent on water quality so a population can go from prolific to nothing and back again over time. It can be absent for many years and then flourish." An expert report may be required given its unpredictability.	<ul style="list-style-type: none"> When the associated PCTs are considered, the soils restriction supports "Grows in swamps, lagoons, dams, channels, creeks or shallow freshwater 30 - 60 cm deep on heavy clay, low nutrients" (as per TBDC). The GIS model accounts for potential unpredictability by applying broad parameters around PCT and soil associations only, ultimately mapping all areas of potential habitat. The use of an expert report is not considered warranted due to the conservative nature of the habitat model. 	<ul style="list-style-type: none"> Concerns remain An expert report may be required given its unpredictability.
<i>Micromyrtus minutiflora</i>	-	BioNet PCT associations: Intact, Thinned	-	-	-	Up to 50 m (Doug & Lyn, 1998)	-	-	Reject There are approximately 10 records in Bionet, around Richmond, that are above 50m, and two records around Penrith at 170m and 190m. The cited reference dates to 1998. The TBDC identifies paddock trees as important habitat.	<ul style="list-style-type: none"> A review of an as-held BioNet extract from 07/07/21 shows all records within, and to the north of, the Project area occurring at ~50 m elevation or less (470 of the total 472 BioNet records). With Richmond generally siting at around 20 m elevation. It is acknowledged that there are two records of the species occur at higher elevations near Fairlight Rd, Mulgoa, however these were considered outliers, and the published literature referenced, combined with 99.5% of BioNet records, were considered suitable to use as a habitat parameter. Removal of Scattered Trees condition state was applied largely to exclude isolated trees throughout suburban areas in GPEC which do not support habitat for the species. It is acknowledged that in doing so there is a small risk that areas of scattered trees in more natural situations (i.e. 'paddock trees'), that do provide potential habitat for the species were excluded, but the precautionary nature of mapping all intact and thinned condition vegetation as habitat mitigates the risk that the species' habitat has been under-mapped. 	<ul style="list-style-type: none"> Concerns remain it is not clear if the use of Doug and Lyn (1998) is acceptable given the age of this reference, and given there are a number of records at Cranebrook above 50 m. The TBDC identifies paddock trees as important habitat and no published, peer reviewed literature has been cited for the Veg Condition parameter.

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
<i>Myotis macropus</i>	Southern Myotis	BioNet PCT associations: Intact, Thinned, Scattered Trees	-	All waterbodies in the Plan Area with pools/reaches of water 3 m or wider and areas of habitat within 200 m of these waterbodies where they occur on the subject land and coincide with the relevant PCTs (OEH, 2019d)	-	-	-	-	Accept	<ul style="list-style-type: none"> Species polygon prepared in accordance with 'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method (OEH, 2019d) 	Concerns addressed
<i>Ninox connivens</i>	Barking Owl	BioNet PCT associations: Intact	>25 ha Justification: Moderate BAM patch size, remove isolated patches	Restricted to within 100 m of a watercourse Justification: Breeding habitat known to be similar and more restrictive than Powerful Owl (DEC, 2006)	-	-	-	Vegetation within "Gullies" DEM layer. Justification: Breeding habitat known to be similar and more restrictive than Powerful Owl (DEC, 2006)	Reject The publication used to justify restriction of habitat to within 100m of a watercourse is the Recovery Plan for Powerful Owl, Sooty Owl and Masked Owl, and it does not include any information on the habitat of the Barking Owl. Further justification with reference to published literature specific to the Barking Owl is required to restrict the species polygon to within 100m of watercourses. Further information is also required on the DEM "gullies" layer and whether this is appropriate to identify minor drainage lines. The TBDC identifies paddock trees as being important habitat and also states "Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey found on these fertile riparian soils." so restricting the vegetation condition to 'intact' is not supported.	<ul style="list-style-type: none"> The species typically breeds in hollows of large eucalypts or paperbarks, usually near watercourses or wetlands (NPWS, 2006). The species seems most abundant in the largest remnants but also occurs at low density in fragmented habitat, where it uses healthy riparian woodland or gallery forest amid extensive, diverse woodland supporting a diversity of native prey. (Debus, 2001). Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey found on these fertile riparian soils. (BioNet, 2021b). It was also noted that Barking Owl habitat has a strong spatial association with hydrological features such as rivers and wetlands (Taylor & Kirsten, 1999). Info on DEM "gullies" layer is provided at the end of this table, the layer was able to accurately map the occurrence of gullies and a GIS section process was then used to capture those gullies that occur within 100m of mapped watercourses. TBDC reference is generic to the species entire distribution across NSW, specifically the example given refers to western NSW, where 'timbered watercourses in heavily cleared habitat' would be the highest quality habitat available and the only areas close to representing 'intact' vegetation. Thus, restricting habitat to intact vegetation is justified. Species use of paddock trees considered to be for essential refuge/stepping stones, not breeding. Therefore, the removal of the Scattered Trees condition state from breeding habitat polygons is considered justified. 	<ul style="list-style-type: none"> Concerns remain No relevant published, peer reviewed literature has been cited for restricting the species polygon to within 100m of watercourses How is it known that the DEM gullies layer was "able to accurately map the occurrences of gullies"? Was the mapping ground truthed? The TBDC does use western NSW as an example but it is an example only, and does not represent all instances where these species are able to breed successfully along timbered watercourses in heavily cleared habitats. No published, peer reviewed literature has been used to support increasing the patch size from less than 5 ha (as stated in Bionet) to > 25 ha.

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
<i>Ninox strenua</i>	Powerful Owl	BioNet PCT associations: 'Intact'	-	Restricted to within 100 m of a watercourse Justification: Nests in old hollow eucalypts in unlogged, unburnt gullies and lower slopes within 100 m of streams or minor drainage lines (DEC, 2006)	-	-	-	Vegetation within "Gullies" DEM layer. Justification: Nests in old hollow eucalypts in unlogged, unburnt gullies and lower slopes within 100 m of streams or minor drainage lines (DEC, 2006)	More information needed The DEC (2006) Recovery Plan has been referenced to support the restriction of breeding habitat to within 100m of drainage lines. The Lake Macquarie Large Forest Owl Planning and Management Guidelines (2014) and Powerful Owl Project: Conserving Owls in Sydney's urban landscape (Bain et al., 2014) also reference nesting sites usually within 100m of drainage lines. As this literature suggests that nesting sites are usually within 100m of drainage lines, this habitat restriction might be supported, however, the BAM requires that the species polygon includes a buffer of 100m from nest sites to minimise disturbance/avoid clearing. As such, discussion is required with the Accountable Officer to see if a more appropriate species polygon would include land within 200 m of drainage lines. Further information is also required on the DEM "gullies" layer and whether this is appropriate to identify minor drainage lines. The TBDC states "As most prey species require hollows and a shrub layer, these are important habitat components for the owl." However, this does not justify restricting vegetation condition to 'intact'.	<ul style="list-style-type: none"> DEM "gullies" layer has been used to map breeding habitat for the species, information is provided at the end of this table. DEC (2006) states the species breeds in hollow eucalypts in unlogged, unburnt gullies, the Intact vegetation condition is considered to represent this requirement. Thus restricting habitat to intact vegetation is justified. 	<ul style="list-style-type: none"> Concerns remain Discussion is required with the Accountable Officer to see if a more appropriate species polygon would include land within 200 m of drainage lines. The inference that DEC (2006) supports restriction of the Veg condition to intact is not supported. The TBDC states "As most prey species require hollows and a shrub layer, these are important habitat components for the owl." However, this does not justify restricting vegetation condition to 'intact'.
<i>Persicaria elatior</i>	-	BioNet PCT associations: Intact, Thinned, Scattered Trees, DNG	-	Habitat mapped within vegetation polygons occurring within 50m of the following Hydro Areas: Anabranche, Backwater, Billabong, Branch, Cowal, Creek, Pond, River, Stream, Swamp, Watercourse, Waterway Justification: Species grows in damp places, especially beside streams and lakes, occasionally in swamp forest (OEH, 2019d)	SOILS: (Wianamatta (South Creek), 'Richmond', 'Freemans Reach', 'Berkshire Park', 'Upper Castlereagh) Justification: Species grows on sandy, alluvial soil (DEWHA, 2008c)	-	-	-	Reject This should be referred to the Accountable Officer. No description/explanation has been given of the Hydro layer used, and it has not been explained, and it is not clear, how the citations support the 'waterways' and 'soil/geology restrictions'. The habitat constraints listed in the TBDC are: semi-permanent/ephemeral wet areas or within 50m; swamps or within 50m; and waterbodies including Wetlands, or within 50m.	<ul style="list-style-type: none"> 'Hydro layer' is NSW Water Theme of the Foundation Spatial Data Framework (FSDF) - Hydro Line © Spatial Services 2021 and NSW Water Theme of the Foundation Spatial Data Framework (FSDF) - Hydro Area © Spatial Services 2021 – part of the LPI set of topography spatial layers. No condition restriction has been applied, so when combined with associated PCTs, proximity to waterbodies and sandy/alluvial soil restriction (based on soils occurring in the project area) the habitat model reflects the requirements as listed in the TBDC and publish information on the species. 	<ul style="list-style-type: none"> Concerns remain This should be referred to the Accountable Officer.

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
<i>Persoonia bargoensis</i>	Bargo Geebung	BioNet PCT associations: Intact, Thinned	-	-	ROCK UNIT: ('Hawkesbury Sandstone', 'Minchinbury Sandstone', 'Mount Hercules Sandstone Member', 'Razorback Sandstone Member') AND Blacktown, Glenorie, Picton, Luddenham soil Landscapes within 80 m of the edge of the sandstone geology. Justification: Species favours interface soil landscapes such as between the Blacktown Soil Landscape and the complex Mittagong Formation soils (Lucas Heights Soil Landscape) with the underlying sandstone (OEH, 2019d)	0 - 450 m Justification: As detailed in Cunninghamia Vol. 6(4): 2000, increased based on records around Bargo (Doug & Lyn, 1998)	-	-	Reject It is not explained how OEH (2019c) supports the 'soil/geology restrictions'. Geology mapping is notoriously coarse (mapped at 250K), and it is not known why 'within 80m' was chosen. The TBDC identifies paddock trees as important habitat and also states "Like most geebung (Persoonia species) this species seems to benefit from the reduced competition and increased light available on disturbance margins including roadsides", so restricting the suitable habitat to the 'intact' and 'thinned' condition states is not supported.	<ul style="list-style-type: none"> Soil restrictions as detailed were those relevant to the project area and were used to constrain the GIS model to map habitat in the area of transition between/ surrounding mapped soil types (as referred to in the TBDC). This restriction was necessary due to the species being associated with several PCTs that occur away from this transitional zone (as well as on/near it), PCT 849 for example. The restriction of 80 m was selected as a result of multiple iterations of the model outputs. It is acknowledged that the TBDC states the species seems to benefit from the reduced competition and increased light available on disturbance margins including roadsides however this is considered to represent the level of disturbance present within the Thinned condition state vegetation not the Scattered Trees condition state. Scattered Trees condition state vegetation has generally undergone significant historical and/or ongoing disturbance such as urbanisation, slashing, grazing and other farming activities, all considered more intensive than that acting upon roadside margins. Furthermore, repeated slashing of roadside margins would prevent the species' seedbank establishment (NPWS, 2000). It is expected that the TBDC noting Paddock Trees as important to the species is likely to reflect the species tolerance of some disturbance, however substantial and/or ongoing disturbance will negatively impact upon the species occurrence, and this level is considered to be occurring at the scattered trees condition vegetation. 	<ul style="list-style-type: none"> Concerns remain It has not been explained how iterations of the model outputs led to the selection of 80 m in the Soil/Geology restrictions, and no published, peer reviewed literature has been cited. The explanation for the development of the GIS model does not include information on iterations, how they were done and how it is known that they led to improvements in the model i.e. was the model tested on the ground, if so, how and where? Was additional data on soil landscapes and/or geology collected to feed into the model and test it on the ground? The TBDC identifies paddock trees as important habitat and no published, peer reviewed literature has been cited for the Veg Condition parameter.
<i>Petaurus norfolcensis</i>	Squirrel Glider	BioNet PCT associations: Intact, Thinned, Scattered Trees	>4 ha Justification: Expected home range within the Plan Area (NSWSC, 2008)	-	-	-	-	Vegetation 10 m tall and higher, buffer all polygons by 12.5 m (to establish connected habitat within glide ratio of 1:2.5 for 10 m trees), clip	Reject NSW Scientific Committee (2008) used to justify the reduced patch size specifies a mean home range of 3-9 ha in coastal habitats, and 3-4ha in productive inland habitat fragments, and outlines that they occur in remnants down to 3 ha in size. Van der Ree & Bennett (2003) found that home ranges in degraded agricultural woodland habitats were small with a mean of 1.4-2.8 ha and down to 0.69 ha. Given this variation, patch size reduction is not accepted without further justification. Jackson (2000) and Vernes (2001) have been referenced to justify tree height exclusion.	<ul style="list-style-type: none"> The project area is considered a 'coastal area' and not an 'inland forest fragment'; and as such a home range of 4 ha is considered appropriate to select suitable connected vegetation. NSWSC (2008) notes Squirrel Gliders have limited ability to disperse across urban or agricultural land. Although capable and willing to cross open habitat on occasion (e.g. to reach heavily flowering trees), they more typically require sufficient connectivity of tree cover within their maximum gliding distance (70 m: van der Ree, 2002; van der Ree et al., 2003). They are therefore susceptible to habitat 	<ul style="list-style-type: none"> Concerns remain The home range of 4 ha is not supported as NSWSC (2008) reports a range of patch sizes. The patch size listed in the TBDC (less than 5 ha) needs to be used.

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
								the buffered polygons back to vegetation polygons, select patches that are 4 hectares and greater Justification: Connected habitats are those which the animals can reach by gliding, 10m tall trees are the minimum expected height for glide launch (Jackson, 2000; Vernes, 2001)	<p>The Vernes (2001) publication is in relation to northern flying squirrel in Canada and it is unclear how this relates to the squirrel glider in NSW.</p> <p>The Jackson (2000) publication mainly looks at gliding behaviour of the Mahogany glider and the Sugar glider and does not provide any detail in relation to squirrel glider.</p> <p>Whilst squirrel gliders preferably stay high in the vegetation, they are known to run short distances across open ground (Goldingay & Taylor 2009). Whilst it is known that tree height is important to maintain squirrel glider habitat connectivity and movement, further justification is required to demonstrate that all areas with trees below 10m does not constitute habitat for the purposes of the species polygon.</p> <p>Further information on LiDAR data utilised and its ability to identify accurate tree height would also be required to support its use for reducing species polygon area.</p> <p>Further information on how the LiDAR data is used would also be required (e.g. if there is one tree >10m within a vegetation patch, what area is included in habitat polygon?</p>	<p>fragmentation and hence population fragmentation. Based on this the model parameter of connected habitat being patches separated by 25 m (12.5 m buffer surrounding polygons) is consider highly conservative.</p> <ul style="list-style-type: none"> LiDAR was used to select >10m height polygons within associated PCTs, these polygons were then buffered by 12.5 m to select all 'connected' vegetation polygons within 25 m of each other, all buffered polygons were then merged and used to clip the original vegetation mapping polygons, if the resultant clipped vegetation polygons were part of a >4 ha patch, the patch was mapped as habitat for the species. The buffering allows for areas of vegetation <10m in height to be captured in the species polygons and captures the species ability to "run short distances across open ground". 	
<i>Pimelea curviflora</i> var. <i>curviflora</i>	-	BioNet PCT associations: Intact, Thinned	-	-	ROCK UNIT: (‘Hawkesbury Sandstone’, ‘Minchinbury Sandstone’) AND All Blacktown soil landscape within a 500m buffer on Wianamatta (South Creek), plus all Berkshire Park soil landscape Justification: Occurs on shaley/lateritic soils over sandstone and shale/sandstone	Less than 300 m (Doug & Lyn, 2001)	-	Sandstone units selected only within a 100 m buffer on "Ridge and Crest" DEM layer Justification: Occurs on shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands (OEH, 2019d)	<p>Reject</p> <p>It is not explained how OEH (2018g) and (OEH 2019c) support the 'soil/geology restrictions' and 'LiDAR – EM/CHM'.</p> <p>The TBDC identifies paddock trees as important habitat.</p> <p>An expert report may be required to review the method.</p>	<ul style="list-style-type: none"> TBDC states relevant to the project area that the species occurs on shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands geology, soil and DEM layers have been used to constrain the GIS model to map habitat in the area of transition between/ surrounding mapped soil types (as referred to in the TBDC). This restriction was necessary due to the species being associated with several PCTs that occur away from this transitional zones (as well as on/near it), PCT 849 for example. The restriction of 80 m was selected as a result of multiple iterations of the model outputs. DEM layer and 'sandstone units' was ultimately not applied as the species was removed as a candidate from Wilton and Macarthur GAs. Removal of Scattered Trees condition state was applied largely to exclude isolated trees throughout suburban areas in GPEC which do not support habitat for the species. It is acknowledged that in doing so there is a small risk that areas of scattered trees in more natural situations (i.e. 'paddock trees'), that do provide potential habitat for the species were excluded, but the precautionary nature of mapping all intact and thinned condition vegetation as 	<ul style="list-style-type: none"> Concerns remain An expert report may be required to review the method No published, peer reviewed literature has been cited for the 500 m and 100 m buffers. Note in the adjacent column "The restriction of 80 m was selected as a result of multiple iterations of the model outputs" appears to be a typo. As previously stated, it is not understood how the model was developed/tested to improve/optimize the parameters. The TBDC identifies paddock trees as important habitat.

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)	
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM				
					transition soils (OEH 2019ae)						habitat mitigates the risk that the species' habitat has been under-mapped. Inclusion of Scattered Trees would have over-mapped the species' habitat by approximately 100 ha.	
<i>Pomaderris brunnea</i>	Rufous Pomaderris	BioNet PCT associations: Intact, Thinned	-	100 m around waterways Justification: Grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines (OEH, 2019d)	SOILS: ('Blacktown', 'Lucas Heights') Justification: Grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines (OEH, 2019d)	Up to 450 m (BioNet records)	-	-	Reject It is not known what the data layer for 'waterways' is. There are lots of records >100m from the 'watercourse' layer on ArcGIS (~30%). OEH (2019c) (i.e. the species profile in the TBDC) does not refer to '100m around waterways'. Bionet records cannot be used to justify restrictions to 'elevation' as they do not represent complete presence/absence data for the species. The TBDC states that paddock trees are important habitat.	<ul style="list-style-type: none"> 100m from the watercourse represents the moist woodland or forest on clay and alluvial soils of flood plains and creek lines within the project area, as derived through iterations of the GIS modelling process. Elevation justification is confirmed as appropriate by Cunninghamia Vol. 6(4): 2000. Following a review of available literature, it was concluded that intact and thinned condition state PCTs were most representative of the species' potential habitat within the project area. 	<ul style="list-style-type: none"> Concerns remain No published, peer reviewed literature is cited for the 100 m buffer to waterways. As previously stated, it is not understood how the model was developed/tested to improve/optimize the parameters. Benson and McDougall (2000) (the Cunninghamia reference) is probably outdated; the altitude for this species is stated to be (page 1152) 0-300 m and the substrate "Sandy loam from riverine alluvium or sandstone, low nutrient, well-drained", with the latter being different to that in the TBDC, which states "grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines" In the adjacent column, no published, peer reviewed literature is cited for the statement "Following a review of available literature, it was concluded that intact and thinned condition state PCTs were most representative of the species' potential habitat within the project area" 	
<i>Pseudophryne australis</i>	Red-crowned Toadlet	BioNet PCT associations: Intact	-	Restricted to 1st and 2nd order watercourses (OEH, 2019d)	ROCK UNIT: ('Hawkesbury Sandstone', 'Minchinbury Sandstone') inside Ridge and Crest Justification: Occurs in open forests, mostly on Hawkesbury and Narrabeen	-	-	Habitat buffered to 50m above and 100m below "Ridge and Crest" DEM layer Justification: Species usually restricted to within 100 m	More information needed Discussion with the Accountable Officer required: the NSW Survey Guide for Threatened Frogs specifies that breeding habitat consists of ephemeral streams or pools, but it appears that bionet records are not always associated with 1st/2nd order watercourses, and no information has been provided on the proposed buffer to the watercourses; the NSW Survey Guide for Threatened Frogs specifies that breeding habitat occurs on Triassic sandstones but further information is required on the GIS layers being used to ensure they are accurate enough to identify triassic sandstones at the appropriate scale; NPWS 2001 states "Within these geological formations, this species mainly occupies the upper parts of ridges, usually being restricted to within about 100 metres of the ridgetop. Although they also occur on plateaus or more level rock platforms along	<ul style="list-style-type: none"> Habitat restricted to 100m from 1st and 2nd order watercourses, where those watercourses occur in association with the stated geologies as mapped in NSW Seamless Surface Geology Rock Units (COLQUHOUN G.P., HUGHES K.S., DEYSSING L., BALLARD J.C., FOLKES C.B., PHILLIPS G., TROEDSON A.L. & FITZHERBERT J.A. 2020. New South Wales Seamless Geology dataset (Single Layer), version 2 [Digital Dataset]. Geological Survey of New South Wales, Department of Regional NSW, Maitland). DEM layer (detailed at the end of this table) was used to refine habitat to within 50-100m of ridgetops as outlined in (NPWS, 2001). 	<ul style="list-style-type: none"> Not supported Discussion with the Accountable Officer required It seems likely that the soil landscape and geological mapping referred to, was originally produced at a 1:100 000 scale. At this scale, it is necessary for field validations to occur. 	

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM			
					Sandstones (OEH, 2019d)			of a ridgetop (NPWS, 2001)	the ridgetop this area is usually less preferred than the first tallus slope areas below the upper escarpment or just below benched rock platforms."		
<i>Pultenaea parviflora</i>	-	BioNet PCT associations: Intact, Thinned	-	-	-	Less than 120 m (Doug & Lyn, 1996)	-	-	<p>More information needed</p> <p>Discussion with the Accountable Officer required; the elevation parameter is not a formal geographic constraint, it is not identified as a habitat constraint in the TBDC, and the cited reference dates to 1996.</p> <p>The TBDC identifies paddock trees as important habitat.</p>	<ul style="list-style-type: none"> Elevation criteria is taken from published literature and remains valid. All BioNet record of the species with and proximal to the project areas occur well below 120 m elevation, almost all below 70 m. It is acknowledged that BioNet records do not represent complete presence/absence data for the species, however the ~1000 records dataset (proximal to the project area) is best available and its application and use in this instance is considered appropriate. Removal of Scattered Trees condition state was applied largely to exclude isolated trees throughout suburban areas in GPEC which do not support habitat for the species. It is acknowledged that in doing so there is a small risk that areas of scattered trees in more natural situations i.e. ('paddock trees'), that do provide potential habitat for the species were excluded, but the precautionary nature of mapping all intact and thinned condition vegetation as habitat mitigates the risk that the species' habitat has been under-mapped. 	<ul style="list-style-type: none"> Concerns remain Discussion with the Accountable Officer required The TBDC identifies paddock trees as important habitat and no published, peer reviewed literature has been cited for the Veg condition parameter. Bionet records cannot be used to justify restrictions as they do not represent complete presence/absence data for the species
<i>Pultenaea pedunculata</i>	Matted Bush-pea	BioNet PCT associations: Intact, Thinned, Scattered Trees	-	-	Occurs on Blacktown, Wianamatta (South Creek), Berkshire Park soil landscapes AND On, or within a 600 m buffer from, "Alluvium" in "GRPSUITE" field OR Within 500 m buffer from boundaries sandstone derived soil landscapes	Less than 150 m (Doug & Lyn, 1996)	-	-	<p>Reject</p> <p>More explanation is required e.g. what is "GRPSUITE" and what are 'sandstone derived soil landscapes' and why was 600m and 500m used?</p> <p>Restrictions to these vegetation conditions are not supported because the TBDC states "The Matted Bush-pea occurs in a range of habitats. NSW populations are generally among woodland vegetation but plants have also been found on road batters and coastal cliffs" and "The ability of stems to creep and root from the nodes has made this species a very good coloniser of bare ground in many parts of its range."</p>	<ul style="list-style-type: none"> Soil restrictions as detailed were those relevant to the project area and were used to constrain the GIS model to map habitat in the area of clay or sandy-clay soils on Wianamatta Shale-derived soils, usually close to patches of Tertiary Alluvium, or at or near the Shale- Sandstone interface, with all sites having a lateritic influence (as referred to in the TBDC). 500 and 600 m buffers were used based on multiple iterations of the GIS model process and were determined to best represent the species habitat. This restriction was necessary due to the species being associated with several PCTs that occur away these soil transitional zones (as well as on/near it), PCT 849 and 850 for example. "GRPSUITE" field relates to in NSW Seamless SurfaceGeology Rock Units outline above. Sandstone derived soil landscapes include: Faulconbridge, Gymea, Gymea/Lambert, Hawkesbury, Lambert, Oxford Falls (incl. Var a and Var. b) soil landscapes. Including Intact, Thinned, Scattered Trees vegetation conditions is considered appropriate based on the 	<ul style="list-style-type: none"> Concerns remain No published, peer reviewed literature has been cited for the 500 m and 600 m buffers. The TBDC states "The Matted Bush-pea occurs in a range of habitats. NSW populations are generally among woodland vegetation but plants have also been found on road batters and coastal cliffs" and so the omission of DNG is not supported. Following on from comments above (i.e. for Camden White Gum, Square-tailed Kite and Bargo Geebung), it is not understood how iterations of the GIS model "were determined to best represent the species habitat". As previously stated, it seems likely that the soil landscape and geological mapping referred to, was originally produced at a 1:100 000 scale. At this scale, it is necessary for field validations to occur.

Habitat parameters									EHG CPCP Assessment Team's comments from the post briefings feedback (DOC21/960040) explaining why the parameters used to identify suitable habitat using the knowledge-based method and section 6.1.1.2 of the BAM were accepted or rejected. These comments were in relation to 'Table B-1: Nominated area threatened species KBM parameters' in the draft (exhibited) assessment report (DOC21/982974).	Justification provided in the BCAR for the use of these parameters (see column 'Further comments to justify parameters used to prepare species polygons' in DOC21/942262)	EHG comments on the habitat parameters, with some reasons explaining why they are not supported (March 2022)	
Scientific name	Common name	Veg. condition	Patch size	Waterways	Soil/ Geology restrictions	Elevation	Geographic	LiDAR – EM / CHM				
					Justification: Favours sites in clay or sandy clay soils on Wianamatta Shale-derived soils, usually close to patches of Tertiary Alluvium, or at or near the Shale-Sandstone interface. All sites have a lateritic influence (OEH, 2019d)						statement in the TBDC on the species a very good coloniser of bare ground. The only condition excluded from the GIS model is DNG which does not represent the 'bare ground' habitat referred to in the TBDC descriptions. Coloniser of bare ground relates to disturbed edges such as those surrounding thinned and scattered tree condition vegetation. Where DNG may occur immediately adjacent to these areas the plant has some potential to occur, however the assumption of presence across all other condition states more than accounts for potential habitat for the species within the project area.	
<i>Tyto novaehollandiae</i>	Masked Owl	Final assessment report Intact, Thinned Draft assessment report Intact, Thinned for Veg, condition, and BioNet PCT associations for Veg. associations	All "Intact" Vegetation or "Thinned" patches over 10 ha in area Justification: Removed scattered and isolated occurrences of "Thinned" vegetation not suitable for breeding habitat	-	-	-	-	Vegetation within "Gullies" DEM layer. Justification: Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting (OEH, 2019d)	Reject No published, peer reviewed literature has been cited for the patch size parameter. The TBDC specifies <5 ha patch size based on the "fact that the species will use areas that are quite small, especially as foraging habitat but also as roosting habitat and occasionally as breeding habitat". The DEC Recovery Plan (2006) specifies that nesting sites are in a variety of topographic positions from gully to upper slope.	DEM "gullies" layer has been used to map suitable breeding habitat for the species within the project area. TBDC patch size relates to minimum patch size to be included as a predicted (ecosystem credit) and potential candidate (species credit) species, across the species entire NSW range. The habitat model is only looking to map breeding (species credit) habitat within the project area, therefore an increase in patch size to captured potential breeding habitat within 'Thinned' condition vegetation was required to map suitable habitat patches and is considered justified. The inclusion of Intact and Thinned condition vegetation accounts for the species' nest sites may be subject to a variety of disturbance regimes, (DEC 2006).	<ul style="list-style-type: none"> Concerns remain No published, peer reviewed literature is cited for the patch size parameter. The TBDC specifies <5 ha patch size and the General Notes state "Patch size selected is based on that fact that the species will use areas that are quite small, especially as foraging habitat but also as roosting habitat and occasionally as breeding habitat". The restriction of Veg condition to "Intact, Thinned" is not supported because the TBDC states that paddock trees are important habitat and "the species will use areas that are quite small, especially as foraging habitat but also as roosting habitat and occasionally as breeding habitat. In Tas and Vic Masked owls have been recording nesting in paddock trees." 	

Appendix 7- Assessment of Commitments & Actions against Conservation Measures in strategic applications for biodiversity certification: Guidance for planning authorities

Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
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Commitment 1 - Development will be undertaken in accordance with the Plan and any conditions of approval. This applies to the following classes of actions:

- **urban and industrial**
- **infrastructure**
- **intensive plant agriculture**
- **major transport corridors.**

<i>Action 1 - Integrate the Plan into the planning delivery framework for the nominated areas through mechanisms including an environmental planning instrument with development controls, a ministerial direction under section 9.1 of the Environmental Planning and Assessment Act 1979, and Cumberland Plain Conservation Plan Guidelines for Infrastructure Development (Commitments 2, 4, 6, 7, 13, 14) (Before start of Plan).</i>	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	N/A	Refer to discussions at Commitment 14.
<i>Action 2 - Monitor the implementation of urban and industrial development, infrastructure, major transport and intensive plant agriculture through the Plan's evaluation program to ensure development is consistent with the Plan. This includes the Plan's: a. commitments for avoiding, minimising, mitigating and offsetting impacts b. reporting and compliance requirements c. class of action approvals (EPBC Act); strategic biodiversity certification order (BC Act). (Life of Plan)</i>	N/A	EPBC Act reporting requirements are not applicable to certification under the BC Act. Refer to discussions at Commitments 25 and 26.	EPBC Act reporting requirements are not applicable to certification under the BC Act. Refer to discussions at Commitments 25 and 26.	EPBC Act reporting requirements are not applicable to certification under the BC Act. Refer to discussions at Commitments 25 and 26.	EPBC Act reporting requirements are not applicable to certification under the BC Act. Refer to discussions at Commitments 25 and 26.	N/A	N/A	EPBC Act reporting requirements are not applicable to certification under the BC Act. Refer to discussions at Commitments 25 and 26.
<i>Action 3 - Require proponents of essential infrastructure to notify the department of any development or activity in</i>	Refer to discussion at Commitment 2 Action 3.	Refer to discussion at Commitment 2 Action 3.	Refer to discussion at Commitment 2 Action 3.	Refer to discussion at Commitment 2 Action 3.	Refer to discussion at Commitment 2 Action 3.	Refer to discussion at Commitment 2 Action 3.	N/A	Refer to discussion at Commitment 2 Action 3.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<p>a. minor adjustments are identified at the site level</p> <p>b. updates are consistent with the avoidance criteria and supported by a BAM-accredited assessor</p> <p>c. residual impacts to biodiversity, including matters of national environmental significance, are mitigated and offset in accordance with the BAM (or equivalent) and EPBC Act Environmental Offsets Policy, 2012 for any EPBC Act matters not covered by the BAM. (Years 1 to 10)</p>								
<p>Action 6 – Progress and submit (subject to compliance with legislative requirements) a modification of the strategic biodiversity certification under the Biodiversity Conservation Act 2016 to include lands proposed by Deerubbin Local Aboriginal Land Council (Year 1).</p>	N/A – outside the scope of the current application.	N/A – outside the scope of the current application.	N/A – outside the scope of the current application.	N/A – outside the scope of the current application.	N/A – outside the scope of the current application.	N/A – outside the scope of the current application.	N/A – outside the scope of the current application.	N/A – outside the scope of the current application.
<p>Commitment 2 - Avoid and minimise impacts of up to 4,505 hectares of high biodiversity value area (the avoided land) through strategic conservation planning in the nominated areas</p> <p>Commitment 2.1 Limit cumulative direct impacts over the life of the Plan from essential infrastructure to the following EPBC Act-listed threatened ecological community in the avoided land:</p> <ul style="list-style-type: none"> • Shale Sandstone Transition Forest • Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest • River-Flat Eucalypt Forest • Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest • Cooks River Castlereagh Ironbark Forest Western Sydney Dry Rainforest and Moist Woodland on Shale. <p>Commitment 2.2 Prioritise the avoidance of impacts from essential infrastructure on the avoided land to:</p> <ul style="list-style-type: none"> • known populations of the following threatened flora species: <ul style="list-style-type: none"> • <i>Grevillea parviflora</i> subsp. <i>parviflora</i> (small-flower grevillea) • <i>Persoonia bargoensis</i> (Bargo geebung) • <i>Persoonia nutans</i> (nodding geebung) • <i>Genoplesium baueri</i> (yellow gnat-orchid) • <i>Pimelea spicata</i> (spiked rice-flower) • <i>Pultanea parviflora</i> • protected koala habitat within the Wilton and Greater Macarthur growth areas to maintain the function of koala movement corridors. 								

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAII) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>Action 1 - Introduce an environmental planning instrument to apply development controls to protect important biodiversity on avoided land under the Plan (Before start of Plan).</i>	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.
<i>Action 2 - Issue a ministerial direction under section 9.1 of the NSW Environmental Planning and Assessment Act 1979 to restrict rezoning of avoided land from its current zone to a zone that permits a more intensive land use (Before start of Plan).</i>	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	Refer to discussions at Commitment 14.	N/A	Refer to discussions at Commitment 14.
<i>Action 3 – Introduce the Cumberland Plain Conservation Plan Guidelines for Infrastructure Development to manage impacts on biodiversity from infrastructure development, including essential infrastructure development, on avoided land in the nominated areas (Before start of Plan).</i>	The Guidelines will mitigate the impacts of entities at risk of SAII, although some impacts may still occur. See Principles 2-5.	The Guidelines aim to ensure that essential infrastructure is located on certified land “wherever possible”. Essential infrastructure can still however be located on avoided or strategic conservation area land in certain circumstances, subject to design provisions in the Guidelines to avoid and minimise impacts. No biodiversity credit equivalent for this measure has been supplied.	The areas subject to the Guidelines in the avoided and strategic conservation area lands have been identified in development of the Plan as being of biodiversity value, including future offsets. The Guideline aims to reduce impacts of essential infrastructure under Part 5 of the EP&A Act in such areas. Notwithstanding the Guidelines’ aim to avoid and minimise impacts on TEC’s and threatened species, there is no guarantee that essential infrastructure will not impact on these communities.	The Guideline aims to preserve intact vegetation, landscape connectivity and biodiversity values of threatened ecological communities and species, and koala habitat. There remains a risk that conservation lands may still be subject to ongoing impacts from essential infrastructure. In such instances, locating essential infrastructure on avoided rather than certified land may undermine the Plan’s avoidance process.	Attachment A of the Guidelines, & the proposed EP&A Reg amendment requires activity authorities to submit a statement of consistency with the Guidelines to the Planning Secretary. The Statement must outline why the activity could not be located on certified land. This is an additional obligation that places the onus on Part 5 approval authorities to demonstrate how essential infrastructure is consistent with the provisions of the CPCP. The effectiveness of this requirement is reduced as it not required until post-approval. There is no mechanism for pre-approval input or concurrence on essential infrastructure on conservation land.	Introducing a Guideline that must be considered for essential infrastructure activities under Part 5 of the EP&A Act is an additional provision. The aim of the Plan should remain to avoid impacts of essential infrastructure on avoided land wherever possible. The Guideline also introduces a specific mitigation measures for proposed essential infrastructure on certified land, which assists in protecting environmental values in development areas from infrastructure impacts.	N/A	The timing of the Action states the Guidelines will be gazetted “before start of Plan”, however it is unlikely they will be in force prior to any approval for the Plan.
<i>Action 4 - Monitor the impacts of development on the avoided land through the Plan’s reconciliation accounting process (Life of Plan as precincts designed).</i>	Refer to discussions at Commitment 25.	Refer to discussions at Commitment 25.	Refer to discussions at Commitment 25.	Refer to discussions at Commitment 25.	Refer to discussions at Commitment 25.	N/A	N/A	Refer to discussions at Commitment 25.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>Action 5 – Notify proponents of essential infrastructure of their obligations under the EPBC Act, including when development does not have Part 10 EPBC Act approval under the Plan (Life of Plan as precincts designed).</i>	N/A - EPBC Act matter	N/A - EPBC Act matter	N/A - EPBC Act matter	N/A - EPBC Act matter	N/A - EPBC Act matter	N/A - EPBC Act matter	N/A - EPBC Act matter	N/A - EPBC Act matter
<i>Action 6 - Locate Asset Protection Zones wholly within certified urban-capable land (Life of Plan as precincts designed).</i>	This Action will mitigate the impacts of APZ's on entities at risk of SAIL within the avoided and conservation lands.	Clearing for asset protection zones (APZ's) within avoided land would impact on biodiversity values being targeted for protection by the Plan. This Action will prevent this from occurring.	This action is aimed at ensuring additional clearing for bushfire protection does not impact on biodiversity values within the avoided land. Protection of such values are therefore prioritised.	APZ's can result on incremental impacts on landscapes values, particularly where they encroach beyond the development footprint into avoided land. This Action aims to maintain landscape function on land avoided and conserved for biodiversity values by locating APZ's on land that has been certified for development only.	The proposed SEPP (Strategic Conservation Planning) does contain a specific clause restricting developments from locating APZ's outside of certified land (CI 18). It is unclear whether all future development applications would impose separate conditions to enact this requirement. Compliance with the SEPP provision prevails may also be an issue, particularly in the event DA's do not meet the requirements of CI 18.	As discussed at Principle 5, specific provisions in the proposed SEPP apply.	N/A	This Action will be enacted by the SEPP, which will apply over the life of the Plan, once it is gazetted.
<p>Commitment 3 - Avoid and minimise impacts to threatened ecological communities, species and their habitat within certified - major transport corridors through detailed planning and design. This includes:</p> <ul style="list-style-type: none"> • avoiding areas of potential habitat connectivity within riparian corridors where possible, particularly for the following species: <ul style="list-style-type: none"> • eastern pygmy possum • green and golden bell-frog • spotted-tailed quoll • squirrel glider • yellow-bellied glider • avoiding known flora populations within the Outer Sydney Orbital and M7/Ropes Crossing Link Road corridors where possible, particularly: <ul style="list-style-type: none"> • <i>Dillwynia tenuifolia</i> • <i>Grevillea juniperina</i> subs. <i>juniperina</i> • <i>Pultanea parviflora</i> • <i>Persoonia nutans</i> • for the Outer Sydney Orbital, minimising where possible the placement of waterway crossing structures within riparian corridors, changes to waterway alignments, and bulk earthworks on adjacent floodplain areas 								
<i>Action 1 - To avoid and minimise impacts to threatened ecological communities, species and their habitats, Transport for NSW will apply the Plan's avoidance criteria during the strategic planning phase of each transport project, with</i>	Land will be certified in the transport corridor, meaning clearing of any SAIL entities may proceed. See Principle 2.	Although land will be certified, "micro-siting" of infrastructure and avoidance should in effect reduce the quantum of clearing certified under the Plan.	See Principle 2.	See Principle 2. Wianamatta Regional Park, is a particular concern, as the preferred alignment on proposed certified land severs connectivity and detailed avoidance has not to date been undertaken.	TFNSW will be required to undertake further avoidance within certified land as an obligations, as per Actions in this Commitment. Measures to avoid and minimise can also be			This will occur over the life of Plan.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>specific consideration to the matters identified in Commitment 3 (Life of Plan).</i>		Although design refinements “should” minimise impacts on sensitive areas as per Action 4, other measures to avoid and minimise impacts within the certified areas can be investigated. This is discussed at Appendix 4.		For certified transport corridors, targets for avoidance of TEC’s and threatened species habitat should be supplied at detailed design stage prior to impact occurring to quantify avoidance outcomes sought under Commitments 2 and 3. Evidence of “micro-siting” infrastructure should also be provided. Climate refugia could also be considered during strategic planning phase to support threatened ecological communities, species and their habitats in the long term.				
<i>Action 2 - Include the biodiversity benefits of avoiding threatened ecological communities, species and their habitats as well as the costs of offsets into the evaluation of the route options (for example using multi-criteria analysis) (Life of Plan).</i>	This is a role for TfNSW.	This is a role for TfNSW.	This is a role for TfNSW.	This is a role for TfNSW.	This is a role for TfNSW.	N/A	N/A	This is a role for TfNSW.
<i>Action 3 - Locate Asset Protection Zones, if required, within the certified-major transport corridor (Life of Plan).</i>	This is consistent with a similar requirement for APZ’s on certified urban capable land, as discussed at Commitment 2 Action 6.	This is consistent with a similar requirement for APZ’s on certified urban capable land, as discussed at Commitment 2 Action 6.	This is consistent with a similar requirement for APZ’s on certified urban capable land, as discussed at Commitment 2 Action 6.	This is consistent with a similar requirement for APZ’s on certified urban capable land, as discussed at Commitment 2 Action 6.	This is consistent with a similar requirement for APZ’s on certified urban capable land, as discussed at Commitment 2 Action 6.	N/A	N/A	This will occur over the life of Plan.
<i>Action 4 - Where an action cannot feasibly or practically avoid impacts on an area of high environmental value, these impacts should be minimised as far as possible using design refinements to reduce overall impact (Life of Plan).</i>	See Action 1.	See Action 1.	See Action 1.	See Action 1.	See Action 1.	N/A	N/A	See Action 1.
<i>Action 5 - Transport for NSW will provide to the department a clearing reconciliation report within</i>	This is a role for TfNSW.	This is a role for TfNSW.	This is a role for TfNSW.	This is a role for TfNSW.	This is a role for TfNSW.	N/A	N/A	This is a role for TfNSW.

Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
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<p>Commitment 4</p> <ul style="list-style-type: none"> Avoid and minimise impacts on threatened ecological communities, species and their habitat within major transport corridors (strategically assessed only), including the Outer Sydney Orbital and Metro Rail Future Extension tunnel sections, in accordance with the: <ul style="list-style-type: none"> major transport corridors class of action description, including the NSW state-significant infrastructure (or equivalent) approvals process Biodiversity Assessment Method (BC Act) (or equivalent). <p>Commitment 4.1</p> <p>Avoid and minimise impacts to known flora populations within the Outer Sydney Orbital and M7/Ropes Crossing Link Road corridors, including:</p> <ul style="list-style-type: none"> Dilwynia tenuifolia Grevillea juniperina subs. Juniperina Pultanea parviflora Cynanchum elegans. <p>Commitment 4.2</p> <p>Avoid and minimise impacts where possible within and adjacent to the tunnel sections, including:</p> <p>1. known populations and habitat of:</p> <ul style="list-style-type: none"> Eucalyptus benthamii Pomaderris brunnea Pimelea spicata Cumberland Plain Land Snail <p>2. known populations and habitat, and threatened ecological communities within:</p> <ul style="list-style-type: none"> Mater Dei BioBank site within the Outer Sydney Orbital footprint near Camden registered property agreement site within the Outer Sydney Orbital footprint at Camden Airport Metro offset site within the footprints for the Outer Sydney Orbital and Metro Rail Future Extension near Harrington Park Nepean River and associated riparian corridor within the Outer Sydney Orbital footprint Camden Golf Club at Narellan adjacent to the footprint for the Metro Rail Future Extension Mount Annan Botanic Gardens within the footprint for the Metro Rail Future Extension. <p>Commitment 4.3</p> <p>Avoid and minimise impacts where possible to environmental values within Commonwealth land sites, including known populations and habitat and threatened ecological communities, and existing infrastructure and services, at:</p> <ul style="list-style-type: none"> Camden Airport Western Sydney University (Campbelltown Campus) 12 Werombi Road, Grasmere NSW. 							
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<p><i>Action 1 - To avoid and minimise impacts to threatened ecological communities, species and their habitat, Transport for NSW will:</i></p> <p><i>a. undertake surveys to confirm biodiversity values, including matters of national environmental significance during the strategic planning phase of each transport project</i></p> <p><i>b. include the biodiversity benefits of avoiding threatened ecological communities, species and their habitats as well as the costs of offsets into the evaluation of the route</i></p>	<p>This is a role for TfNSW.</p> <p>See also discussion at Commitment 3 above.</p>	<p>This is a role for TfNSW.</p> <p>See also discussion at Commitment 3 above.</p>	<p>This is a role for TfNSW.</p> <p>See also discussion at Commitment 3 above.</p>	<p>This is a role for TfNSW.</p> <p>See also discussion at Commitment 3 above.</p>	<p>This is a role for TfNSW.</p> <p>See also discussion at Commitment 3 above.</p>	<p>N/A</p>	<p>N/A</p>	<p>This is a role for TfNSW.</p> <p>See also discussion at Commitment 3 above.</p>
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	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<p><i>options (for example using multi-criteria analysis)</i></p> <p><i>c. avoid and minimise impacts to biodiversity values, including matters of national environmental significance, in accordance with the Biodiversity Assessment Method (or equivalent) and with specific consideration to the protected matters identified in commitments 4.1, 4.2 and 4.3 during the environmental impact assessment phase of each transport project</i></p> <p><i>d. offset impacts to biodiversity values, including matters of national environmental significance, in accordance with the Biodiversity Assessment Method (or equivalent) and EPBC Act Environmental Offsets Policy, 2012 for any EPBC Act matters not covered by the BAM</i></p> <p><i>e. report to the department and executive implementation committee on vegetation cleared and adjustments to transport corridor boundaries identified through the NSW SSI approval (or equivalent) for each transport project. This will include: reporting on avoidance achieved within the mapped or protected corridors identified in this Plan; additional impacts outside of mapped corridors for EPBC Act-listed species, populations or ecological communities; and offsets to be secured under the NSW SSI approval and EPBC Act Environmental Offsets Policy, 2012, where relevant. (Life of Plan)</i></p>								
Action 2 - The department will use this information to	This is a role for TfNSW.	This is a role for TfNSW.	This is a role for TfNSW.	This is a role for TfNSW.	This is a role for TfNSW.	N/A	N/A	This is a role for TfNSW.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAII) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>track impacts and adjust Transport for NSW's offset liabilities through the Plan's reconciliation accounting process, in agreement with Transport for NSW (Life of Plan).</i>	See also discussion at Commitment 3 above. Reconciliation is discussed at Commitment 25.	See also discussion at Commitment 3 above. Reconciliation is discussed at Commitment 25.	See also discussion at Commitment 3 above. Reconciliation is discussed at Commitment 25.	See also discussion at Commitment 3 above. Reconciliation is discussed at Commitment 25.	See also discussion at Commitment 3 above. Reconciliation is discussed at Commitment 25.			See also discussion at Commitment 3 above. Reconciliation is discussed at Commitment 25.
<i>Action 3 - Transport-related impacts to biodiversity (including MNES) will be published through the Plan's annual updates and five yearly reviews (Life of Plan).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
Commitment 5 - Mitigate indirect and prescribed impacts from urban and industrial development; infrastructure; and intensive plant agriculture on threatened ecological communities, species and their habitat. This includes meeting specific mitigation requirements for threatened ecological communities, species and their habitat in accordance with Appendix E of the Plan								
<i>Action 1 - Incorporate development controls in the state-led development control plans where they apply to relevant nominated areas, setting out development controls that need to be addressed by neighbourhood plans and development applications to mitigate indirect and prescribed impacts on threatened species. This includes: a. specific controls that apply to the nominated areas to mitigate indirect and prescribed impacts on specific threatened species or ecological communities or other environmentally sensitive areas in accordance with Appendix E of the Plan b. a common set of development controls to mitigate indirect and prescribed impacts across the 4 nominated areas that inform general biodiversity protection as listed in Chapter 15 of the Cumberland Plain Assessment Report. (Before start of Plan)</i>	DCP measures to mitigate impacts will relate to SAII entities.	The Template DCP provides specific controls for threatened ecological communities and koala habitat which occur in the impacted nominated areas where state-led DCP's are proposed. Precincts where state-led DCP's are not proposed will be subject to the Mitigation Measures Guideline, as discussed at Action 2 below. No biodiversity credit equivalent for this measure has been supplied.	While direct impacts are substantial, numerous areas of biodiversity value within the nominated areas have been avoided and are located in the proposed conservation lands. The Template DCP relates to mitigation of impacts in the proposed certified land. These include weed control, fire management, pre-clearance surveys, translocation, temporary fencing, traffic calming controls and measures to restrict construction impacts.	Although koala habitat is one of the two key values to which mitigation measures will apply, koala habitat is not detailed in supporting maps. Koala mitigation measures are addressed at Commitments 5, 7, 10, 12, 13, 20, 22, and 23.	The Template DCP is additional to existing conservation obligations, and function as complementary to the proposed State Environmental Planning Policy (Strategic Conservation Planning) which enacts them. It is not however a binding legal or statutory instrument. Furthermore the DCP provisions do not take effect until they are incorporated into precinct DCP's, as discussed at Action 4 below. The Template DCP includes the following additional controls: <ul style="list-style-type: none"> Urban design requirements to retain koala feed trees and habitat Pre-clearance protocols Traffic calming measures for development to reduce impacts on koalas & other fauna species Protective fencing for conservation areas APZs & stormwater infrastructure located 	The Template DCP will apply in those areas where state-led DCP's are proposed. The Greater Macarthur and Greater Penrith- Eastern Creek nominated areas, where state-led DCP's are not proposed, will be subject to under the Mitigation Measures Guideline which prescribes a consistent set of mitigation measures. See discussion under Action 2 below.	N/A	The timing of the Action states the Guidelines will be adopted before the start of the Plan. Although the Template DCP has been prepared, these controls will need to be incorporated into the planning framework as development progresses. An audit process is proposed to ensure this occurs, as discussed at Action 4 below.

Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain	
					<p>within land certified for urban development only</p> <ul style="list-style-type: none"> • Weed, pest mitigation, soil & erosion management controls • Setbacks for Grey-headed flying fox camps (100m) & raptor nests (500m) • Riparian management & revegetation controls 			
<p><i>Action 2 - Introduce the Cumberland Plain Conservation Plan Mitigation Measures Guidelines consistent with Appendix E of the Plan to address indirect impacts in Greater Macarthur Growth Area and Greater Penrith to Eastern Creek Investigation Area (Year 1).</i></p>	<p>Refer to Action 1.</p>	<p>The Guidelines relate to specific controls for threatened ecological communities and koala habitat which occur in the impacted nominated areas at Greater Macarthur and Greater Penrith-Eastern Creek, where state-led DCP's are not proposed.</p> <p>No biodiversity credit equivalent for this measure has been supplied.</p>	<p>Areas of highest biodiversity value within the nominated areas have been avoided and are located in the proposed conservation lands.</p> <p>The Guidelines relate to mitigation of impacts in the proposed certified land. These include weed control, fire management, pre-clearance surveys, translocation, temporary fencing, traffic calming controls and measures to restrict construction impacts.</p> <p>Notably, the DCP and Mitigation Measures package is silent on matters of compensatory habitat which could be accommodated on areas of environment value not developed on certified land. This could form part of the planning provisions under these policies.</p>	<p>Although koala habitat is one of the two key values to which mitigation measures will apply, koala habitat is not detailed in supporting maps.</p> <p>Koala mitigation measures are addressed at Commitments 5, 7, 10, 12, 13, 20, 22, and 23.</p>	<p>The Guidelines are additional to existing conservation obligations, and function as complementary to the proposed State Environmental Planning Policy (Strategic Conservation Planning) which enacts them. It is not however a binding legal or statutory instrument,</p> <p>The Guidelines include the following additional controls:</p> <ul style="list-style-type: none"> • Urban design requirements to retain koala feed trees and habitat • Pre-clearance protocols to endure minimal disturbance to species including koalas • Traffic calming measures for development to reduce impacts on koalas & other fauna species • Protective fencing for conservation areas • APZs & stormwater infrastructure located within land certified for urban development only 	<p>The Mitigation Measures Guidelines have been designed explicitly for Greater Macarthur and Greater Penrith-Eastern Creek nominated areas only. This is because the DCP Template will not apply to these nominated areas, as state-led DCP's are not proposed in these areas.</p> <p>Notwithstanding the Guideline, mitigation measures should be incorporated across the four nominated areas. This will occur via development control plans for Wilton and Aerotropolis nominated areas. See discussion of the Template DCP under Action 1 above.</p>	<p>N/A</p>	<p>The timing of the Action states the Guidelines will be adopted in Year 1.</p>

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
					<ul style="list-style-type: none"> • Weed, pest mitigation, soil & erosion management controls • Setbacks for Grey-headed flying fox camps (100m) & raptor nests (500m) • Riparian management & revegetation controls 			
<i>Action 3 - Provide ongoing support to local councils and other proponents in the application of development control plans and the Mitigation Measures Guidelines within the nominated areas, including the sharing of knowledge, maps and data (Life of Plan).</i>	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	N/A	Refer to discussion at Commitments 24-26.
<i>Action 4 - Audit growth area development control plans for the Plan's nominated areas where they apply to ensure the Cumberland Plain Conservation Plan DCP template development controls are incorporated in accordance with the development control plan requirements for each growth area (Life of Plan).</i>	Refer to Action 1.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	<p>The audit process will need to ensure that State-led DCPs incorporate the DCP provisions over time as precincts are developed.</p> <p>Requirements to undertake this audit will need to be addressed at post-approval stage in the governance structure.</p> <p>Refer to discussion at Commitments 24-26.</p>	Refer to discussion at Action 1 above.	N/A	This Action will be ongoing, and require monitoring throughout the life of the Plan.
<i>Action 5 - Monitor the implementation of the development controls through approval conditions by the relevant consent authority. If monitoring finds that development controls are not being effectively implemented, review and redraft new controls to update relevant state development control plans and the Mitigation Measures Guidelines and re-educate councils to ensure</i>	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	N/A	Refer to discussion at Commitments 24-26.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>stronger consideration of the controls through their assessment process (Life of Plan).</i>								
<i>Action 6 - Introduce the Cumberland Plain Conservation Plan Guidelines for Infrastructure Development to be addressed by a public authority or other proponents of essential infrastructure, including mitigation measures for indirect and prescribed impacts to biodiversity from infrastructure activities in accordance with Appendix E of the Plan (Year 1).</i>	Refer to discussion at Commitment 2 Action 3.	Refer to discussion at Commitment 2 Action 3.	Refer to discussion at Commitment 2 Action 3.	Refer to discussion at Commitment 2 Action 3.	Refer to discussion at Commitment 2 Action 3.	Refer to discussion at Commitment 2 Action 3.	N/A	Refer to discussion at Commitment 2 Action 3.
<i>Action 7 - Implement mitigation measures based on the outcomes of environmental assessment of detailed designs in accordance with the requirements of the NSW approval process, as well as published, best-practice guidelines (Life of Plan).</i>	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	Refer to discussion at Commitments 24-26.	N/A	Refer to discussion at Commitments 24-26.
<i>Action 8 - Consult with the relevant public land manager to minimise disturbance and impacts to threatened species in accordance with Appendix E, including: a. ensuring walking tracks and management trails in Wianamatta Regional Park are located in a way that avoids and minimises exposure of <i>Persoonia nutans</i> to human disturbance b. ensuring land management in potential habitat for <i>Pimelea spicata</i>, particularly mowing and slashing activities and weed management activities involving the use of</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	This is a role for the applicant.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<p>herbicides, will minimise risks and maintain the species</p> <p>c. work with NSW DPI – Fisheries to address the risk of illegal and incidental recreational fishing capture along stretches of known habitat for Macquarie Perch in Erskine Creek, Glenbrook Creek, Georges River and Cordeaux River (Years 1-5)</p>								
<p>Commitment 6 - Mitigate indirect and prescribed impacts on threatened ecological communities, species and their habitat within major transport corridors, including the Outer Sydney Orbital and Metro Rail Future Extension tunnel sections, in accordance with the:</p> <ul style="list-style-type: none"> major transport corridors class of action description, including the NSW state-significant infrastructure (or equivalent) approval for certified-major transport corridors major transport corridors class of action description and the Biodiversity Assessment Method (BC Act) (or equivalent) for major transport corridors (strategically assessed only) specific mitigation measures to address impacts on biodiversity values prescribed in Appendix E. 								
<p><i>Action 1 - To mitigate indirect and prescribed impacts on threatened species and their habitat, Transport for NSW will across all major transport corridors:</i></p> <p>a. assess the impacts on biodiversity values for major transport corridors (strategically assessed only) and other environmental values (for certified- and strategically assessed-only major transport corridors) based on detailed design</p> <p>b. implement specific mitigation measures prescribed in Appendix E and identify and implement additional mitigation measures based on the outcomes of environmental assessment of detailed designs in accordance with the requirements of the State Significant Infrastructure (or equivalent) approval process, as well as published, best practice guidelines, including but not limited to, the RMS</p>	Indirect and detailed impacts under the BAM are addressed at s5.2.1 and Appendix 4 of the report.	Indirect and detailed impacts under the BAM are addressed at s5.2.1 and Appendix 4 of the report.	Indirect and detailed impacts under the BAM are addressed at s5.2.1 and Appendix 4 of the report.	Indirect and detailed impacts under the BAM are addressed at s5.2.1 and Appendix 4 of the report.	Indirect and detailed impacts under the BAM are addressed at s5.2.1 and Appendix 4 of the report.	N/A	N/A	Indirect and detailed impacts under the BAM are addressed at s5.2.1 and Appendix 4 of the report.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>Biodiversity Guidelines (PDF 8.07 MB)</i> c. apply further mitigation according to the Biodiversity Assessment Method (BC Act) (or equivalent) for major transport corridors (strategically assessed only), including the tunnels sections d. identify potential design options for major watercourse crossings to reduce disruption to connectivity and the risk of fauna vehicle strikes e. establish baseline monitoring data and undertake ongoing monitoring of high-value environmental areas, and review and adjust mitigation measures (where practical) in response to monitoring outcomes, in accordance with the requirements of the state-significant infrastructure (or equivalent) approval.								
<i>Action 2 - Transport for NSW will report to the department and executive implementation committee on mitigation measures proposed to manage impacts of each major transport corridor project, including proposed techniques, timing, frequency and responsibility for implementing each measure (Life of Plan).</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Commitment 7 - Mitigate indirect and prescribed impacts from urban, industrial, infrastructure development on the Southern Sydney koala population to best-practice standards and in line with advice from the Office of the NSW Chief Scientist & Engineer, and in accordance with Appendix E of the Plan.								
<i>Action 1 - Install koala-exclusion fencing, including gates and grids, between koala habitat that can safely support koalas and urban land within the Greater</i>	N/A	Koala exclusion fencing is required to mitigate the impacts of urban development, including traffic, and ensure the koala south western Sydney koala	The koala population will be prioritised and directly benefitted by the proposed Action, subject to detailed design ensuring fencing achieves its stated purpose,	The final design of exclusion fencing and fauna crossings to ensure landscape and habitat connectivity for koalas is maintained are yet to be agreed. Subject to this	The proposed exclusion fencing is additional to existing obligations. It is however essential to ensure proposed koala corridors achieve their stated aim of	N/A	N/A	This Action will be undertaken over the life of the Plan.

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<p><i>Macarthur Growth Area and Wilton Growth Area, except where exclusion fencing is not feasible or necessary due to slope, heritage or water courses.</i></p> <p><i>a. Manage impacts to fences by locating koala-exclusion fencing at least 3 metres from any trees where practical (measured from canopy).</i></p> <p><i>b. Apply koala specific mitigation actions in accordance with Appendix E.</i></p> <p><i>c. Where fencing must cross existing or planned linear infrastructure such as gas and electricity transmission, consider appropriate access treatments such as gates to ensure the integrity of the koala exclusion fencing.</i></p> <p><i>d. Fence off koala corridors that are too narrow to safely support koalas and relocate koalas out of the unsafe corridors if needed. (Commitment 12 Action 1f).</i></p> <p><i>e. Address the requirements of the Cumberland Plain Conservation Plan Guidelines for Infrastructure Development as essential infrastructure for EPBC Act approval in the avoided land. (Life of Plan)</i></p>		<p>population remains sustainable.</p> <p>Refer also to Appendix 8.</p>	<p>and timing to ensure it progresses commensurate with development stages.</p> <p>Refer also to Appendix 8.</p>	<p>occurring post-approval by way of the feasibility study, to the satisfaction of EHG, key connections to ensure koala movement will be retained.</p> <p>The minimum corridor widths are generally in accordance with the Office of Chief Scientist & Engineer's recommendations, as discussed at Commitment 12 below.</p> <p>Tangible outcomes in the initial period of the Plan, such as early establishment of koala mitigations, will be critical to visibly demonstrate effectiveness of the conservation program.</p> <p>Refer also to Appendix 8.</p>	<p>protecting the koala population.</p>			
<p><i>Action 2 - Complete a feasibility study on the koala-exclusion fencing to help inform the design, locations and construction of the fencing and identify fencing priorities for the first 5 years (Year 1).</i></p>	N/A	Refer also to Appendix 8.	Refer also to Appendix 8.	Refer also to Appendix 8.	Refer also to Appendix 8.	N/A	N/A	This Action will be undertaken within Year 1.
<p><i>Action 3 - Install koala-exclusion fencing along the western alignment of the Georges River Koala Reserve where existing urban development is a threat to</i></p>	N/A	See Actions 1 and 2.	See Actions 1 and 2.	<p>This location is supported in principle, subject to detailed design to be addressed in the fencing feasibility study.</p> <p>See Actions 1 and 2.</p>	See Actions 1 and 2.	N/A	N/A	This Action will be undertaken within Years 1-20.

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<i>the koala population (Years 1 to 20).</i>								
<i>Action 4 - Install koala-exclusion fencing, in the vicinity of koala habitat, along both sides of Appin Road between Rosemeadow and Appin to mitigate koala vehicle strikes at roadkill hotspots. Fencing along Appin Road will be in addition to planned fencing works to be delivered by Transport for NSW (Years 1 to 5).</i>	N/A	See Actions 1 and 2.	See Actions 1 and 2.	This location is supported in principle, subject to detailed design to be addressed in the fencing feasibility study. See Actions 1 and 2.		N/A	N/A	This Action will be undertaken within Years 1-5.
<i>Action 5 - Undertake targeted stakeholder and community engagement to support the delivery of koala-exclusion fencing (Years 1 to 3).</i>	N/A	Refer also to Appendix 8.	Refer also to Appendix 8.	Refer also to Appendix 8.	Refer also to Appendix 8.	N/A	N/A	This Action will be undertaken within Years 1-3.
<i>Action 6 - Establish a koala working group with representation from relevant government agencies to support implementation of the koala commitments and actions. The working group will support implementation of the koala sub-plan, by providing advice to inform: a. alignment, staging, and design of the koala exclusion fencing and fauna crossing, including advice about providing appropriate koala movement corridors b. priority locations and approach for koala habitat restoration c. monitoring and evaluation of the Plan's koala commitments, including providing advice to support adaptive management based on monitoring and evaluation data d. community and stakeholder engagement for</i>	N/A	Refer also to Appendix 8.	Refer also to Appendix 8.	Refer also to Appendix 8.	Refer also to Appendix 8.	N/A	N/A	The Koala Working Group has already been established.

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<i>the koala conservation commitments and actions e. research and management actions relating to koalas. (Before start of Plan)</i>								
<i>Action 7 - Work with local councils, National Parks and Wildlife Service and Office of Strategic Lands to ensure the threats posed by dogs on all public land that is identified as koala habitat protected under the Plan, are managed: a. For land that is not publicly accessible, this will include the installation of signs and/or fences. b. For land managed as a reserve or for recreation, this will be achieved by incorporating requirements in a relevant plan of management. (Life of Plan)</i>	N/A	It is noted that some additional stakeholders may be required here, namely EES (Conservation, Policy & Strategy) who lead work on mitigation of dog threats to koalas. Refer also to Appendix 8.	Refer also to Appendix 8.	Refer also to Appendix 8.	Refer also to Appendix 8.	N/A	N/A	This Action will be undertaken over the life of the Plan.
<i>Action 8 - Provide safe fauna crossings, based on current best practice design, across Appin Road and other linear infrastructure by: a. installing a koala underpass culvert under Appin Road, near the intersection with Brian Road to support east-west koala movement from the Georges River to the Nepean River b. augmenting the existing Kings Falls Bridge at the Georges River by constructing a bench adjacent to the bridge abutments to allow dry passage for koalas (and other fauna) under Appin Road, supporting north-south koala movement from the Georges River Koala Reserve to the southern koala habitat</i>	N/A	See Actions 1 and 2.	See Actions 1 and 2.	The proposed fauna crossing locations are supported in principle, subject to final locations and detailed design being determined. See Actions 1 and 2.	See Actions 1 and 2.	N/A	N/A	This Action will be undertaken within Years 1-5.

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<p>c. investigating options for enhancing koala movement across the Upper Canal</p> <p>d. addressing the requirements of the Cumberland Plain Conservation Plan Guidelines for Infrastructure Development, as essential infrastructure for EPBC Act approval in the avoided land. (Years 1 to 5)</p>								
<p>Commitment 8 - Protect a minimum of 5,325 hectares of native vegetation in the Cumberland subregion to conserve biodiversity values in perpetuity in accordance with the conservation land selection steps, which may require up to 11,900 hectares of conservation land.</p> <p>Commitment 8.1 This target includes minimum areas of the following EPBC Act-listed threatened ecological communities:</p> <ul style="list-style-type: none"> • 675 hectares of Shale Sandstone Transition Forest • 665 hectares of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest • 570 hectares of River-flat eucalypt forest of eastern Australia • 125 hectares of Cooks River Castlereagh Ironbark Forest • 20 hectares of Coastal Swamp Oak Forest • 0.2 hectares of Western Sydney Dry Rainforest and Moist Woodland on Shale. <p>Commitment 8.2 This target includes minimum areas of the following BC Act-listed threatened ecological communities:</p> <ul style="list-style-type: none"> • 2,885 hectares of Cumberland Plain Woodland • 1,455 hectares of Shale Sandstone Transition Forest • 505 hectares of River-Flat Eucalypt Forest • 285 hectares of Shale Gravel Transition Forest • 115 hectares of Cooks River Castlereagh Ironbark Forest • 70 hectares of Swamp Oak Floodplain Forest • 10 hectares of Freshwater Wetlands on Coastal Floodplains • 0.2 hectares of Moist Shale Woodland. 								
<p><i>Action 1 - Prepare a conservation land implementation strategy to guide the establishment of land for conservation, including:</i></p> <p>a. priorities for selecting and purchasing land</p> <p>b. targets and proposed timeframes for establishing new conservation land</p> <p>c. proposed land-based conservation type for each area of priority conservation land (reserve or biodiversity stewardship agreement)</p>	<p>SAIL entities are targeted in the Conservation Lands Implementation Strategy, and have informed mapping of the Strategic Conservation Area (SCA).</p> <p>SAIL is discussed further at s5.5 and Appendix 6.</p>	<p>The proposed draft Conservation Land Implementation Strategy is designed to target values being impacted by the Plan. 90% of conservation program funding will deliver conservation lands.</p> <p>A credit value has been provided for this measure. The applicant has also developed a "Reverse BAM" to guide the headline 5,325 ha target figure for native vegetation communities impacted by the Plan. This process determined a likely</p>	<p>The SCA was designed to target TEC's and threatened species at threat from development under the Plan. It also covers approximately 25% of existing land on the Cumberland Plain mapped on the NSW Biodiversity Values Map.</p> <p>The conservation priorities method, which informed mapping of the SCA, was developed by undertaking the following repeatable process:</p>	<p>The SCA has been designed to identify highest priority areas for conservation and restoration at the landscape scale in the Plan area. More than 90% of the SCA includes remnant patches greater than 50 ha in size. BIO Map corridor and core mapping have also informed the planning for the conservation lands within the nominated areas, with over half of the areas mapped avoided for biodiversity purposes and captured in the SCA.</p>	<p>The proposed conservation lands implementation strategy is critical to deliver of the private land conservation program. BSA's and proposed NPWS reserves are the two mechanisms by which offsets will be secured.</p>	N/A	<p>Reserve establishment is discussed at Commitments 10 and 11.</p>	<p>The timing for completion of the draft implementation strategy is Year 1, with offsets to be sourced thereafter over the Plan's life.</p> <p>The certainty of offsets being delivered over the Plan's life as proposed, commensurate to impacts occurring, is contingent upon tracking/reconciliation during implementation.</p> <p>See also Commitment 25.</p>

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<p>d. suitable land managers for each area of priority conservation land</p> <p>e. a process to secure alternative areas where targets and timing cannot be met. (Year 1)</p>	<p>credit range, based on “required” or “active restoration” management scenarios for the offset target. These were as follows:</p> <ul style="list-style-type: none"> Required management scenario: future veg structure, composition and function values same as default assigned in BAM-C Active restoration management scenario: future veg structure, composition and function values improved to benchmark or higher <p>The range determined was between 4,154 ha-8,615 ha. The target figure of 5,325 ha falls within this range.</p> <p>A requirement for the applicant to provide credit equivalents for the proposed offset targets across all TEC’s will be supplied within Year 1. This figure will provide a “baseline” in subsequently tracking establishment of offsets in both hectares and credits over the Plan’s life. See also Commitment 25.</p> <p>The 5,325 ha native vegetation target figure excludes 10% of the Plan’s total offset target of 5,920 ha (595 ha), which has been allocated to non-land based measures. See discussion at Commitments 15-20 of the Plan.</p> <p>The SCA comprises approximately 27,200 ha, including just over 7,808 ha of TECs being impacted in total. The area of the SCA is approximately 2.5 times</p>	<ul style="list-style-type: none"> Ecological assessment to identify remaining native vegetation in the Plan area native vegetation extent Complementary assessments to factor in constraints, including tenure, zoning, lot size, utilities and mining leases. Conservation priorities and offset selection, to determine best available vegetation subject to constraints and restoration potential to meet the offset targets Ground truthing to verify desktop assessment, with “over the fence” type assessments used <p>The conservation lands selection steps process retains some flexibility in acquiring offsets, noting that impacted entities within the Plan area are targeted as a priority. These state that:</p> <ul style="list-style-type: none"> Priority areas with the SCA must be targeted first, followed by Anywhere in the SCA, followed by The Cumberland subregion and adjacent subregions, and finally Anywhere in NSW. <p>These steps are comparable to the variation rules under Part 6 of the BC Regs. The total cap on offsets located outside the Plan areas is 20%.</p> <p>Tangible outcomes in the initial period of the Plan, such as establishment of the Georges River Koala Reserve</p>	<p>Success of the private land conservation program is however contingent upon future landholder engagement. An engagement strategy for attracting landholders to the CPCP offsets program has been prepared by the BCT. The BCT will also use its suite of available levers for securing offsets, including fixed price offers, tenders and use of a revolving fund to on-sell purchased properties with a BSA established.</p> <p>Recent research undertaken by DPE Centre for Advanced Data & Analytics has explored the issue of landholder willingness to engage in private land conservation schemes. The research identified that approximately 15% of landholders are of the type, or have the profile / preferences making them likely to engage with the scheme. This is irrespective of whether they have done so to date. The research varied spatially, with estimates of 10% for the Hawkesbury-Nepean and 17% for the Sydney Metro regions, which is broadly consistent with the statewide figure.</p> <p>The adaptive management regime specifies that acquisition of land for offsets can be undertaken as a last resort. Reconciliation of impacts and offsets is required over the life of Plan, to ensure that offsets are tracking commensurate with impacts occurring on certified land. See discussion at Commitment 25 below.</p>				

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		<p>greater than the area being impacted that is proposed for certification. It is also approximately double the total area of native vegetation being targeted for offsets under the Plan (5,325 ha).</p> <p>Shale Gravel Transition Forest, Castlereagh Ironbark Forest and Swamp Oak Floodplain Forest TEC's, have a shortfall of 196 ha, 48 ha and 61 ha respectively to meet offset targets in the SCA. There is a significantly greater quantum of Cumberland Plain Woodland (2,309 ha), comprising PCT's 849 and 850, available in the SCA to meet the offset target. However analysis at the TEC level masks the difference in PCT 849, where this is a significant shortfall of 649 ha in the SCA, while PCT 850 is comparatively abundant.</p> <p>Other TEC's, whilst having at least the minimum amount required in the SCA, are not as well placed to realistically meet offset targets without significant restoration and/or sourcing offsets outside the Plan area. With restoration potential factored in, shortfalls would likely remain of 189 ha for Shale Gravel Transition Forest (PCT 724) and 22 ha for Cooks River Castlereagh Ironbark Forest.</p> <p>Restoration is discussed at Commitment 13.</p>	<p>and early BSA sites in the southern part of the Plan area, will be critical to visibly demonstrate effectiveness of the conservation program.</p> <p>The initial phase of the private land conservation program will target offsets in the Razorback and Orangeville areas in concert with the BCT over the first 5 years. This landscape is characterised by relatively intact patches of remnant native vegetation. It provides connectivity between catchment lands and Dharawal National Park to the east, and the Blue Mountains to the west.</p> <p>The draft Strategy also clarifies that "like-for-like" offsets matches the definition in the BC Reg.</p>	<p>Flexibility to secure offsets outside of the Plan area is capped at 20% of the total offset target. A component of the native vegetation offset target up to 25% is also proposed to be established via reconstruction or restoration, as discussed at Commitment 13 below.</p> <p>It is also noted that some PCT's being impacted and targeted have shortfalls in the SCA. This means that restoration or sourcing offsets outside the Plan area in accordance with the selection steps must be utilised to negate shortfalls.</p> <p>There is a risk that, as offset delivery will likely not meet the headline offset target wholly within the Plan area, landscape outcomes targeted by the conservation program may be compromised in some instances.</p> <p>Connections through and between Wilton and Greater Macarthur nominated areas and the broader Plan area, including large patches of contiguous vegetation, are relatively well represented in the SCA. However it is noted that the South Creek corridor, despite being identified for future investigation as a reserve with TEC restoration potential of up to 370 ha, is not well represented in the SCA. This is pertinent as there are minimal areas of SCA in Western Sydney Aerotropolis and Greater Penrith-Eastern Creek, and connectivity from</p>				

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<i>Action 5 - Protect and manage land containing targeted plant communities within the strategic conservation area by: a. establishing reserves under relevant legislation including the National Parks and Wildlife Act 1974, Crown Land Management Act 2016, and Local Government Act 1993 b. establishing biodiversity stewardship agreements under the BC Act c. purchasing and retiring biodiversity credits under the Biodiversity Offsets Scheme. (Life of Plan)</i>	See Action 1 above, and Commitments 10 and 11 below.	See Action 1 above, and Commitments 10 and 11 below. Direct purchase and retirement of credits can also be used as a substitute for establishing land-based offsets, such as reserves or BSA's. Establishment of land-based offsets should be first priority, with credit purchase to meet offset target a second preference. Currently the Plan expresses offset targets in hectares. The offset targets have been calculated under the "Reverse BAM" process, and a credit estimate for land-based conservation measures including NPWS and private reserve establishment has been supplied.	See Action 1 above, and Commitments 10 and 11 below.	The success of the private land conservation program hinges on engaging landholders to commit to establishing biodiversity stewardship agreements on their land. A delivery plan for the first 5 years has been developed by the applicant and the NSW BCT, who have also developed an engagement strategy. Research from EHG also indicates than 20% or less. Establishment of NPWS reserves are discussed at Commitments 10 and 11 below.	See Action 1 above, and Commitments 10 and 11 below.	N/A	Reserve establishment is discussed at Commitments 10 and 11.	This will occur over the life of the Plan.
<i>Action 6 - Track the progress of meeting threatened ecological community targets (in hectares) through the reconciliation accounting process (Commitment 25 Action 2) (Life of Plan).</i>	See Commitment 25.	See Commitment 25.	See Commitment 25.	See Commitment 25.	See Commitment 25.	N/A	N/A	See Commitment 25.
<i>Action 7 - Provide up-front funding for business cases and Biodiversity Assessment Method assessments to support landholders entering into biodiversity stewardship agreements where this investment can be recouped through the later sale of biodiversity credits (Life of Plan).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 8 - Define a land purchase strategy that will guide decision-making and processes to be used when purchasing land for</i>	N/A	The Land Purchase Strategy has been supplied, and clarifies selection steps for land to be purchased, proposed purchase arrangements, and short	See Principle 2.	See Principle 2.	Land purchase is critical to the success of conservation program and establishment of BSA's and reserves, which are additional obligations.	N/A	N/A	The Land Purchase Strategy was finalised as part of the application package.

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<i>conservation under the Plan (Before start of plan).</i>		long term management arrangements. Lands prioritised for purchase include primarily highest value lands in the CSA, such those identified for NPWS reserves or lands adjacent to land already purchased. See Action 1 above.						
<i>Action 9 - Purchase land within the strategic conservation area to commence establishing reserves under the Plan with priority given to land listed for sale and land in the Georges River Koala Reserve (Life of Plan).</i>	See Action 8 above. The Georges River Koala Reserve is discussed at Commitment 10.	See Action 8 above. The Georges River Koala Reserve is discussed at Commitment 10.	See Action 8 above. The Georges River Koala Reserve is discussed at Commitment 10.	See Action 8 above. The Georges River Koala Reserve is discussed at Commitment 10.	See Action 8 above. The Georges River Koala Reserve is discussed at Commitment 10.	N/A	N/A	See Action 8 above. The Georges River Koala Reserve is discussed at Commitment 10.
<i>Action 10 - Introduce an acquisition clause in an environmental planning instrument to land identified for future reserves under the Plan as funds become available through the program (Life of Plan).</i>	See Commitment 14.	See Commitment 14.	See Commitment 14.	See Commitment 14.	See Commitment 14.	See Commitment 14.	See Commitment 14.	See Commitment 14.
<i>Action 11 - Work with local councils and other land managers to ensure that reserves established under the Plan provide for increased public access, including the provision of compatible low biodiversity impact recreation activities (Life of Plan).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<p>Commitment 9 - Protect threatened species likely to be at risk of residual adverse impacts from development under the Plan (target species) in accordance with the Plan's conservation land selection steps. This includes securing offsets to protect known locations for the following target threatened species.</p> <p>Flora species:</p> <ul style="list-style-type: none"> • 2 offset locations for <i>Cynanchum elegans</i> • 3 offset locations for <i>Dillwynia tenuifolia</i> • 3 offset locations for <i>Grevillea juniperina</i> subsp. <i>juniperina</i> • 1 offset location for <i>Hibbertia fumana</i> • 1 offset location for <i>Hibbertia puberola</i> • 2 offset locations for <i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> 								

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- 2 offset locations for *Persoonia nutans*
- 3 offset locations for *Pimelea spicata*
- 2 offset locations for *Pultenaea parviflora*
- 2 offset locations for *Pultenaea pedunculata*

Fauna species:

- 1 offset location for *Haliaeetus leucogaster*
- 1 offset location for *Hieraaetus morphnoides*
- 1 offset location for *Lophoictinia isura*
- 3 offset locations for *Meridolum corneovirens*
- 1 offset locations for *Myotis macropus*

This includes securing habitat for the following target threatened fauna species:

- 4,410 hectares of potential foraging habitat for *Lathamus discolour* (including 100 hectares of *Lathamus discolour* important habitat as defined under the BAM)
- 570 hectares of important habitat for *Phascolarctos cinereus* as defined in the Cumberland Plain Assessment Report.

<i>Action 1 - Assess and record the habitat attributes of where target species have been located and use the information to establish baseline monitoring data for areas of known habitat for target species and incorporate into the evaluation program (Commitment 25) (Year 1).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 2 - Protect offset locations and species habitat for the target threatened species through establishing reserves or biodiversity stewardship sites or through the direct purchase of species credits in the Cumberland subregion or across NSW (Life of Plan).</i>	See discussion at Commitment 8 Actions 1 & 5.	Credit estimates for the proposed land-based offset measures have been provided. There are a total of 17 species identified as target species for the offset program, out of a total of 39 species credit species for which an offset liability was determined in the BCAR. The remaining 22 species credit species were determined in the BCAR to have habitat that is well-represented in the SCA, and therefore that specified targets were not required. Offset targets for the remaining 17 species credit species were developed to ensure areas of known habitat or known locations are protected. However, these locations are ambiguously defined and conservation land selection	See discussion at Commitment 8 Actions 1 & 5.	The success of establishing species offset locations in stewardship agreements is contingent upon landholder engagement. There is a risk that if suitable landholdings are not secured under the program, that the species-specific offset location targets may not be met. See also discussion at Commitment 8 Actions 1 & 5.	See discussion at Commitment 8 Actions 1 & 5.	N/A	Reserve establishment is discussed at Commitments 10 and 11.	See discussion at Commitment 8 Actions 1 & 5.

Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain	
		<p>steps allow for purchase of equivalent credits after a period of time.</p> <p>Of these, it is proposed to offset 15 of the target species credit species by securing a specified number of offset sites for each. Preliminary analysis of existing BSA's and EOI's in the public register in the BCAR indicates most for species are readily available to meet these targets within the SCA, including Swift Parrot as described below.</p> <p>However based on existing data, five of these 15 species may require offsets outside the Plan area. These species are:</p> <ul style="list-style-type: none"> • Cynanchum elegans • Hibbertia fumana • Hibbertia puberula • Pimelea spicata • Pultenea pedunculata <p>This cannot occur until the conservation land selection steps have been appropriately followed, as discussed at Commitment 8.</p> <p>This is a considered to be a risk for the conservation program, as it is anticipated up front that almost a third of targeted species cannot be offset within the Plan area.</p> <p>The approach for determining the number of 'offset locations' for these species was based on the level of 'residual adverse risk' and conservation status. Up to three offset locations could result, including three for critically endangered species and potential SAIL entities with</p>						

Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain	
		<p>substantial risk, one for endangered species with a small risk, and zero for vulnerable species with a small risk (see page 8-14 of the assessment report for the full range of number of offset locations).</p> <p>This approach to offsetting species credit species relies on BioNet records being a good proxy for occurrence, which is not necessarily the case. It also uses arbitrary cut off points, and an arbitrary range of number of offset locations, which unlike the BAM does not factor in the area and condition of the offset locations for the target species. There is also ambiguity surrounding whether offset locations or credit retirement can be used.</p> <p>Offsetting species credit species using what is essentially ecosystem credits is also problematic, as species credit species' likelihood of occurrence, or elements of suitable habitat, cannot be confidently predicted by vegetation surrogates and landscape features (see section 6.3.1.2 of the BAM).</p> <p>Targeted species may also be present in other offsets secured for TEC's under the private land conservation program. However the use of offset locations for species credit species targets could also result in species impacted by the Plan being under-represented across the proposed conservation lands, especially for those</p>						

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		<p>species which require habitat features that are becoming increasingly rare, such as medium to large sized hollows, and breeding habitat with adequate buffers from disturbances like roads, residential areas, and light spill.</p> <p>For two additional species considered at highest risk, namely Koala and Swift Parrot, area-based offset targets for habitat have been quantified. These include 570 ha of “important habitat” for Koala, and 4,410 ha of “potential foraging habitat” for Swift Parrot.</p> <p>Proposed measures to secure additional koala habitat, including the Georges River Koala Reserve, are discussed at Commitments 10 and 12.</p> <p>See also discussion at Commitment 8 Action 5.</p>						
<i>Action 3 - Achieve the Plan’s species targets by applying the conservation land selection steps (Life of Plan).</i>	See discussion at Commitment 8 Action 1.	See discussion at Commitment 8 Action 1.	See discussion at Commitment 8 Action 1.	See discussion at Commitment 8 Action 1.	See discussion at Commitment 8 Action 1.	N/A	N/A	See discussion at Commitment 8 Action 1.
<i>Action 4 - Identify species-specific management measures for areas of known habitat for target species in consultation with future land managers of reserves established under the Plan and incorporate these into management plans for the land (Life of Plan).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 5 - Track progress in meeting species offset targets through the reconciliation accounting</i>	See Commitment 25.	See Commitment 25.	See Commitment 25.	See Commitment 25.	See Commitment 25.	N/A	N/A	See Commitment 25.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>process (Commitment 25 Action 2) (Life of Plan).</i>								
Commitment 10 - Establish a reserve to protect the north-south koala movement corridor along the Georges River between Appin and Long Point.								
<i>Action 1 - Transfer and reserve lots identified for early transfer to National Parks and Wildlife Service as the first stage in establishing Georges River Koala Reserve (Years 1 to 2).</i>	<p>Koalas are not identified in the BCAR as a species at risk of SAIL, although it is noted their listing has recently been upgraded to endangered under the Commonwealth EPBC Act.</p> <p>However both vegetation types primarily affected by development are located within the GRKR (Shale Sandstone Transition Forest and Cumberland Plain Woodland), and are targeted for conservation within the GRKR.</p>	<p>Koala habitat and movement corridors are proposed to be impacted by the certification. The GRKR has been identified by the NSW Office of Chief Scientist & Engineer as essential to the persistence of the south western Sydney koala population.</p> <p>Lots for early transfer comprising 1,195 ha are already held by the NSW Office of Strategic Lands, and will be transferred once the GRKR is gazetted.</p> <p>Stages 1a and 1b comprises up to 1,105 ha between Appin and Kentlyn, and Stage 2 comprises up to 725 ha between Kentlyn and Long Point.</p> <p>However it is noted that the proposed GRKR, whilst containing existing native vegetation, would also require significant areas of restoration.</p> <p>See discussion at Commitment 13.</p>	<p>As discussed at Principle 2, the south western Sydney koala population is recognised as being at threat from urban development.</p> <p>The proposed early establishment of the reserve would provide connectivity for the species, and is in accordance with the recommended minimum corridor widths in the Office of Chief Scientist & Engineer's recommendations for the CPCP.</p>	<p>The proposed GRKR would ensure a contiguous north-south corridor for koala movement on shale and shale transition soils.</p> <p>However its effectiveness is dependent on the establishment of future stages beyond the lands already acquired, as discussed below.</p>	<p>The establishment of the proposed GRKR is additional to existing obligations, and will be managed as an NPWS reserve.</p>	N/A	<p>Whilst the proposed reserve overall meets the CAR framework as discussed below, the early lots for transfer are fragmented. However they represent a critical first stage in establishing a viable reserve that provides connectivity for koala movement.</p> <p>NPWS supports reservation of the GRKR in principle, and has signed an interim MoU with the applicant. NPWS supports the proposed reserve locations in principle. A detailed MoU will also be agreed and finalised in Year 1.</p> <p>A preference for BSA's has been expressed to fund reserve establishment. However, the MoU provides sufficient flexibility that an alternative funding mechanism, such as direct funding from infrastructure contributions can instead be agreed. Alternative funding may be suitable in instances where the scope of management actions and funding under a BSA do not align well with the future on-park management regime.</p>	<p>The early transfer of land into the GRKR is fairly certain, given the lots are already owned by OSL and transferred to NPWS and gazetted within Year 1 of the Plan.</p>
<i>Action 2 - Reserve additional areas of the Georges River Koala Reserve between Appin and Kentlyn using NSW government land as a priority and by purchasing additional land (Stages 1a and 1b) (Years 1 to 10).</i>	See discussion at Action 1 above.	See discussion at Action 1 above.	See discussion at Action 1 above.	<p>The proposed GRKR would ensure a contiguous north-south corridor for koala movement on shale and shale transition soils.</p> <p>The success of Stages 1a, 1b, 2 and 3 depends on successful acquisition of</p>	See discussion at Action 1 above.	N/A	<p>The proposed establishment of the reserve is consistent with the CAR reserve system scientific principles, as follows:</p> <ul style="list-style-type: none"> Comprehensiveness: Whilst larger, full ranges of forest 	<p>Funding for the Plan has not been secured beyond the first 5 years. Contingent upon funding being secured under infrastructure contributions, the establishment of stages beyond the early transfer lots is reasonably certain.</p>

Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
				<p>properties to ensure landscape connectivity for koala movement is achieved. There are considerable uncertainties and the potential for key linking landholdings to resist acquisition. Should this occur, adaptive management will be required to enact compulsory acquisition, as discussed at Commitment 25. Extinguishment of mining licences in consultation with South 32 as the licence holder is also required for the early stages of the GRKR in the vicinity of Appin.</p> <p>It is proposed to establish BSA's as a first preference to secure ongoing management funding, however alternatives are also possible as discussed at Action 1 above.</p> <p>Significant restoration of areas of future NPWS reserves are proposed, including up to 200 ha in the Georges River Koala Reserve, prior to transfer to NPWS. The restoration of koala habitat, including critically endangered Cumberland Plain Woodland and Shale Sandstone Transition Forest, is contingent upon ensuring that such communities are successfully re-established upon completion.</p>		<p>communities are preferred under the CAR framework are preferred, this is acknowledged to be extremely difficult. Smaller, more manageable units of management are therefore preferred. The GRKR targets forest types used by koalas and seeks to maintain landscape connectivity for this species, and is supported on this basis. The GRKR also reserves a contiguous corridor of critically endangered CPW and SSTF communities. More than 95% of the land targeted for the reserve comprises patches greater than 50 ha.</p> <ul style="list-style-type: none"> • Adequacy: This principle aims to ensure that the chances of long-term survival of a population being targeted are maximised and appropriately managed. The GRKR is aimed at providing a functional corridor to ensure koala movement and connectivity, in accordance with expert advice from the Office of Chief Scientist & Engineer. • Representativeness: This principle aims to ensure that targeted species are adequately reserved to maximise and ensure their viability. The GRKR has been informed by expert advice on koala movements within 	<p>Funding is discussed further under Commitments 8 and 9.</p>

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							identified corridors, and is based on suitable habitat that provides feed trees for koalas. The proposed GRKR also provides for mitigation measures such as fencing to preserve movement corridors and prevent edge effects. See also discussion at Action 1 above.	
<i>Action 3 - Reserve additional areas of the Georges River Koala Reserve between Kentlyn and Long Point using NSW government land as a priority and by purchasing additional land (Stage 2) (Years 1 to 20) .</i>	See discussion at Action 1 above.	See discussion at Action 1 above.	See discussion at Action 1 above.	See discussion at Action 2 above.	See discussion at Action 1 above.	N/A	See discussion at Actions 1 and 2 above.	See discussion at Action 2 above.
<i>Action 4 - Restore up to 80 hectares of cleared land for koala habitat in priority areas including the Georges River Koala Reserve to strengthen the north-south koala corridor (Years 1 to 5).</i>	See discussion at Action 1 above. Restoration is also discussed at Commitment 13.	See discussion at Action 1 above. Restoration is also discussed at Commitment 13.	See discussion at Action 1 above. Restoration is also discussed at Commitment 13.	See discussion at Action 1 above. Restoration is also discussed at Commitment 13.	See discussion at Action 1 above. Restoration is also discussed at Commitment 13.	N/A	See discussion at Actions 1 and 2 above. Restoration is also discussed at Commitment 13.	See discussion at Action 2 above.
<i>Action 5 – Restore additional koala habitat within the Georges River Koala Reserve to strengthen the north-south koala movement corridor (Years 6 to 25).</i>	See discussion at Action 1 above. Restoration is also discussed at Commitment 13.	See discussion at Action 1 above. Restoration is also discussed at Commitment 13.	See discussion at Action 1 above. Restoration is also discussed at Commitment 13.	Restoration of between 80 and 170 ha of koala habitat on conservation land within the GRKR is proposed. See discussion at Action 1 above. Restoration is also discussed at Commitment 13.	See discussion at Action 1 above. Restoration is also discussed at Commitment 13.	N/A	See discussion at Actions 1 and 2 above. Restoration more generally is also discussed at Commitment 13.	See discussion at Action 2 above.
<i>Action 6 - Work with National Parks and Wildlife Service, Office of Strategic Lands and other key stakeholders to prepare a concept plan for the Georges River Koala Reserve (Year 1).</i>	See discussion at Action 1 above.	The Concept Plan is aimed at providing a strategic framework for koala preservation within the GRKR. It is targeted at land use decisions with the proposed reserve to preserve koalas impacted by the Plan.	The Concept Plan aims to establish a land use planning and management framework activities for activities that enhance koala conservation.	The proposed concept plan is aimed at identifying parts of the landscape within the GRKR that can be effectively restored as koala habitat. Restoration is also discussed at Commitment 13.	The Concept Plan is additional and complementary to reservation of land in the GRKR.	N/A	See discussion at Actions 1 and 2 above.	The Action aims to complete the plan by the end of Year 1.

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Commitment 11 - Establish at least 2 new reserves in addition to the Georges River Koala Reserve that will protect threatened communities, species and habitats that are targeted for protection through the Plan.

<p><i>Action 1 - Investigate a new reserve that will provide an ecological connection between Gulguer Nature Reserve, Bents Basin State Conservation Area and Burratorang State Conservation Area (Year 1).</i></p>	<p>Vegetation types and species primarily affected by development are located within the, notably Cumberland Plain Woodland and habitat for threatened species at risk of SAIL, are targeted for conservation within the Gulguer and Confluence reserve investigation areas.</p>	<p>A credit equivalent for proposed reserves has not been provided.</p> <p>The proposed reserve investigation areas represent numerous communities and threatened ecological communities and habitats for species impacted by the Plan. The Gulguer Reserve Investigation Area comprises approximately 1,850 ha in total, and the Confluence Reserve Investigation Area comprises approximately 580 ha. However it is noted that Confluence is entirely non-native and Gulguer, whilst containing native vegetation, would also require significant areas of restoration. Confluence Reserve would require approximately 370 ha of restoration.</p> <p>These include across all three reserves:</p> <ul style="list-style-type: none"> • Cumberland Plain Woodland (up to 263 ha available, up to 407 ha with restoration potential) • River-flat Eucalypt Forest (up to 330 ha with restoration potential) • Southern Myotis • Little Eagle • Cumberland Land Snail • Square-tailed kite • White-bellied sea eagle • Marsdenia viridiflora • Regent honeyeater • Grey-headed flying fox 	<p>The proposed establishment of two new reserves would preserve important biodiversity values within the broader Plan area, enhance connectivity and provide linkages to existing reserves.</p>	<p>The proposed establishment of two reserves would protect TEC's and threatened species habitat, as discussed at Principle 2. The proposed locations have also been selected on the basis of landscape connections to the existing reserve network.</p> <p>NPWS supports the proposed reserve locations in principle. An interim Memorandum of Understanding (MoU) has been finalised between the applicant (DPE GRP) and NPWS. A detailed MoU will also be agreed and finalised in Year 1.</p> <p>A preference for BSA's has been expressed to fund reserve establishment in the MoU. However, the MoU provides sufficient flexibility that an alternative funding mechanism, such as direct funding from infrastructure contributions can instead be agreed. Alternative funding may be suitable in instances where the scope of management actions and funding under a BSA do not align well with the future on-park management regime.</p>	<p>The establishment of proposed reserves is additional to existing obligations, and will be managed by NPWS.</p>	<p>N/A</p>	<p>The proposed establishment of the reserve is consistent with the CAR reserve system scientific principles, as follows:</p> <ul style="list-style-type: none"> • Comprehensiveness: Whilst larger, full ranges of forest communities are preferred under the CAR framework are preferred, this is acknowledged to be extremely difficult. Smaller, more manageable units of management are therefore preferred. Notwithstanding, More than 95% of the land targeted for proposed reserves comprises patches greater than 50 ha. The reserve investigation areas target communities impacted by the Plan, comprises the majority of impacted PCT's and offer connectivity to existing reserves, and are supported on this basis. • Adequacy: This principle aims to ensure that the chances of long-term survival of a population being targeted are maximised and appropriately managed. The reserve investigation areas have been selected on the basis aimed at providing that they represent numerous threatened ecological communities and threatened species 	<p>Funding for the Plan has not been secured beyond the first 5 years. Contingent upon funding being secured under infrastructure contributions, the establishment of stages beyond the early transfer lots is reasonably certain.</p> <p>Funding is discussed further under Commitments 8 and 9.</p>
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							<p>habitats impacted by the Plan.</p> <ul style="list-style-type: none"> Representativeness: This principle aims to ensure that targeted species are adequately reserved to maximise and ensure their viability. The reserve investigation areas have been informed by their conservation values and linkages to existing reserves. 	
<i>Action 2 - Investigate a new reserve on Wianamatta (South Creek) that will allow for the restoration of up to 370 hectares of threatened ecological communities (Year 1).</i>	Insufficient information has been supplied about this Action to make an informed assessment, apart from the fact it could link with the Confluence reserve investigation area.	Insufficient information has been supplied about this Action to make an informed assessment, apart from the fact it could link with the Confluence reserve investigation area.	Insufficient information has been supplied about this Action to make an informed assessment, apart from the fact it could link with the Confluence reserve investigation area.	Insufficient information has been supplied about this Action to make an informed assessment, apart from the fact it could link with the Confluence reserve investigation area.	Insufficient information has been supplied about this Action to make an informed assessment, apart from the fact it could link with the Confluence reserve investigation area.	Insufficient information has been supplied about this Action to make an informed assessment, apart from the fact it could link with the Confluence reserve investigation area.	Insufficient information has been supplied about this Action to make an informed assessment, apart from the fact it could link with the Confluence reserve investigation area.	Insufficient information has been supplied about this Action to make an informed assessment, apart from the fact it could link with the Confluence reserve investigation area.
<i>Action 3 - Establish a community engagement program with landholders in the reserve investigation areas to provide information and seek expressions of interest for land purchase to support establishment of new reserves (Years 1 to 10).</i>						N/A	N/A	
<i>Action 4 - Establish biodiversity stewardship agreements appropriate to land purchased for a future reserve to commence management of the site (Life of Plan).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	This is a role for the applicant.	This is a role for the applicant.
<i>Action 5 - Gazette at least 2 new reserves in addition to the Georges River Koala Reserve by Year 20 of the Plan (Year 1 to 20).</i>	See discussions at Actions 1 and 2 above.	See discussions at Actions 1 and 2 above.	See discussions at Actions 1 and 2 above.	See discussions at Actions 1 and 2 above.	See discussions at Actions 1 and 2 above.	N/A	See discussions at Actions 1 and 2 above.	See discussions at Actions 1 and 2 above.
Commitment 12 - Protect koala corridors in the Cumberland subregion, including those along the Nepean River, Georges River, Cataract River and Ousedale Creek.								

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<i>Action 1 - Apply development controls to koala habitat protected under the Plan and ensure safe, functional corridors for koala movement (consistent with advice from the Office of the NSW Chief Scientist & Engineer) including: a. the north-south koala corridor along the Georges River (Commitment 10) b. the north-south koala corridor along the Nepean and Cataract rivers c. the east-west corridor along Ousedale Creek between the Georges River and Nepean River d. Elladale Creek and Simpsons Creek as an area of functional koala habitat e. the north-south koala corridor along Allens Creek f. excluding koalas from east-west corridors that do not meet the minimum requirements for a functional koala corridor (Corridor C: Nepean Creek to Beulah, and Corridor D: Mallaty Creek to Georges River) (Before start of Plan).</i>	N/A	The minimum widths for koala corridors identified in the OCSE report have been generally adhered to, and are mapped under the proposed SEPP (Strategic Conservation Planning). The proposed planning package, notably including biodiversity overlay provisions under the SEPP, are discussed at Commitment 14. The function of the koala corridors in relation to the minimum widths recommended by the OCSE are discussed at Appendix 8. See also Commitments 10 and 11 relating to the Georges River Koala Reserve.	Refer to Commitment 14 relating to planning measures and Appendix 8 in relation to koala corridors. See also Commitments 10 and 11 relating to the Georges River Koala Reserve.	Refer to Commitment 14 relating to planning measures and Appendix 8 in relation to koala corridors. See also Commitments 10 and 11 relating to the Georges River Koala Reserve.	Refer to Commitment 14 relating to planning measures and Appendix 8 in relation to koala corridors. See also Commitments 10 and 11 relating to the Georges River Koala Reserve.	Refer to Commitment 14 relating to planning measures and Appendix 8 in relation to koala corridors. See also Commitments 10 and 11 relating to the Georges River Koala Reserve.	Refer to Commitment 14 relating to planning measures and Appendix 8 in relation to koala corridors. See also Commitments 10 and 11 relating to the Georges River Koala Reserve.	Refer to Commitment 14 relating to planning measures.
<i>Action 2 - Restore koala habitat in the Georges River and Ousedale Creek corridors to ensure they meet requirements for safe and functional koala movement corridors, consistent with advice from the Office of the NSW Chief Scientist & Engineer (Commitment 13) (Life of Plan).</i>	N/A	Refer to discussion under Commitment 13 relating to ecological restoration. Refer also to Appendix 8.	Refer to discussion under Commitment 13 relating to ecological restoration. Refer also to Appendix 8.	Refer to discussion under Commitment 13 relating to ecological restoration. Refer also to Appendix 8.	Refer to discussion under Commitment 13 relating to ecological restoration. Refer also to Appendix 8.	N/A	N/A	Refer to discussion under Commitment 13 relating to ecological restoration.
Commitment 13 - Deliver and support ecological restoration activities in conservation land including ecological reconstruction of up to a maximum of 25% of the Plan's offset target for native vegetation (Commitment 8).								
<i>Action 1 - Establish a restoration working group to guide the implementation of restoration activities</i>	N/A	A draft restoration strategy has been prepared and will be finalised post-conferral in consultation with the	Proposed restoration is targeted to TEC's being impacted by the Plan.	N/A	N/A	N/A	N/A	N/A

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<i>under the Plan including the preparation of a restoration implementation strategy and supporting technical guidance where relevant (Year 1).</i>		restoration working group to be established. See Action 5 below.	See Action 5 below.					
<i>Action 2 - Develop a restoration implementation strategy in consultation with the restoration working group and other key stakeholders to establish best practice principles and methodologies, to:</i> <i>a. identify the range of restoration activities and what will be undertaken under the Plan</i> <i>b. ensure the long-term sustainability of restoration considers genetic diversity in what is established</i> <i>c. identify considerations for restoration potential and constraints of land</i> <i>d. provide reference to guidelines for restoration, including the NSW Biodiversity Conservation Trust guidelines for restoring native vegetation undertaken in a biodiversity stewardship site</i> <i>e. develop a seed-procurement approach</i> <i>f. reference research needs being considered through the research program implementation strategy (Commitment 22, Action 1).</i> <i>g. enter into written agreements with delivery partners and engage specialist providers where necessary to implement the restoration actions.</i> <i>(Year 1)</i>	N/A	EHG has been consulted during the draft's preparation by the applicant. To achieve the stated aims, the draft strategy must be updated to reflect the following at a minimum: <ul style="list-style-type: none"> • Integrated approach to key threatening processes at the landscape scale • Rigorous monitoring at the landscape scale to ensure restoration is successful • Adequate reporting, auditing and monitoring framework See also Action 5 below.	See Principle 2 & Action 5 below	The BAM is not referenced in the current draft restoration strategy, which commits to the SERA framework as a benchmark for restoration. As discussed at Action 5 below, the BAM should be utilised as the best available science to establish restoration objectives. To date, key threatening processes across the landscape to restoration have not been specifically addressed. Landscape threat management more broadly is discussed at Commitments 15-20 of the Plan. An integrated approach to landscape threats rather than on a site-by-site basis, will be critical to future success. There is no mention of ensuring the risks of climate change are incorporated into restoration principles, including: <ul style="list-style-type: none"> • Consideration of climate refugia • Ensuring seed is climate adjusted • Building resilience in restored ecosystems to ensure long term persistence. The link between the research proposed under Commitment 22 and the referencing of research needs (Action 2, point f) is unclear.	The draft restoration strategy will be finalised post-conferral. As discussed at Principles 2 and 4, robust monitoring and reference to the BAM for restoration benchmarks will be required.	N/A	N/A	The proposed restoration implementation strategy will be critical to guiding the Plan's restoration outcomes and will be delivered in Year 1.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAII) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>Action 3 - Deliver ecological restoration (including reconstruction) to restore koala habitat in the Georges River Koala Reserve and other priority locations in the strategic conservation area including along Ousedale Creek and around Appin (Year 1 onwards).</i>		Up to 200 ha of koala habitat is proposed to be restored within the Georges River Koala Reserve, with a broader target of up to 570 ha, including the Ousedale Creek corridor. The restoration will target land on shale transition soils well suited to koala habitat within the proposed reserve. See also Action 5 below.	The benchmarks for restoration will be as set by the requirements for the broader Plan area.	Koala restoration will be developed against the objectives in the NSW Koala Strategy. Other lands in the SCA that are koala habitat will also be subject to restoration over the life of the Plan. The proposed restoration for koala habitat will enhance landscape function in the long term, subject to viable and self-sustaining communities being established. See Actions 1 and 5 for further discussion.	Restoration on land purchased for future NPWS reserves will occur as land is acquired, and prior to transfer. Land within koala corridors identified by the OCSE is also being targeted. See Appendix 8. Although the Plan states that the Ousedale Creek corridor will be “secured and enhanced”, there is no specific mechanism identified for land in this corridor and other koala habitat outside the proposed Georges River Koala Reserve. Land not identified for NPWS reserves within the SCA will be targeted for private land offsets including restoration works, as per Commitment 8 of the Plan.	N/A	N/A	Restoration is proposed to be delivered over the life of the Plan.
<i>Action 4 – Incorporate adaptive management principles into restoration actions including pilot sites to trial and develop restoration methodologies and applying new research as appropriate (Life of Plan).</i>	N/A	This matter requires further development post-conferral. Pilot sites should target entities subject to greatest threats from development under the Plan.	See Action 2.	Reconstruction is highly uncertain and the strategy should describe a rigorous monitoring and learning plan, so that where restorations fail to deliver predicted gains, adaptive management triggers lead to targeted investment in learning and improving.	Predictions of expected changes should be made prior to implementation, and then compared with monitoring data. If predictions have not been met, then adaptive management triggers should be used to investigate why and improve management actions.	N/A	N/A	Adaptive management for restoration will be delivered over the life of the Plan.
<i>Action 5 - Deliver up to a maximum of 1,330 hectares of ecological reconstruction on conservation land targeting the following threatened ecological communities:</i> <i>a. Cooks River Castlereagh Ironbark Forest</i> <i>b. Cumberland Plain Woodland</i> <i>c. River-flat Eucalypt Forest</i> <i>d. Shale Gravel Transition Forest</i> <i>e. Swamp Oak Forest.</i>	The communities being targeted for reconstruction, particularly Cumberland Plain Woodland and Cooks River Castlereagh Ironbark Forest are at risk of SAII, as detailed further at Appendix 5. However other TEC’s at risk of SAII, such as Shale Sandstone Transition Forest, have not been identified.	Restoration and reconstruction is proposed to deliver up to 25% of the native vegetation being targeted for offsets under the Plan, including TEC’s proposed to be impacted by the Plan. While innovative approaches to restoration are welcomed, a key risk for conservation program is failure of the restoration to result in self-sustaining	Successful restoration at the landscape scale is also dependent on landholder engagement for BSA’s and reserve establishment, as discussed at Commitments 8, 9, 10 & 11. The targeted TEC’s do not include reference to Shale Sandstone Transition Forest, which is significantly impacted under the Plan. It appears this is due to the	Restoration of ecological communities to a self-sustaining and recognisable state is essential to achieving long term viability and resilience. As it stands, the proposed restoration actions may not automatically lead to conservation gains. Restoration objectives must be completed prior to restoration for each site and measured at an appropriate	Photo point monitoring “at a minimum” as proposed in the draft strategy is not sufficient to achieve rigorous monitoring. Restoration works will be required to undertake surveys: <ul style="list-style-type: none">• Prior to works occurring to establish an existing “before” condition.• Immediately post-completion to confirm restoration is recognisable as, or is	N/A	N/A	Restoration is proposed to be delivered over the life of the Plan. As restoration is difficult, certainty of outcomes depends on robust monitoring as discussed throughout this section.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
(Life of Plan)		communities in the long term. This can be addressed by rigorous monitoring requirements.	excess amount of this TEC in the SCA.	<p>time post-completion against restoration outcomes. These should include but not be limited to:</p> <ul style="list-style-type: none"> the TEC & PCT being targeted predictions for final vegetation condition likelihood of and risks to self-sustainability over time (including climate change) objectives and criteria for completion predictors of restored assessment against reference sites feasibility of the proposed restoration appropriateness within the landscape likely landscape threats to restoration. <p>Allowing 25% of offsets to come from reconstruction should only be permitted if there is a commitment to monitor responses and show progressive shifts towards all benchmarks over time. The 25% is figure is substantive, and must be justified with rigorous monitoring.</p>	<p>trending towards, the TEC being targeted.</p> <ul style="list-style-type: none"> 5 years post-completion to confirm that restoration is self-sustaining, and/or is now recognisable as the TEC. <p>If restoration is not successful at the 5-year benchmark, the site (or portion thereof being restored) should not count towards the offset target.</p> <p>Restoration objectives should also be undertaken prior to restoration for each site, to be measured post-completion at the five-year mark against restoration outcomes.</p> <p>These could be objectives and criteria for completion, predictors of restored assessment against reference sites, feasibility of the proposed restoration, appropriateness within the landscape and likely landscape threats to successful restoration.</p>			
Commitment 14 - Minimise impacts from development on biodiversity values in the strategic conservation area								
<i>Action 1 - Introduce a State Environmental Planning Policy to apply development controls to the strategic conservation area to require consideration of impacts on biodiversity values when consent authorities assess development applications (Before start of Plan).</i>	SAIL entities are identified in the SCA and avoided lands, to which the planning package relates. Refer to Commitment 8.	<p>The SEPP is proposed to apply to land in the nominated areas, shown as avoided. It also applies to land in the strategic conservation area.</p> <p>No biodiversity credit equivalent for this measure has been supplied.</p> <p>Environmental zoning is not proposed under the SEPP. It</p>	The SEPP would apply to the areas identified as avoided and strategic conservation land within the four nominated areas (the BCAA). It is targeted at those values being protected under the Plan.	<p>The strategic conservation area covered by the SEPP, in particular, has been mapped under a conservation priorities selection process. This land and will be subject to future offsets under the conservation program and reserve acquisition.</p> <p>Refer to discussion under Commitments 8, 9, 10 and 11.</p>	<p>The draft SEPP comprises the following additional obligations:</p> <ul style="list-style-type: none"> Requirement to clear native vegetation requires development consent, preventing clearing under the LLS clearing codes (where applicable) and SEPP (Vegetation in Non-Rural Areas) 2017 	<p>The SEPP is an addition to existing planning controls and would prevail to the extent of any inconsistency. The SEPP represents an upgrade from the existing situation, as conservation lands are subject to a range of additional controls.</p> <p>However rezoning conservation lands environmental is no longer</p>	N/A	The timing of the Action states the SEPP will be gazetted "before start of Plan", however it is extremely unlikely the SEPP will be gazetted prior to any approval for the Plan.

Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain	
		<p>is noted that whilst Appendix J of BAM 2020 provides that planning measures comprising environmental zoning must determine a credit equivalent, this is not a requirement under BAM 2017.</p>	<p>The provision to replant native vegetation in the SEPP mapped areas not covered by the biodiversity offsets scheme at a rate of 1:1 will reduce incremental clearing and promote landscape connectivity.</p>	<ul style="list-style-type: none"> Requirement to offset for clearing of native vegetation not captured by the biodiversity offsets scheme clearing thresholds at a rate of 1:1 Requirement that asset protection zones are located on certified land (refer to discussion at Commitment 2 Action 6) Requirements for development on avoided land in the strategic conservation area to consider whether clearing is likely to adversely impact upon biodiversity values, including habitat connectivity/fauna movement & impacts on riparian land, including supporting infrastructure required Requirement for development to consider cumulative impacts, having regard to the land's biodiversity values and restoration potential Acquisition clause for land identified for an NPWS reserve 	<p>proposed, in response to submissions received during public exhibition. The SEPP instead proposes that a biodiversity overlay apply to avoided and SCA lands. Land captured in the overlay map will be subject to SEPP provisions.</p> <p>Rezoning the conservation land environmental has been EHG's preference throughout development of the CPCP. It is acknowledged BAM 2017 does not prescribe environmental zoning as a requirement for planning measures, unlike BAM 2020.</p> <p>As an alternative approach, the biodiversity overlay would allow for a wider range of development under the existing zoning than would have been permitted in an environmental zone. As such permitted uses under the existing zoning will not always be "consistent with the conservation or enhancement of the natural environment", as per Principle 6 of the Guidance. Such range of developments are also at the discretion of the approval authority, who is the applicable council, and may lead to varied outcomes. This is particularly the case as many of the SEPP provisions are qualitative in nature and require interpretation by the decision-maker.</p> <p>Limits on rezoning under the proposed s9.1 Direction would still provide some protection from inappropriate land uses to conservation lands under</p>			

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					<p>the SEPP. Refer to discussion under Action 2 below.</p> <p>The SEPP also requires consideration of the Mitigation Measures Guideline. Refer to discussion under Commitment 5 Action 2.</p>			
<p><i>Action 2 - Issue a ministerial direction under section 9.1 of the Environmental Planning and Assessment Act 1979 (NSW) to require consistency with the objectives of the strategic conservation area when a planning authority prepares a planning proposal or reviews local environmental plans within the strategic conservation area (Before start of Plan).</i></p>	<p>N/A</p>	<p>The s9.1 Direction is proposed to apply to land in the nominated areas, shown as avoided. It also applies to land in the strategic conservation area.</p>	<p>The s9.1 Direction would apply to the areas identified as avoided and strategic conservation land within the four nominated areas (the BCAA). It is targeted at those values being protected under the Plan.</p>	<p>The strategic conservation area covered by the s9.1 Direction, in particular, has been mapped under a conservation priorities selection process. This land and will be subject to future offsets under the conservation program and reserve acquisition.</p> <p>Refer to discussion under Commitments 8, 9, 10 and 11.</p>	<p>The s9.1 Direction aims to prevent rezoning of conservation lands to incompatible uses. It is strictly a land use planning tool and no other management obligations will be imposed.</p>	<p>The s9.1 Direction provides a range of considerations that planning proposals must demonstrate consistency with:</p> <ul style="list-style-type: none"> • Protection or enhancement of native vegetation, riparian lands/ water quality • Protection or enhancement of TEC's/threatened species & their habitats • Protection or enhancement of koala habitats/corridors and matters of national environmental significance (MNES) <p>It is noted that this is a merit-based appraisal, which relies on final determination from DPE PSPD as the planning authority. As a stand-alone provision, this is not a significant upgrade from existing strategic planning provisions, notably Direction 2.1 Environment Protection Zones.</p> <p>However, the proposed s9.1 Direction also prevents land in the strategic conservation area from being rezoned to:</p> <ul style="list-style-type: none"> • A rural, residential, business, industrial, SP1, SP3, RE2 or "equivalent" zone 	<p>N/A</p>	<p>The timing of the Action states the s9.1 Direction will be in force "before start of Plan", however it is extremely unlikely the SEPP will be gazetted prior to any approval for the Plan.</p>

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						<ul style="list-style-type: none"> SP2 Infrastructure, unless for essential infrastructure consistent with the CPCP Guidelines <p>In the absence of environmental zoning for the avoided and strategic conservation lands, the Direction will restrict rezoning opportunities to minimise future land uses impacting on conservation values.</p> <p>However, the impact of essential infrastructure permitted in the SP2 zone on avoided land remains a concern. This type of activity is regulated under the CPCP Guidelines.</p> <p>Refer to discussion at Commitment 2 Action 3.</p>		
<i>Action 3 - Work with local councils to integrate mapping of the strategic conservation area into local and regional planning through local strategic planning statements, which guide the local plan-making process (Life of Plan).</i>	N/A						N/A	
Commitment 15 - Manage priority weeds in strategic locations in the Cumberland subregion to reduce threats to land secured within the strategic conservation area.								
<i>Action 1 – Participate in the Sydney Weeds Network to inform the implementation of weed control activities under the Plan including the preparation of a weed control strategy (Year 1). • Prepare a weed control strategy in consultation with the Sydney Weeds Network to establish a coordinated weed control program in the Cumberland subregion that:</i>	<p>Weeds are a key landscape threat for SAIL entities such as:</p> <ul style="list-style-type: none"> Cooks River Castlereagh Ironbark Forest Shale Sandstone Transition Forest Cumberland Plan Woodland <p>Given the general nature of this commitment, it is difficult to know how or</p>	<p>The proposed Action includes:</p> <ul style="list-style-type: none"> Preparation of a Weed Control Strategy, and entering into written agreements with delivery partners to implement the weed control program Integration of weed control actions for conservation land into biodiversity stewardship 	See Principle 2.	See Principle 2.	Weed control measures are additional to existing obligations, however the mechanisms by which the proposed weed management strategy can be imposed has not been detailed.	N/A	N/A	

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<p>a. identifies priority weed species and priority locations for weed control to maximise benefits to biodiversity in the strategic conservation area</p> <p>b. identifies the training, extension and resource needs to address threats</p> <p>c. provides guidance on weed control methods</p> <p>d. identifies roles, responsibilities, delivery partners and other stakeholders</p> <p>e. provides guidance on funding decisions under the weed control program</p> <p>f. is consistent with existing weed control programs, reserve or biodiversity stewardship agreement management requirements.</p> <p>(Year 2)</p> <ul style="list-style-type: none"> • Enter into written agreements with delivery partners to implement the weed control strategy (Year 2). • Integrate weed control actions for conservation land into reserve management plans (Life of Plan). • Fund organisations to help deliver actions in the weed control strategy for example Bushcare and Landcare groups, and local Aboriginal land councils (Year 3 onwards). 	<p>where SAIL entities will benefit at this stage.</p>	<p>agreements and reserve management plans</p> <ul style="list-style-type: none"> • Provision of grants to relevant stakeholders to reduce weeds in the following locations: on public land adjoining or near conservation land, and on Aboriginal-owned land adjoining or near to conservation land. <p>The BCAR states that a landscape scale management approach to weeds under the proposed strategy will be undertaken. Further integration of weed management approaches with the proposed reserve management framework for offsets under the proposed strategy, whether by BSA's or NPWS reserves, is currently unclear.</p> <p>Weed management is addressed in the proposed planning controls, including DCPs and mitigation guidance as discussed at Commitments 5, in addition to more broadly in the proposed SEPP as discussed at Commitment 14. It is unclear how these will relate to the proposed weed management strategy.</p> <p>The strategy should make reference to site specific data, including pre-clearing surveys to document weeds across the site, and species specific control measures and targets, based on the Greater Sydney Regional Strategic Weed Management Plan 2017 – 2022 (LLS 2019).</p>						

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Commitment 16 - Manage priority pest animals in strategic locations in the Cumberland subregion to reduce threats to land protected within the strategic conservation area.

<i>Action 1 - Establish a pest animal control working group to guide the implementation of pest animal control activities under the Plan including preparation of a pest animal control implementation strategy (Year 1).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 2 - Prepare a pest animal control strategy to guide the implementation of the pest control program, that:</i> <i>a. identifies pest control priorities, including priority pest species and priority locations for pest control to maximise benefits to biodiversity in the strategic conservation area</i> <i>b. identifies the training, extension and resource needs to address threats</i> <i>c. provides guidance on pest control methods</i> <i>d. identifies roles, responsibilities delivery partners and other stakeholders</i> <i>e. provides guidance on funding arrangements under the pest control program</i> <i>f. is consistent with existing pest control programs, reserve or biodiversity stewardship agreement management requirements. (Year 2)</i>	<p>Pests are a key landscape threat for SAIL entities such as:</p> <ul style="list-style-type: none"> • Cooks River Castlereagh Ironbark Forest • Shale Sandstone Transition Forest • Cumberland Plan Woodland <p>Given the general nature of this commitment, it is difficult to know how or where SAIL entities will benefit.</p>	<p>Threats associated with pest animals over time for areas being protected will be exacerbated, given increased urbanisation on land proposed for certification.</p> <p>Integration of pest management approaches with the proposed reserve management framework for offsets under the proposed strategy, whether by BSA's or NPWS reserves, is currently unclear.</p> <p>Pest management is addressed in the proposed planning controls, including DCPs and mitigation guidance as discussed at Commitments 5, in addition to more broadly in the proposed SEPP as discussed at Commitment 14. It is currently unclear how these will relate to the proposed pest animal control strategy.</p> <p>Regional scale commitments, such as funding of organisations such as NSW Local Land Services, are an effective way of dealing with pests at the landscape scale. Regional funding to organisations for pest management is discussed at Action 5 below.</p>	See Principle 2. This is a role for the applicant.	See Principle 2. This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This Action is proposed to be delivered over the life of the Plan.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>Action 3 - Ensure that the pest animal control strategy specifies the use of pest control techniques that will reduce the risk of secondary poisoning from Pindone or second-generation rodenticides in accordance with Appendix E (Year 2).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 4 - Enter into written agreements with delivery partners to implement the pest animal control program (Year 2).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 5 -Fund organisations to help deliver actions in the pest animal control strategy, for example Greater Sydney Local Land Care Services, Bushcare and Landcare groups, and local Aboriginal land councils (Year 3 onwards).</i>	This is a role for the applicant.	As the Plan is likely to increase the number of pest species at the peri-urban interface, the plan should include regional measures to manage pest species. Funding of organisations such as LLS is considered effective to undertake these aims, although the level of funding has not been quantified.	See Principle 2.	See Principle 2.	Ongoing funding for the Plan needs to be over its life.	N/A	N/A	This is a role for the applicant.
Commitment 17 - Manage fire in strategic locations in the Cumberland subregion to support the maintenance of biodiversity values on conservation land.								
<i>Action 1 - Consult with the NSW Rural Fire Service, NSW National Parks and Wildlife Service, and the department (Environment, Energy and Science group) to identify fire management priorities, including fire-sensitive species and ecological communities (Year 2).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 2 - Partner with Aboriginal knowledge holders and organisations to learn about Indigenous fire management techniques and consider how this</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>knowledge may be applied to manage and protect conservation land (Year 2).</i>								
<p><i>Action 3 - Prepare a fire management strategy that:</i></p> <p><i>a. identifies priority locations for fire management to maximise benefits to biodiversity in the strategic conservation area</i></p> <p><i>b. identifies priority fire-sensitive species and ecological communities</i></p> <p><i>c. provides guidance on fire management to maintain and promote biodiversity values, particularly among fire-sensitive species and ecological communities</i></p> <p><i>d. identifies roles and responsibilities and co-ordinates delivery partners</i></p> <p><i>e. provides criteria to guide decisions on funding of fire management under the Plan.</i></p> <p><i>(Year 2)</i></p>	<p>Fire is a key landscape threat for SAIL entities such as:</p> <ul style="list-style-type: none"> • Cooks River Castlereagh Ironbark Forest • Shale Sandstone Transition Forest • Cumberland Plan Woodland <p>Given the general nature of this commitment, it is difficult to know how or where SAIL entities will benefit.</p>	<p>Proposed fire management actions are aimed at minimising the threat of fire upon sensitive areas or biodiversity values in the Plan's avoided areas. These can include both increased fire risk from arson and fire authority hazard reduction, as well as less frequent fire management due to nearby human settlement.</p> <p>A fire management strategy is proposed, however the details of this are as yet unclear. Proposed measures to integrate these requirements into BSAs and reserve management plans and investigation of traditional fire management techniques, whilst broadly supported, are as yet unclear and require resolution post-conferral.</p> <p>The proposed fire management strategy would benefit from consideration of changing fire regimes due to climate change (incorporating research proposed in Commitments 19 and 22) and incorporation of modelled climate change refugia.</p> <p>The Plan commits to locating APZ's within land certified for urban development in the proposed SEPP. As discussed at Commitment 2, this measure is supported to minimise bushfire risk to sensitive areas and prevent asset protection clearing on avoided and conservation lands.</p>	See Principle 2.	See Principle 2.	Fire management measures are additional to existing obligations, however the mechanisms by which the proposed fire management strategy can be imposed has not been detailed.	N/A	N/A	This Action is proposed to be delivered over the life of the Plan, following development of the strategy.

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		Fire management measures are also addressed under the proposed mitigation measures and infrastructure guidelines in the planning package, as discussed at Commitments 2 and 5.						
<i>Action 4 - Enter into written agreements with delivery partners to implement the fire management strategy (Year 2).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 5 - Integrate fire management actions for conservation land identified in the fire management strategy in stewardship agreements and reserve management plans (Year 3 onwards).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
Commitment 18 - Support new or existing programs to control key diseases affecting threatened species and ecological communities in the Cumberland subregion.								
<i>Action 1 - Consult with researchers, government agencies and other delivery partners to identify programs that contribute to the management of disease and dieback in the Cumberland subregion including consideration of the following key threatening processes: a. Phytophthora cinnamomi root fungus b. amphibian chytrid fungus c. psittacine circoviral beak and feather disease d. psyllid and bell miner-associated dieback in eucalypts. (Year 6 onwards)</i>	Disease is a key landscape threat for SAIL entities such as: <ul style="list-style-type: none"> Cooks River Castlereagh Ironbark Forest Shale Sandstone Transition Forest Cumberland Plan Woodland The benefits of the proposed research programs on SAIL entities will need to be fleshed out at the implementation stage.	Further research of these key threatening processes are supported in principle. Given the general nature of this commitment, and as these diseases are already existing threats, it is difficult to ascertain the likely extent of benefits at this stage. Climate change will also play a significant role in the threats to disease over time, as discussed under Commitment 19.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 2 - Enter into written agreements with delivery partners to implement priority disease control programs (Year 6 onwards).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>Action 3 - Require regular reporting by delivery partners on the disease control program outcomes to the department and to the executive implementation committee (Year 6 onwards).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
Commitment 19 - Support existing or new programs to help threatened species and ecological communities adapt to the impacts of climate change in the plan area.								
<i>Action 1 - Consider funding research on climate change adaptation in developing the research program implementation strategy (Commitment 22, Action 1) (Year 1).</i>	The proposed climate research has the potential to support SAIL entities.	Climate change is a threat amplifier. Therefore, additional research may not be required to implement adaptation actions now, but rather a framework for a more systematic response to climate change. Whilst this Action is proposed to “consider” funding climate change adaptation research, an action to implement adaptation actions is not proposed. Once knowledge is gained and impacts of climate change are further understood, there should be a focus on conducting risk assessments, implementing adaptation actions and measuring indicators of biodiversity responses to climate change (to enable adaptive management).	See Principle 2.	While supported in principle, it is unclear exactly what the research program will entail in relation to climate change, if in fact it is funded through the Plan. Research that supports other commitments, namely Commitment 13 (restoration) as well as Commitments 15-18 addressing disease, fire, pests and weeds should be considered (as these are factors that are noted will likely be exacerbated with climate change). Any research conducted must translate into adaptation actions in order to improve biodiversity values and landscape function in the long term.	This measure, whilst additional to existing obligations, is difficult to quantify in terms of scope and impact until the after the initial prioritisation exercise has occurred.	N/A	N/A	This is a role for the applicant.
<i>Action 2 - Partner with the Royal Botanic Gardens Greater Sydney to develop seed sourcing guidelines for ten keystone Cumberland Plain Woodland species and define the species-specific seed transfer zones for these species (Years 1 to 3).</i>	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 3 - Update the strategic conservation area</i>	N/A	Identifying new priority locations reflecting	See Principle 2.	See Principle 2.	It is proposed to update the Conservation Lands	N/A	As per Principle 4, this Action would benefit from	This Action is proposed to be delivered over the life of

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<i>if new priority locations are identified through research that will support biodiversity adaptation to climate impacts and incorporate these new areas into the conservation land implementation strategy (Commitment 8) (Every 5 years).</i>		<p>adaptation to climate impacts over the Plan's life is supported in principle. Selection of new reserves should identify and protect areas of climate refugia using the Climate Refugia Webtool and include links between areas of climate refugia.</p> <p>The process by which the SCA will be updated is currently unclear, as is the exact nature of the proposed additional areas/entities that will be benefitted. Clear objectives for identifying locations that may trigger a review of the SCA under the Action would be beneficial.</p>			<p>Implementation Strategy to reflect new areas incorporated into the SCA.</p> <p>While this is an internal delivery mechanism for the Plan, it is not clear whether updates to the SEPP mapping are proposed in the event that the SCA is amended. The SEPP identifies the SCA as mapped, and acts to protect land identified for future offsets in the interim by way of a planning mechanism.</p>		<p>an update to the SEPP mapping. It is unclear if or whether this may occur, as it not explicitly mentioned.</p>	<p>the Plan, following development of the strategy, and can be addressed as a post-approval requirement.</p>
Commitment 20 - Provide opportunities for the residents of Western Sydney to learn about and actively participate in biodiversity conservation including koala conservation.								
<i>Action 1 - Prepare an education and engagement implementation strategy to guide implementation of the education and engagement program that:</i> <i>a. identifies priority topics for education</i> <i>b. identifies intended audiences</i> <i>c. proposes implementation mechanisms</i> <i>d. outlines governance arrangements for implementing the program. (Year 4)</i>	N/A	The Action proposes to align with the Koala Strategy and is targeted at koalas in areas impacted by the Plan.	<p>The south western Sydney koala population is recognised as being at threat from urban development. The proposal to raise community awareness and provide increased community engagement will allow for biodiversity impacted by the Plan and targeted for conservation measures, particularly koalas, to gain increased community awareness.</p> <p>Specifically in relation to koalas, this will align with the NSW Koala Strategy and delivering conservation actions. The proposed Koala Working Group, which includes EHG, will be responsible for ongoing monitoring over the Plan's life.</p>	The proposed Action is not targeted at direct on-ground measures, however increased public awareness will increase public support for proposed mitigation and conservation measures.	The proposed Action is additional to existing obligations.	N/A	N/A	This is a role for the applicant.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<p><i>Action 2 - Establish 3 full-time community engagement officers to work across the local councils in the plan area to:</i></p> <ul style="list-style-type: none"> <i>a. undertake activities according to the education and engagement implementation strategy and monitor its implementation</i> <i>b. support biodiversity programs that are consistent with the objectives of the Plan</i> <i>c. coordinate activities and pop-up events</i> <i>d. coordinate grants to local councils and community groups for projects that meet criteria developed in the strategy.</i> <p><i>(Year 5)</i></p>	N/A	See discussion at Action 1.	See discussion at Action 1.	See discussion at Action 1.	See discussion at Action 1.	N/A	N/A	See discussion at Action 1.
<p><i>Action 3 - Fund local councils and community groups to help deliver an education and engagement program that is consistent with the education and engagement implementation strategy, with indicative activities that include:</i></p> <ul style="list-style-type: none"> <i>a. engaging with local schools to provide biodiversity education</i> <i>b. hosting community activities such as tree planting and nature walks</i> <i>c. developing a mobile education trailer as a shared resource for local councils in the plan area</i> <i>d. promoting new and existing citizen science programs to encourage participation in nature-related science</i> <i>e. raising awareness of the cultural significance of biodiversity to Aboriginal people.</i> <p><i>(Year 5 onwards)</i></p>	N/A	See discussion at Action 1.	See discussion at Action 1.	See discussion at Action 1.	See discussion at Action 1.	N/A	N/A	See discussion at Action 1.

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<i>Action 4 - Invest in the NSW Koala Strategy to raise awareness of the Southern Sydney koala population and encourage community participation in koala conservation in Western Sydney (Year 1 onwards).</i>	N/A	See discussion at Action 1.	See discussion at Action 1.	See discussion at Action 1.	See discussion at Action 1.	N/A	N/A	See discussion at Action 1.
<i>Action 5 - In partnership with the Biodiversity Conservation Trust, establish a community engagement program to educate landholders within the strategic conservation area and promote the opportunities and benefits of biodiversity stewardship sites (Year 1)</i>	N/A	The BCT has developed a landowner engagement program to engage landholders interested in participating in the Plan's conservation program. See discussion at Commitment 8.	See Principle 2.	See Principle 2.	See Principle 2.	N/A	N/A	This is a role for the applicant.
<i>Action 6 - Work with councils and other landholders to install signs and interpretive displays at identified conservation land to raise awareness of the biodiversity values of a site (Life of Plan).</i>	N/A					N/A	N/A	This is a role for the applicant.
Commitment 21 - Partner with Aboriginal groups and community to help maintain a distinctive cultural, spiritual, physical and economic relationships with their land and waters in Western Sydney								
<i>Action 1 - Fund a grants program to build capacity in the 3 local Aboriginal land councils in the plan area to fund land management and biodiversity works, and culture and heritage projects on Aboriginal-owned lands and other important areas (Years 1 to 2).</i>	N/A	This Action is supported in principle. It is noted that many LALC land holdings comprise significant biodiversity values, and that Aboriginal knowledge holders can contribute significantly to the Plan's program.	See Principle 2.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 2 - Partner with Traditional Custodians, local Aboriginal land councils and other interested Aboriginal people in Western Sydney to collaboratively develop a 10-year Aboriginal engagement and implementation strategy (Year 1).</i>	N/A	This Action is supported in principle.	See Principle 2.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.

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<p><i>Action 3 - Partner with Western Sydney's Aboriginal communities to implement the Plan and a 10-year Aboriginal engagement and implementation strategy through:</i></p> <p><i>a. establishing partnerships, including the co-design of actions under the strategy, with Traditional Custodians, local Aboriginal land councils, Aboriginal businesses and other interested Aboriginal groups</i></p> <p><i>b. establishing an Aboriginal advisory group to provide advice on the delivery of the Aboriginal engagement and implementation strategy and the Plan</i></p> <p><i>c. actively engage and empower Aboriginal groups and community to enable participation in decision-making to deliver the Aboriginal engagement and implementation strategy and the Plan.</i></p> <p><i>(Years 2 to 11)</i></p>	N/A	<p>This Action is supported in principle.</p> <p>See also Action 1.</p>	See Principle 2.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<p><i>Action 4 – Implement a 10-year Aboriginal engagement and implementation strategy to support economic participation for Aboriginal people and cultural outcomes under the Plan to:</i></p> <p><i>a. recognise, celebrate and promote Aboriginal culture and heritage in Western Sydney with a focus on natural areas and protecting biodiversity</i></p> <p><i>b. recognise and embed the knowledge and connection that Aboriginal people have with Country into the implementation of the Plan</i></p> <p><i>c. enable Traditional Custodians and interested Aboriginal groups to care for</i></p>	N/A	<p>This Action is supported in principle.</p> <p>See also Action 1.</p>	See Principle 2.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>Country on new conservation land d. grow Aboriginal businesses and employment in the environmental sector. (Years 2 to 11)</i>								
Commitment 22 – Invest in research priorities that will support the implementation of the Plan and help to deliver the Plan’s outcomes.								
<i>Action 1 - Develop a research program implementation strategy to guide delivery of a 35-year research program that will help achieve the Plan’s outcomes in Western Sydney, including identifying research priorities for the first 4 years of the program (Year 1).</i>	N/A	<p>Research to identify the most at-risk species and ecological communities, priority locations to support species persistence, engagement in citizen science, education and “extension” services to landowners, as well as research into community attitudes, are supported in principle.</p> <p>Partnership with and funding of programs such as Saving Our Species and NSW Koala Strategy are also supported in principle.</p> <p>Notwithstanding, it is difficult to ascertain the exact scope of species and communities being benefited until the research prioritisation under this Action has occurred.</p> <p>Early establishment of priority research during the first 5 years is considered essential to guide development of the research program over the Plan’s life.</p> <p>Specific measures to investigate vulnerability of species to climate change is discussed at Commitment 19.</p> <p>Although Sub-Plan A mentions that the research program will underpin both</p>	See Principle 2.	See Principle 2.	This measure, whilst additional to existing obligations, is difficult to quantify in terms of scope and impact until the after the initial prioritisation exercise has occurred.	N/A	N/A	This Action will be addressed in Year 1 and guide research outcomes over the life of the Plan.

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		<p>the implementation of conservation commitments and the adaptive management needed to improve biodiversity outcomes, it is unclear how the Plan's adaptive management will influence, or be influenced by, the research program. It would be beneficial for research to respond to the outcomes and challenges of the conservation program, and target entities where there is a specific need and outcomes that will assist in delivering the Plan's overall aims.</p> <p>Restoration research is discussed at Action 2 below and at Commitment 13.</p>						
<p><i>Action 2 - Deliver a research program in accordance with the research program implementation strategy. The research program may include:</i></p> <p><i>a. research on the vulnerability of threatened species and ecological communities to climate change</i></p> <p><i>b. research that increases knowledge of the adaptive capacity of plant, animal and microbial organisms used in active restoration of ecological communities of the sub-region</i></p> <p><i>c. research that improves restoration outcomes, including ecosystem function and resilience, for threatened ecological communities of the sub-region</i></p> <p><i>d. research on ecological connectivity and landscape function at site, local and regional scales to enhance conservation outcomes</i></p>	N/A	<p>See Action 1 above.</p> <p>Given the Plan's reliance on restoration as a key contributor to meeting offset targets, it is agreed that research into effective measures will be required to ensure this has the best chance of successfully delivering offset outcomes.</p> <p>Restoration is discussed in further detail at Commitment 13.</p> <p>Engagement with Aboriginal groups and communities is discussed at Commitment 21.</p> <p>Programs relating to climate change are discussed at Commitment 19.</p>	See Principle 2 and Action 1 above.	See Principle 2 and Action 1 above.	See Principle 2 and Action 1 above.	N/A	N/A	This is a role for the applicant.

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<p>e. research into changing community attitudes and behaviour to biodiversity and conservation values including factors influencing those and how they evolve and change</p> <p>f. research into the connections between land management, biodiversity and Aboriginal culture and practices in Western Sydney as proposed by the Aboriginal engagement and implementation strategy (Commitment 21). (Year 2 onwards)</p>								
<p>Action 3 - Support NSW Government programs for threatened species research in Western Sydney including:</p> <p>a. research on threatened species impacted by the Plan in the Cumberland subregion through the Saving our Species program</p> <p>b. research that increases knowledge of population demographics, life-history and ecology of the Southern Sydney koala population as part of the NSW Koala Strategy's NSW Koala Research Plan. (Year 2 onwards)</p>	N/A	<p>See Action 1 above.</p> <p>Specific koala research measures are discussed at Commitments 20 and 23.</p>	See Action 1 above.	See Action 1 above.	See Action 1 above.	N/A	N/A	This is a role for the applicant.
Commitment 23 - Support rehabilitation measures to help maintain koala health and welfare.								
<p>Action 1 - Invest in the NSW Koala Strategy and other potential partners to implement the koala health and welfare program in south-western Sydney, with key deliverables that include:</p> <p>a. monitoring koalas, key threats, and the effectiveness of mitigation measures as part of the NSW Koala Strategy Monitoring Framework</p>	N/A	The Action proposes to align with the NSW Koala Strategy and is targeted at koalas impacted by the Plan.	The south western Sydney koala population is recognised as being at threat from urban development. In line with the OCSE recommendations, an ongoing monitoring program is proposed with the particular aims of: <ul style="list-style-type: none"> minimising threats such as disease from chlamydia, including vaccinating tagged 	The proposed Action is not targeted at direct on-ground measures, however increased public awareness will increase public support for proposed mitigation and conservation measures.	The proposed Action is additional to existing obligations.	N/A	N/A	This is a role for the applicant.

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<p><i>b. designating the koalas in south-western Sydney as one of the dedicated monitoring sites for the NSW Koala Strategy</i></p> <p><i>c. providing enhanced training in wildlife treatment for veterinarians</i></p> <p><i>d. providing grants for community wildlife organisations for resources and carer recruitment and training</i></p> <p><i>e. establishing health and welfare programs to support koalas from threats including vehicle strike, fire, disease and climate change. (Year 1 onwards)</i></p>			<p>koalas prior to re-release</p> <ul style="list-style-type: none"> vaccine trials for koalas against chlamydia as a preventative measure against any future disease incursions effectiveness of koala mitigation measures introduced as part of the Plan building capacity in koala rehabilitation sector with wildlife carers veterinarians & vet's nurses, in partnership with Taronga Zoo 					
<p><i>Action 2 - Koalas that are captured and/or handled as part of a monitoring program will be vaccinated against chlamydia and have a tissue sample taken for genetic analysis, with the tissue samples lodged with the NSW Koala Biobank (Year 1 onwards).</i></p>	N/A	See discussions at Action 1.	See discussions at Action 1.	See discussions at Action 1.	See discussions at Action 1.	N/A	N/A	This is a role for the applicant.
Commitment 24 - Establish governance arrangements including roles, responsibilities and funding to ensure the efficient and effective implementation of the Plan.								
<p><i>Action 1 - Establish a multi-agency executive implementation committee to act as a central governance steering committee for the Plan (Year 1).</i></p>	N/A					N/A	N/A	This is a role for the applicant.
<p><i>Action 2 - Enter into written agreements with delivery partners, including Transport for NSW as project partner responsible for delivering the major transport corridors, to support the implementation of specific commitments and actions (Year 1).</i></p>	N/A					N/A	N/A	This is a role for the applicant.

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<i>Action 3 - Establish working groups to advise the executive implementation committee and oversee implementation of specific commitments and actions (commitments 7, 13, 16 and 26) (Year 1).</i>	N/A	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	
<i>Action 4 - Establish arrangements to fund delivery of the Plan's commitments and actions through contributions from residential, commercial and industrial developers in the nominated areas (Year 1).</i>	N/A	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 5 - Ensure that at least 90% of conservation program funding is spent on establishing and restoring conservation land or purchasing biodiversity credits consistent with the conservation land selection steps (Life of Plan).</i>	N/A	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
Commitment 25 - Implement an evaluation program for the Plan that sets out requirements for monitoring, evaluation, reporting and adaptive management.								
<i>Action 1 - Finalise the evaluation program in consultation with key stakeholders, including: a. establishing governance arrangements for the evaluation program as part of the Plan's governance arrangements for implementation b. establishing a monitoring and data collection methodology c. finalising evaluation questions including scope and frequency d. developing a method for evaluation outputs to support adaptive management e. establishing the reconciliation accounting process to track progress of</i>	N/A	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.

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<p><i>the Plan's commitments and actions</i></p> <p><i>f. developing templates for reporting quarterly to the executive implementation steering committee and annual updates over the life of the Plan.</i></p> <p><i>g. establishing processes to support independent 5-yearly reviews of the Plan (Year 1)</i></p>								
<p><i>Action 2 - Track progress in meeting conservation targets (in hectares) through the reconciliation accounting process (Life of Plan).</i></p>	N/A	<p>The proposed reconciliation accounting process will be established to track conservation land and credit purchases against impacts of development on certified land over the Plan's life.</p> <p>Five-yearly housing forecasts for development land impacted by the Plan will be tracked against the Metropolitan Housing Monitor and Sydney Greenfield Monitor. These forecasts can be used to predict predicted and actual development against offset delivery in each five-year period.</p> <p>The reconciliation accounting process will also report offset delivery in both hectares and credits. The credit estimate provided for all proposed measures will also act as a baseline against which future offsets delivery can be measured.</p> <p>Offset targets prior to each five-year period will also be required, to refine the overall offset targets in Commitments 8 and 9 of the Plan. See also Commitment 8 Action 1.</p>	See Principle 2.	See Principle 2.	The reconciliation accounting process is essential to ensuring that offset targets will be met over the Plan's life.	N/A	N/A	The reconciliation accounting process will operate over the life of the Plan.

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		<p>In the event offsets are not tracking to meet expected impacts and dip below 80%, adaptive management steps will be triggered. Refer to Action 3 below.</p> <p>In addition, evidence of funding to deliver the conservation program for each five-year period beyond the first five years will be required.</p>						
<p><i>Action 3 - Implement adaptive management steps for offsets if the reconciliation accounting process determines that the Plan's offsets are not keeping track with development (Life of Plan).</i></p>	N/A	<p>The adaptive management regime specifies that land acquisition can be undertaken as a last resort, with penalties including a moratorium on future rezonings, where offsets are lagging at less than 80% of the requirement at Year 3.</p> <p>Under the proposed steps, the highest level intervention (moratorium on rezonings) cannot be enacted until Year 8 at the earliest, and only if the Plan's total offsets are tracking below 80%.</p> <p>It should be clarified that the Minister for Environment & Heritage can request adaptive management be investigated outside of the Plan's triggers, if there are reasonable concerns that the Plan's total offsets or any particular entity targeted in Commitments 8 and 9 is lagging below 80% after Year 3. Alternatively, TEC or species-specific triggers for adaptive management may be agreed with EHG.</p> <p>Suspension and revocation measures remain within the Minister's power under s8.6</p>	See Principle 2.	See Principle 2.	The adaptive management regime is essential to ensuring that offset targets and conservation obligations will be met over the Plan's life.	N/A	N/A	This is a role for the applicant.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
		of the BC Act and CI 8.6 of the BC Regs. It will be made explicit that the Minister can request in writing if a measure has failed in their opinion that this must be addressed as a first step, before deciding to initiate suspension and as a last resort revocation of the certification.						
<i>Action 4 - Publish annual updates on implementation of the Plan (Life of Plan).</i>	N/A	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 5 - Undertake independent 5-yearly reviews of the progress of the Plan, including progress towards meeting commitments and achieving outcomes, and publish a review report (Life of Plan).</i>	N/A	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 6 - Undertake internal process reviews at the mid-term point (2.5 years) between independent reviews and provide a report to key delivery partners and stakeholders (Life of Plan).</i>	N/A	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 7 - Develop an overarching communication and engagement strategy to support the Plan's implementation. Review the strategy every 5 years and updated it accordingly (Year 1 then life of Plan).</i>	N/A	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
Commitment 26 - Implement a compliance program to ensure compliance with the Plan and conditions of approval.								
<i>Action 1 - Establish a compliance and implementation working group comprising the department, local councils and other relevant stakeholders to guide the implementation of</i>	N/A	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>compliance activities under the Plan including preparation of a compliance strategy (Year 1).</i>								
<i>Action 2 - Prepare a compliance strategy under guidance of the working group to: a. identify relevant compliance mechanisms b. set out compliance monitoring and auditing priorities and processes c. set out a decision-making framework for taking compliance action d. set out procedures and protocols for taking compliance action e. identify roles and responsibilities for compliance. (Year 1)</i>	N/A	Objectives and performance measures for the compliance strategy are unclear at this stage and require further development as part of the strategy's development.	This is a role for the applicant.	This is a role for the applicant.	There is no mention of EHG as specific role in the compliance program, despite references to EHG as the "regulator" for certification more broadly throughout the Plan.	N/A	N/A	This is a role for the applicant.
<i>Action 3 - Provide funding to employ 6 full-time compliance officers to work with local councils to carry out compliance activities in the Plan area (Year 2 onwards).</i>	N/A	This is a role for the applicant.	The Plan suggests compliance officers will only act on activities in conservation areas. There may be a significant gap if, for example, clearing occurs in a certified area prior to its release for development and it is not investigated as part of the compliance program.	This is a role for the applicant.	It is unclear whether the compliance officers will be embedded with local councils, as the Plan states they will officers "will help coordinate investigations and remediation activities". If this means they won't undertake investigations, then this role will fall to Councils creating additional workload pressure.	N/A	N/A	This is a role for the applicant.
<i>Action 4 - Share knowledge, maps and data and provide ongoing support and training to council staff to help local councils carry out implementation and compliance activities (Life of Plan).</i>	N/A	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.
<i>Action 5 - Publish a compliance report as part of the yearly update on implementation of the Plan and provide it to local</i>	N/A	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	N/A	N/A	This is a role for the applicant.

	Principle 1 – Impacts on entities at risk of a serious and irreversible impact (SAIL) are avoided and minimised	Principle 2 – Conservation measures address the biodiversity values being impacted	Principle 3 – Conservation measures prioritise important biodiversity values	Principle 4 – Conservation measures improve biodiversity values and landscape function in the long term	Principle 5 – Conservation measures are additional to existing conservation obligations	Principle 6 – Development controls that conserve or enhance the natural environment must be new or represent a significant upgrade	Principle 7 – Any proposed new national parks are consistent with the comprehensiveness, adequacy and representativeness (CAR) reserve system scientific framework	Principle 8 – The delivery of conservation measures is timely and certain
<i>councils for review and investigation (Life of Plan).</i>								
<i>Action 6 - Prepare reports every two-and-a-half years on any identified breaches with Plan commitments and approval conditions, such as auditing development consent conditions and environmental management plans (Life of Plan).</i>	N/A	This is a role for the applicant.	This is a role for the applicant.	This is a role for the applicant.	The scope of this matter is particularly broad. For example, investigating illegal dumping and vegetation clearing as mentioned in the Plan is very different from auditing development consent conditions and environmental management plans as proposed. If all of these are proposed under the compliance program its scope should be clarified.	N/A	N/A	This is a role for the applicant.

**Appendix 8 - Assessment of Response to NSW Office of Chief Scientist & Engineer CPCP
Recommendations**

OCSE Recommendation:**PDPS Response:****EHG Comment:****Habitat and connectivity**

1. Strategic planning - Habitat protection should be enabled through forward planning and commitments at a regional scale and over the lifetime of the development.	<p>The Plan takes a landscape-scale approach to assessing and protecting biodiversity while planning for future urban development. Through the Plan we have identified and protected upfront the most important habitat for species' population viability and connectivity.</p> <p>The Plan removes these areas from future development and will help protect them by incorporating them into local and regional plans to guide future development in the nominated growth areas.</p> <p>The Plan's conservation program comprises 26 commitments designed to improve ecological resilience and protect biodiversity over the 35-year life of the Plan.</p>	<p>Agree - subject to compliance with the minimum corridor widths and buffer interfaces and co-operation of private landholders.</p> <p>Avoided and conservation land in the Plan area seeks to protect koala corridors from the impact of development in the certified areas.</p> <p>Corridor widths are discussed at Recommendation 5 below.</p>
2. Protected & connected - Retain, increase, restore and protect koala habitat, reducing fragmentation and increasing connectivity. The habitat should support the movement of koalas such that dispersing koalas can move through the landscape, can breed to ensure genetic diversity, and can access and persist in refugia in times of stress, bushfire, drought, or other threats.	<p>The conservation program has been designed to maintain and improve the resilience of koala habitat at a landscape scale. It aims to retain existing koala habitat and increase koala habitat through restoration. The restored habitat will improve connectivity and mitigate threats to the koala population associated with fragmented habitat patches. We will protect koala habitat in perpetuity by applying planning controls across the strategic conservation area and</p>	<p>Agree – subject to restoration of koala habitat in the identified conservation lands, the identification of suitable sites for underpasses of Appin Road, the compliance of private landholders at underpass locations, and the identification of suitable crossing sites of the heritage canal. One crossing site of the canal is proposed (at Ousedale Creek) and this may not be sufficient to maintain connectivity across this structure.</p> <p>The provision for development within the Allens Creek Corridor is a departure from this</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
	<p>establishing new reserves and biodiversity stewardship sites.</p> <p>The conservation program for koalas also addresses additional threats and impacts from development to support the resilience and persistence of the Southern Sydney koala population over the long term and in response to climate change.</p>	<p>recommendation. Although the remaining corridor is larger than the minimum recommended width, the impact on this area of habitat and connectivity will be significant. Currently the area identified for development is paddocks with scattered trees but is part of the connected landscape. The change to urban land use of this patch within the corridor will significantly impact on it.</p> <p>Restoration is discussed at Recommendation 8 below.</p>
<p>3. Avoid dead-ends & population isolation - Ensuring (as far as possible) that the habitat has multiple connections can help prevent the formation of dead ends and population sinks and ensure that koalas (and other species) have routes to move through the landscape.</p>	<p>The Plan aims to create functional koala corridors. Following the most recent advice, we reviewed our koala habitat and corridor mapping and the specific sites identified by the panel as dead ends and corridors. We have addressed these specific examples of dead ends and islands through changes to the mapping and the proposed fence alignment. Where we have identified dead ends, we will use fencing to prevent koalas from accessing those areas while protecting the vegetation.</p>	<p>Agree – subject to koala exclusion fencing protecting identified dead ends.</p> <p>Koala exclusion fencing is discussed under Recommendation 15 below.</p>
<p>4. Corridors provide habitat - The term 'corridor' should not be misinterpreted to mean that its only function is a thoroughfare and the provision of connectivity. Not all identified corridors are suitable to provide connectivity for koalas, but the habitat should be protected for biodiversity values and</p>	<p>Functional koala corridors previously identified by the Office of the NSW Chief Scientist & Engineer (2020) will be protected as koala and fauna habitat. However, some corridors have been identified as not suitable for safe koala movement as they do not meet the requirements of a functional koala corridor. For example, they may not meet</p>	<p>Agree.</p> <p>So long as remnant vegetation is part of a 'connected landscape' they do not need to connect from A to B to be useful to koalas. They can be thinner than 390m and they can be connected by scattered trees. This is not ideal, but they do not need to be fenced off.</p> <p>See also Recommendation 5 below.</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
<p>amenity in the region, as well as protected koala habitat in some cases.</p>	<p>the average minimum width of 390 to 425 metres.</p> <p>The Plan will protect the corridors identified by the Office of the NSW Chief Scientist & Engineer as a priority. These are the north–south corridor in the Georges River Koala Reserve and the east– west Ousedale Creek corridor.</p> <p>In line with the latest advice from the Office of the NSW Chief Scientist & Engineer 2021, the koala corridor along the Nepean River has also been protected from urban development to secure future koala movement. All the remaining east– west corridors in the Plan Area will be protected as habitat for other species but will be fenced off to exclude koala movement. We may protect additional corridors through other planning processes in the surrounding areas outside the Plan Area.</p>	
<p>5. Corridor widths - Corridors should be widened where feasible through revegetation to an average minimum width of 390 - 425 m, include a buffer on either side (30 m wide where fenced and wider to ~ 60 m where fencing is infeasible), and trees should 3 m from the fence (to prevent tree branch damage to fence)</p>	<p>We have completed a thorough review of all koala corridors to ensure they meet the recommended widths for functional koala habitat. This included reviewing the alignment and widths of koala corridors and any areas of concern (such as dead ends) highlighted by the expert panel.</p> <p>We used koala suitability mapping from the NSW Koala Strategy 2018–2021 and slope data to inform the draft mapping of koala corridors. This mapping was verified in the</p>	<p>Agree – subject to non-compliance at Nepean River-North corridor being justified as “not feasible”.</p> <p>All corridors in the final Plan layout meet the “functional” minimum widths of 390-425m, with the exception of the Nepean River-North which has an average minimum width of 313m.</p> <p>Non-compliance has been justified on the basis of:</p> <ul style="list-style-type: none"> Existing zoning in this part of Wilton nominated area

OCSE Recommendation:	PDPS Response:	EHG Comment:
	<p>field and we made adjustments to the corridors in some places. This resulted in amendments to the mapping of avoided land and certified land, particularly along the Nepean River where koala habitat is constrained in some places.</p> <p>All corridors now meet the average width recommended by the Office of the NSW Chief Scientist & Engineer, except for a very small area where we deemed it not feasible due to existing development and zoning.</p>	<ul style="list-style-type: none"> Existing industrial area (e.g. Boral batching plant) and infrastructure (southern railway) Short length of corridor <p>Corridors within avoided lands were extended to achieve the minimum corridor widths in all cases bar the Nepean River-North corridor. The functional width was measured up to the edge of existing major land uses or infrastructure, where achieving additional width was not possible.</p> <p>Within this context, achieving compliance is extremely difficult and there are no feasible options to widen the corridor at this pinch point. It is also noted that the total average width of all corridors exceeds 500m.</p> <p>Buffers are discussed under Recommendation 19 below.</p>
<p>6. Larger area, shorter edges - Revegetation should be targeted to widen habitat units and corridors where feasible and aim to reduce the edge: area ratio of habitat (i.e. 'fingers' or areas between strips of habitat could be infilled with vegetation).</p>	<p>We have completed a thorough review of all koala corridors to ensure they meet the recommended widths for functional koala habitat. Following the review and considering the latest advice from the Office of the NSW Chief Scientist & Engineer (2021), we have widened the corridors where feasible to support a functional corridor for koalas in the future. This means we have removed some areas from the mapped certified land and included these in the adjacent land to be avoided. We will incorporate these mostly cleared areas into the strategic conservation area and target them for future revegetation.</p>	<p>Agree – subject to restoration of koala habitat in the identified habitat.</p> <p>Restoration is discussed at Recommendation 8 below.</p> <p>See also Recommendation 5 above.</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
<p>7. Habitat buffers separate from APZ - Buffer zones in corridors/habitat should be separate from Asset Protection Zones (APZs), with APZs on the urban side of the exclusion fence.</p>	<p>We have incorporated this principle into the mapping of the urban-capable and avoided lands, with adjustments to corridor widths made where necessary. The Plan has ensured that buffers are located within the avoided land and that the APZ is located within the certified urban-capable land as per the recommendations shown in Figure A1 of the May 2021 advice.</p> <p>The planning for the koala exclusion fencing will incorporate this principle, with all or the majority of the APZ being located on the urban side of the fence.</p>	<p>Agree - subject to APZ's remaining on the certified land outside of avoided land.</p> <p>This is included at Commitment 2 Action 6 of the Plan.</p>
<p>8. Target shale soils - Where possible, revegetation should target relatively higher quality soils (i.e. to produce higher quality habitat) – shale-based 'Blacktown soil landscape' is preferred to 'Hawkesbury sandstone landscape'.</p>	<p>Restoration efforts through the Plan will focus on those communities that we need to offset. These include Shale Sandstone Transition Forest and Cumberland Plain Woodland – both of which typically occur on shale soils. We are preparing a restoration strategy to guide revegetation (ecological restoration) of koala habitat and threatened ecological communities. We will incorporate this advice into the strategy.</p>	<p>Agree– subject to restoration of koala habitat in the identified conservation lands.</p> <p>The restoration of koala habitat, including critically endangered Cumberland Plain Woodland and Shale Sandstone Transition Forest, is contingent upon ensuring that such communities are successfully re-established upon completion.</p> <p>See also Section 5 of the recommendation report.</p>
<p>9. Earlier planting leads to more mature trees - Early implementation of koala habitat planting, and restoration can lead to trees being at a more mature stage by the time they are needed, areas that will improve connectivity and</p>	<p>The NSW government has provided funding to achieve some early restoration of koala habitat in the strategic conservation area. We are using this funding to prioritise planting and restoration of up to 80 hectares of cleared and degraded land in the Koala Reserve over the next four years. Early</p>	<p>Agree – see also Recommendation 8 above.</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
<p>nutrition (based on soil type) should be prioritised.</p>	<p>planting will include a mix of trees, shrubs and groundcovers with the priority being preferred koala food trees. Once the Plan is approved there will be a longer-term restoration program that will build on these early restoration efforts.</p>	
<p>10. Prevent degradation of habitat - Early protection and active management will prevent the degradation and loss of existing habitat over the time during development – engage community and stakeholders to protect habitat.</p>	<p>The Strategic Conservation Planning State Environmental Planning Policy (SEPP) will include planning controls to protect koala habitat in avoided land and the strategic conservation area. These controls are designed to avoid or minimise impacts of development on biodiversity values and support the protection, expansion and restoration of koala habitat.</p> <p>We are using early implementation funding to purchase lands and secure priority corridors. This includes establishing biodiversity stewardship agreements in koala habitat within the strategic conservation area.</p> <p>When the final Plan is released, we will launch an education and engagement program to help the community and landowners in Western Sydney better understand the important role they can also play in conservation and encourage them to protect their local koala habitat.</p>	<p>Agree – subject to early establishment of Georges River Koala Reserve and community engagement program being successfully undertaken.</p> <p>Land has been previously purchased and set aside for the proposed Georges River Koala Reserve, to be transferred to NPWS.</p> <p>The success of the private land conservation program hinges on engaging landholders to commit to establishing biodiversity stewardship agreements on their land. A delivery plan for the first 5 years has been developed by the applicant and the NSW BCT.</p> <p>See also Section 5 of the recommendation report. A community engagement program is addressed under Commitment 20 of the Plan.</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
<p>11. Plan for climate change - Consider water sources, soil types, tree varieties, and well connected refugia.</p>	<p>The conservation program aims to support species resilience. Part of this is ensuring the actions in the Plan are implemented in a way that recognises the impacts of climate change. The Plan supports programs that help threatened ecological communities, species and their habitats adapt to climate change in the Cumberland subregion. This includes funding research to identify the most at-risk species and ecological communities and identifying priority locations (such as refugia) to support persistence and adaptation of species and ecological communities in the subregion. We have partnered with Western Sydney University to develop and begin the research strategy for the Plan.</p> <p>We have mapped all major riparian corridors as avoided land. The only riparian areas that have not been avoided for development are first and second order streams where there is no vegetation. This is in response to public feedback during the exhibition period.</p> <p>Securing connected habitat at a landscape scale is a primary objective of the conservation program and forms the basis of the selection of lands for the strategic conservation area.</p>	<p>Agree - subject to research measures being carried out in accordance with Commitments 19 and 22 of the Plan.</p> <p>See also Section 5 of the recommendation report.</p>

Fauna crossings for linear infrastructure

OCSE Recommendation:	PDPS Response:	EHG Comment:
<p>12. Safe movement - Infrastructure that will cut across a designated corridor should include underpass or overpass structures to enable the movement of koalas along the corridor. Any infrastructure (such as roads) that cross, or might have an impact on, the corridor should be designed to be sympathetic to the protections of the corridor and to enable safe access across or under the linear infrastructure.</p>	<p>We are working with Transport for NSW to minimise impacts to koala corridors and threatened ecological communities. This includes collaborating on the design of major transport corridors such as the Outer Sydney Orbital (OSO). Future infrastructure will be designed to minimise impacts on threatened species and koala movement corridors including at Wianamatta Regional Park and South Creek (OSO Stage 1), and in the Appin area (OSO Stage 2).</p> <p>We are working with Transport for NSW and WaterNSW to design suitable structures to allow safe passage across Appin Road and the Upper Canal (see the response to principle 14).</p> <p>We have developed the 'Cumberland Plain Conservation Plan Infrastructure Guidelines' which are designed to avoid or minimise impacts on biodiversity from infrastructure activities over the life of the Plan.</p>	<p>Agree – subject to detailed design and final locations being determined.</p>
<p>13. Fencing underpasses - Suitable fencing and connecting habitat put in place early enough through the process so that it is complete by the time the infrastructure is constructed.</p>	<p>Koala safety is a priority of the Plan. We intend to have fencing constructed at the same time as the construction of all underpasses. Restoration of vegetation to ensure supporting habitat and safe movement near of the underpasses will also be a priority where practical.</p> <p>We are working with Transport for NSW to prepare environmental assessments and detailed survey work on the proposed Appin</p>	<p>Agree – subject to detailed design and final locations being determined, and proposed timing of koala mitigation measures aligning with development. This is to ensure that fences and fauna crossings are constructed before development commences, to ensure koalas habituate to the changed area before development commences and that development does not increase the threat of vehicle strike.</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
	<p>Road underpass. The timing of construction is not yet confirmed and is dependent on other Transport for NSW construction projects. We will construct a short section of fencing as part of the underpass project to direct koalas towards a safe crossing of Appin Road.</p>	<p>Fencing is discussed at Recommendation 15 below.</p>
<p>14. Underpass design - Construction of connectivity structures for roads: overpasses, underpasses (including road bridges) or culverts, with associated exclusion fencing, cattle grids, gates to prevent koalas entering the roadway. Designing underpasses to maximise the likelihood of koala use – look to the latest evidence, include attributes such as clear line of site, avoidance of predator death traps, keep dry, include furniture such as logs for koalas, the bigger the better.</p>	<p>We are working with Transport for NSW to design a suitable underpass structure at Appin Road based on previous experience in other parts of NSW. We have completed a feasibility study. The proposal is for a 2.4 metre by 2.4 metre box culvert with a clear line of sight, including clear line of sight and log furniture. The final dimensions of the culvert may change subject to detailed design assessment.</p> <p>The proposed passage under Kings Falls Bridge will comprise one or two retrofitted ledges to provide dry passage with log furniture where required. A feasibility study is underway.</p> <p>We are also working with WaterNSW to ensure safe koala passage across the Upper Canal water pipeline at Ousedale Creek. A feasibility study will begin late this year.</p>	<p>Agree - subject to detailed design, private landholder compliance, feasibility of Upper Canal crossing including heritage concerns, and final locations being determined.</p> <p>See discussion at Recommendations 12 and 13 above.</p>
Threat mitigation		
<p>15. Exclusion fencing - Maintaining a separation between koalas and threats using exclusion fencing should be a</p>	<p>We will construct koala exclusion fencing as part of implementing the plan to protect the southern Sydney koala population. A</p>	<p>Agree – subject to fencing feasibility study being finalised.</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
<p>priority, and where this is not feasible (e.g. steep terrain), fallback measures to reduce risk (e.g. vehicle speed limits) and monitoring should be undertaken. Fencing should be adaptively managed with design, location and maintenance evaluated.</p>	<p>feasibility study for the proposed fencing is underway.</p> <p>In areas where fencing is not feasible (due to creek crossings or heritage constraints for example), a larger buffer will apply (at least 60 metres). Consistent with advice from the Office of the NSW Chief Scientist & Engineer (2020), koala-specific development controls will apply to this land to mitigate threats before construction, during construction, and in the design and operation of development. In addition, certain koala controls will also apply to either all certified urban-capable land regardless of exclusion fencing or on certified land adjacent to koala habitat.</p> <p>The fencing of Appin Road will be a priority over the first 5 years, with fencing around urban-capable lands to be constructed as they are developed. We have started a community engagement program and through this we will be consulting with stakeholders and the community about the purpose and location of the fencing.</p>	<p>The feasibility study should be completed within Year 1.</p> <p>Compliance with OCSE recommendations, including mitigation measures, should be detailed at each five-year review period, at a minimum. Mitigation measures are addressed in planning controls proposed to apply the certified areas. See discussion at Section 5 of the recommendation report.</p>
<p>16. Spatial and temporal planning for threats - Threat mitigation and reducing stressors should be enabled through forward planning and commitments at a regional scale and over the lifetime of the development.</p>	<p>The Plan identifies actions to address 5 key landscape threats to threatened species and threatened ecological communities across Western Sydney. These actions are:</p> <ul style="list-style-type: none"> • managing and controlling the extent of weeds • managing emergent pest species • managing bushfire risk 	<p>Agree – subject to landscape threat mitigation measures being undertaken. These are addressed at Commitments 15-18 of the Plan. See discussion at Section 5 of the recommendation report.</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
	<ul style="list-style-type: none"> • managing key diseases • supporting climate change adaptation. <p>We will be introducing programs for mitigating each of these threats at a landscape scale, which we will implement over the life of the Plan.</p>	
<p>17. Reducing impacts from construction - Ensure processes are in place to protect koalas during construction and operational phases of the development. e.g. an onsite ecologist present through the duration of pre-clearance surveys and clearing works, koala and wildlife relocation protocols, tree-felling protocols, and education programs for construction workers.</p>	<p>The development control plan (DCP) template developed through the Plan comprises koala specific controls to mitigate threats to koalas during pre-construction, development design, and construction. Pre-construction controls include the requirement for a koala survey and assessment prior to clearing (including translocation if required), a tree-felling protocol for clearing, and controls for site hygiene. Also included is a control for temporary fencing for onsite koala habitat protection, and construction specific traffic mitigation measures.</p> <p>Pre-construction koala controls apply where koala exclusion fencing is not installed. Construction traffic calming measures apply to all certified land and mitigate threats to all fauna.</p>	<p>Agree – subject to DCP mitigation measures being addressed and complied with at development application stage.</p> <p>Mitigation measures are addressed in planning controls proposed to apply the certified areas. See discussion at Section 5 of the recommendation report.</p>
<p>18. Sensitive urban design - Traffic calming measures, planning of greenspace, avoid koala feed trees in urban footprint, domestic dogs secured in</p>	<p>The DCP template (see principle 17) provides development controls for koala-sensitive precinct design. This includes traffic calming measures, avoidance of koala</p>	<p>Agree – subject to effective mitigation of threats, particularly interactions with domestic dogs such as incursions of dogs into koala habitat. It is noted that Commitment 7 Action 7 of the Plan also deals with managing threats from domestic dogs.</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
<p>neighbourhood backyards, fauna sensitive design</p>	<p>feed trees in urban land, and requirements for dog-proof fencing.</p> <p>Although the DCP template includes controls that require dog containment fencing be considered in development design, the regulation and containment of dogs in backyards is beyond the scope of the NSW planning system and may be regulated by council's guidelines. We are establishing a council working group as part of the Plan's governance and this is one of the issues that can be raised through that forum.</p>	<p>See Recommendation 17 above.</p>
<p>19. Avoid stressors that repel koalas - Some effects of increasing urbanisation can increase koala stress levels which in turn can lead to changed patterns of behaviour, avoidance of exposed habitat, increased propensity to disease. Utilise approaches to reduce these effects including buffers.</p>	<p>The Plan incorporates many mitigation measures designed to reduce impacts and stress on koalas resulting from increased urbanisation. This includes application of advice from the Office of the NSW Chief Scientist & Engineer on 30 metre buffers, the use of exclusion fencing where feasible to separate koalas from urban areas and roads, and the use of development controls where fencing is not feasible.</p>	<p>Agree – subject to buffers being incorporated as development progresses.</p> <p>The avoided lands have been amended to achieve minimum corridor widths, and to enable suitable buffers to be incorporated in accordance with the OCSE recommendations.</p> <p>The Plan must achieve compliance with all OCSE recommendations, including buffers/buffer interfaces delineating rural, avoided and developments of 30m for fenced and 60m for non-fenced lands.</p> <p>However detailed design has yet to occur for many of the precincts to be developed on proposed certified land. The final configuration of proposed reserves and biodiversity stewardship sites within the avoided land is also yet to be determined.</p> <p>The width of the proposed corridors is adequate to incorporate the minimum functional widths</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
		recommended by the OCSE, including excluded areas such as steep land. Compliance with the OCSE recommendations, particularly buffer interfaces where exact future land uses are not yet certain, should be detailed at each five-year review period, at a minimum.

Disease management

<p>20. Avoid chlamydia incursion - Much of the koala population within the CPCP appears currently to be free of <i>Chlamydia pecorum</i> infection. Planning and delivering protection measures should be progressed to maintain this disease-free status as much as possible, and to respond to it should it emerge.</p>	<p>The NSW Government is currently updating the NSW Koala Strategy 2018-2021. The department will partner with the updated Strategy to fund the Plan's commitments around monitoring the status and health of koalas in southern Sydney. We have established a disease monitoring program in the Campbelltown koala population (see principle 21) under the NSW Koala Monitoring Framework. The framework details actions that will be triggered if <i>Chlamydia</i> enters a <i>Chlamydia</i>-free location such as Campbelltown.</p> <p>Through the monitoring framework, we are working to understand more about the genetic fitness of the Campbelltown koala population. The Campbelltown koala population has been designated as a site for the statewide genomic sequencing program (conducted by the University of Sydney and partners). Tissue samples were collected in May and June 2021. Tissue and scat samples were also collected for disease</p>	<p>Agree – subject to ongoing monitoring. This is addressed at Commitment 23 of the Plan. An ongoing monitoring program is proposed with the particular aims of minimising threats such as disease from chlamydia, including vaccinating tagged koalas prior to re-release and a vaccine trial at the interface of the disease free and southern koala population as a preventative measure against any future disease incursions.</p>
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OCSE Recommendation:	PDPS Response:	EHG Comment:
	<p>assessment. This will help to inform a management regime that balances genetic diversity and movement corridors with the risk of <i>Chlamydia</i> entering the Campbelltown population.</p>	
<p>21. Identify koala routes and monitor for disease - There is a need to have a monitoring stream that targets chlamydia entry into, and potentially within, the Campbelltown population. This should target specific locations where the Southern Highlands population may intersect.</p>	<p>The Campbelltown population was monitored under the NSW Koala Strategy 2018–2021 and it is intended that this will continue with new funding. The first surveys along the likely path of disease incursion were done in 2018. These have been repeated and extended using new technology (thermal imagery from drones, detection dogs) in 2021, funded by the Plan’s early implementation program. This survey work will help gain a greater sample size and more robust estimate of <i>Chlamydia</i> prevalence.</p>	<p>Agree- subject to ongoing monitoring. See Recommendation 20 above.</p>
<p>22. Vaccine trials - The Campbelltown koala population may be a good place to conduct a vaccination trial, given its chlamydia-free status. Given the early stage development of the vaccination, a trial could be conducted on the interface between the two populations (the Campbelltown and the northern Southern Highlands population). Vaccines are still unproven so not yet a basis for management.</p>	<p>The need for a vaccine trial was informed by the 2021 disease monitoring program of the NSW Koala Strategy 2018–2021 (see principles 20 and 21). It is likely there will be a <i>Chlamydia</i> incursion at some point in the future and it makes good sense to start investigating a vaccination trial in readiness for this.</p>	<p>Agree. See Recommendation 20 above.</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
<p>23. Adaptive management for disease - There should be the development of monitoring that matches triggers for actions: actions should be commensurate to the detection level.</p>	<p>See the responses to principle 22 for disease management and principle 28 for adaptive management.</p> <p>We intend to reinforce these methods with the adaptive management approach in the updated Koala Strategy. We will use both active and passive adaptive management informed by monitoring and local circumstances to assist in managing the complexity inherent in koala conservation work.</p>	<p>Agree.</p> <p>See Recommendation 22 above.</p>
<p>Adaptive management</p>		
<p>24. Baseline data set - Baseline data are required to better understand the status of the population(s), including numbers, distribution and how they functionally use the landscape.</p>	<p>Monitoring data from previous koala surveys in the Campbelltown area has helped inform the koala protection measures in the Plan. We intend to fund ongoing site-specific monitoring of the Campbelltown–Wollondilly populations under the updated Koala Strategy to increase understanding of the koala population numbers, trends and distribution, use of different vegetation types, genetics and disease status. We will capture data under the NSW Koala Monitoring Framework.</p>	<p>Agree – subject to ongoing monitoring and alignment with the Koala Strategy.</p> <p>The applicant will continue to work with EES in this regard as part of the ongoing Koala Working Group.</p>
<p>25. Surveys and monitoring - Ongoing and regular survey and monitoring efforts, compared against the baseline, to detected population trends over time and inform adaptive management approaches (including the development</p>	<p>As in the response to principle 24, the updated Koala Strategy intends to continue ongoing monitoring of the Campbelltown–Wollondilly populations. The data generated from monitoring programs under the NSW Koala Monitoring Framework will feed into</p>	<p>Agree - pending formation of a monitoring plan and agreed funding source, as undertaking this action properly will be significant and costly</p> <p>See Recommendation 24 above.</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
and understanding of appropriate triggers and responses, including timeframes).	the adaptive management process of the proposed strategy. It will contribute to evaluation of the success of management actions in achieving the long-term goal to increase koala numbers and ensure genetically diverse and viable populations across the state. The cyclical nature of the adaptive management process allows modification of actions if objectives are not being met, so that they provide better conservation outcomes for koalas.	
26. New monitoring technologies - New monitoring approaches enabled by smaller, cheaper, more sensitive devices, that are connected and remote will increase the extent and value of monitoring programs.	New technology (thermal imagery from drones and detection dogs) has been used in the 2021 population and disease surveys of the Southern Sydney koala population. The updated Koala Strategy will continue to support the development of new and innovative monitoring technologies.	Agree. See Recommendations 22 and 24 above.
27. Interface monitoring with NSW Koala Monitoring Framework - Monitoring should inform the NSW Koala Strategy, as a designated monitoring site. Site specific monitoring will need to be conducted within the CPCP and that will evolve over time.	The Plan will fund ongoing monitoring of the local koala population to increase our understanding of the status, genetics and movement of koalas in south-western Sydney. As in the response to principle 25, the data generated from monitoring programs under the NSW Koala Monitoring Framework will feed into the adaptive management process of the updated Koala Strategy. We will monitor any koala crossings on infrastructure constructed as	Agree. See Recommendations 22 and 24 above.

OCSE Recommendation:**PDPS Response:****EHG Comment:**

part of the Plan under the NSW Koala Strategy Monitoring Framework.

28. Adaptive management informed by triggers - Monitoring should include evaluation points tied to management 'trigger' actions and responses.

In the NSW Koala Strategy Monitoring Framework, sampling objectives have been set in each section with ecologically meaningful points that require action. These points may indicate undesirable changes (such as declines in occupancy) but could also indicate positive outcomes (for example increases in koala habitat due to land purchases). The frequency with which trends should be evaluated is also specified.

Through the updated Koala Strategy, monitoring partners will provide data to the department in accordance with the requirements of their programs. When a sampling objective is reached, it will be assessed by the NSW Koala Monitoring Expert Panel and a recommendation for action will be presented to the department's Environment, Energy and Science Group NSW Koala Strategy Program Board. If a serious or rapid change is detected, for example if *Chlamydia pecorum* is detected in a naïve population, an immediate response will be put in place. An extraordinary meeting of the NSW Koala Monitoring Expert Panel would be called so that action (such as a vaccination program) could be implemented as soon as practicable.

Agree – subject to post-conferral review by the Koala Working Group.

This is addressed at Commitment 7 Action 6 of the Plan.

The Plan will be required to ensure meaningful triggers are developed, and alternative approaches adopted where mitigation measures undertaken to date have failed to meet agreed triggers in a timely fashion.

OCSE Recommendation:	PDPS Response:	EHG Comment:
<p>29. Timely mitigation - As per an adaptive management approach, a lack of information should not preclude mitigation activities occurring in a timely manner.</p>	<p>The Plan includes an adaptive management framework to account for major changes that cannot be forecast by the Plan's risk management process and implementation planning. The Plan's evaluation program will identify these large-scale risks up front and monitor changes through the life of the Plan, with linkages to the updated Koala Strategy and the NSW Koala Strategy Monitoring Framework.</p> <p>The NSW Government will also commission an independent review on the status of the Plan every 5 years. If required, the updated Koala Strategy will be adaptively managed in consultation with the department's Environment, Energy and Science Group to respond to any unforeseen changes, or where actions are not having the desired outcome. When there is an absence of scientific certainty to inform decision-making, the approach will incorporate the precautionary principle.</p>	<p>Agree – subject to post-conferral review by the Koala Working Group. See Recommendation 28 above.</p>
<p>30. Understand alternatives - There is also a need to map alternative management approaches that could be employed if actions are not achieving the desired results.</p>	<p>The Plan includes an adaptive management framework with regular review of outcomes to see if actions are achieving the desired results (see principle 29). This approach will ensure the long-term effectiveness of actions to maintain the integrity of koala movement corridors across the landscape and identify where external circumstances may</p>	<p>Agree - subject to post-conferral review by the Koala Working Group. See Recommendation 28 above.</p>

OCSE Recommendation:	PDPS Response:	EHG Comment:
	<p>exacerbate threats or contribute to unintended outcomes.</p> <p>The updated Koala Strategy will also apply an adaptive management process, including a regular review of outcomes. Adaptive management will occur at the project level (the koala monitoring project) and at the program level (5-yearly reviews). There will be links to other programs under the updated Koala Strategy (such as the land purchase program and private land conservation program) that we could explore if actions are not deemed to be effective.</p>	
<p>31. Risk-based emergency response protocols - Interested stakeholders undertake a risk assessment (likelihood and consequence) and establish monitoring and response protocols – for threats with a fast or slow onset.</p>	<p>Risks to koala populations include habitat loss, vehicle strike, attack by domestic dogs, disease and fire. Some of these are being addressed directly through the Plan including vehicle strike and urban-related threats through fencing and development controls. It is intended that other risks to koalas in the Plan area, such as disease and fire, may be addressed through the updated Koala Strategy. Each of these programs will work in parallel and help inform the other's adaptive management program.</p> <p>The proposed monitoring program will review koala population trends and identify impacts/ priorities of threats in the Campbelltown area and the effectiveness of actions to mitigate them.</p>	<p>Agree – subject to development controls and the alignment with the Koala Strategy.</p>

Appendix 9 - Credit estimate for land-based conservation measures in Strategic Conservation Area

Name of ecosystem credit	PCT no.	Target TEC name	Estimate of credits generated within SCA – active management scenario	Estimate of credits generated within SCA - required management scenario	Estimate of credits generated within SCA - average
Broad-leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion	724	Shale Gravel Transition Forest	99	51	74
Broad-leaved Ironbark - Melaleuca decora shrubby open forest on clay soils of the Cumberland Plain, Sydney Basin Bioregion	725	Cooks River Castlereagh Ironbark Forest	296	172	233
Coastal freshwater lagoons of the Sydney Basin Bioregion and South East Corner Bioregion	781	Freshwater Wetlands	458	356	406
Forest Red Gum - Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	830	Moist Shale Woodlands	3,716	1,387	2,622
Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	835	River-flat Eucalypt Forest	1,509	1,048	1,278

Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	849	Cumberland Plain Woodland	3,828	2,122	2,976
Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	850	Cumberland Plain Woodland	18,673	9,617	14,145
Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion	1395	Shale Sandstone Transition Forest	23,014	19,175	21,095
Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley	1800	Swamp Oak Floodplain Forest	0	0	0

Appendix 10 – Minister for Planning s8.6 Letter

The Hon. James Griffin MP
Minister for Environment and Heritage
GPO Box 5341
SYDNEY NSW 2001

Via email: Office@Griffin.minister.nsw.gov.au

Dear Minister

Thank you for your correspondence to the Hon. Anthony Roberts MP, Minister for Planning and Minister for Homes, consulting on an application for biodiversity certification for the Cumberland Plain Conservation Plan. The Minister asked me to respond on his behalf.

I am pleased to advise the Department of Planning and Environment (the Department) supports the application for biodiversity certification for the Cumberland Plain Conservation Plan.

As your letter noted, the Minister for Planning is also the applicant for this biodiversity certification, however this does not remove the legal requirement for the Minister to be consulted under section 8.6(2) of the *Biodiversity Conservation Act 2016* and we appreciate your actioning of this legal requirement.

If your staff have any questions, I can be contacted directly on 0458 762 215 or at Steve.Hartley@planning.nsw.gov.au and can provide any further information as desired.

Yours sincerely



Steve Hartley
Executive Director
Green and Resilient Places

CC: Ms Louisa Clark, Acting Director Greater Sydney Branch, Environment, Energy and Science