



A T Adams Consulting

URBAN DEVELOPMENT AT WEST BELCONNEN

Program Report

prepared for:

Riverview Projects (ACT) Pty Ltd

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Abbreviations and Definitions

NCA = National Capital Authority (Commonwealth)

EDD = Economic Development Directorate (inclusive of LDA – Land Development Agency, ACT)

EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999*

ESD Environmentally Sustainable Development (principles as defined in section 3A of the EPBC Act)

ESDD = Environment and Sustainable Development Directorate (inclusive of CPR – Conservation, Planning and Research & EPA – Environment Protection Agency)

DoE= Commonwealth Department of the Environment

DV 351 = Draft Variation 351 to the Territory Plan

LEP Local Environment Plan

YLEP Yass Valley Local Environment Plan

TaMS = Territory and Municipal Services Directorate

YVC = Yass valley Shire Council

Box Gum Woodland = yellow box-red gum grassy woodland

PTWL = Pink Tailed Worm Lizard (*Aprasia parapulchella*)

GSM = Golden Sun Moth (*Synemon plana*)

OEH = NSW Office of Environment and Heritage

EMT = West Belconnen and Parkwood Environmental Management Trust.

VBC = Village Building Company

WBCC = West Belconnen Conservation Corridor

RMP = Reserve management plan

‘Proponent’ = Riverview Projects (ACT) Pty Ltd acting on behalf of the ACT Government with respect to land in the ACT and Land in NSW owned by the ACT Government, acting on behalf of other NSW landowners within the project area and on its own behalf with respect to its related entity landholdings within the project area in NSW.

‘Construction’ includes actions that may impact on MNES habitats such as preparatory works required to be undertaken including clearing vegetation and temporary structures and the use of construction or excavation equipment on site for the purpose of breaking the ground for buildings or infrastructure but does not include site surveys and investigatory work including geotechnical investigations or fencing and other stock management measures.

“Government” means the ACT, NSW and or Commonwealth Governments as appropriate.

1.0 Introduction

1.1 Background

In July 2014, Riverview Projects (ACT) Pty Ltd (Riverview) and the Commonwealth Government commenced a Strategic Assessment under Part 10 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The focus of the agreement is to assess the potential impacts from development of the West Belconnen project area (referred to as “the development” in this report), on Matters of National Environmental Significance (MNES) protected under the EPBC Act. For the purposes of the preparation of this assessment Riverview is acting for the ACT Government with respect to land within the ACT and in its own right as owner of part of the NSW land and as an agent for the other four owners of the NSW land. Riverview, representing the land owners in NSW and the ACT Government is referred to as “the proponent” in this report.

1.2 Purpose of this Document

This is one of 2 documents relating to the Strategic Assessment of the West Belconnen urban development in accord with the EPBC Act as follows:

- **Program Report (this report, A T Adams Consulting)** which sets out the program of works, actions, management and funding arrangements, and commitments for the protection of matters of national environmental significance. The program is to be presented to the Minister for the Environment for endorsement and consideration of an approval for a class of actions for urban development under Part 10 of the EPBC Act.
- **Assessment report (Umwelt Pty Ltd)** which presents an assessment of the impacts of the program on Matters of National Environmental Significance and the extent to which those impacts will be avoided, mitigated or offset by actions proposed as part of the program.

2.0 Site Description

2.1 Location

The project site is at West Belconnen, in the north west of the Canberra metropolitan area, generally to the west of the suburbs of Holt and Macgregor, and extending into NSW, as shown in a regional context on Figure 1 and locally on Figure 2. This area will be rezoned for a variety of development and conservation uses as discussed in Section 3.0 below. Figure 2 also shows the proposed alignment for the completion of Ginninderra Drive. The proposed alignment traverses the Jarramlee and Macgregor offset areas. No development (other than the road extension) is proposed in these offset areas.

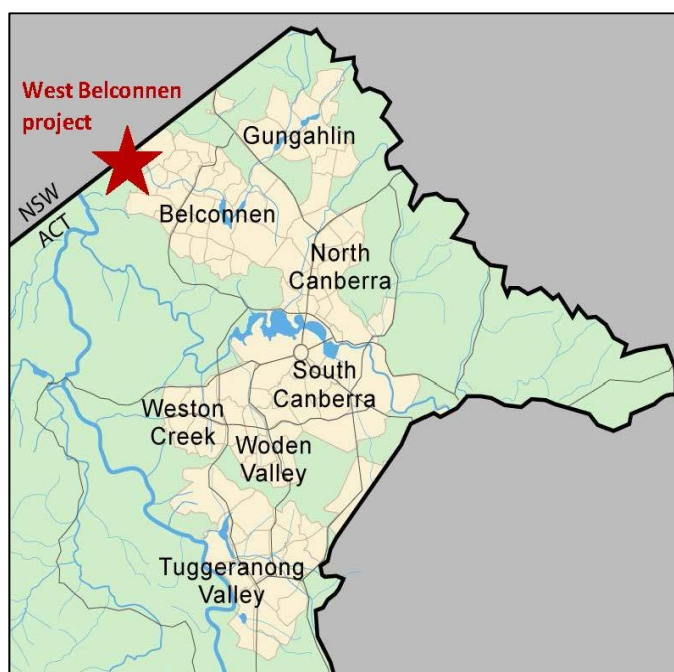


Figure 1: West Belconnen regional location

A portion of the site was included in an earlier assessment under the EPBC Act (ACTPLA, 2011); the specific area was labelled “West Molonglo” at that time and is shown on Figure 2 also.

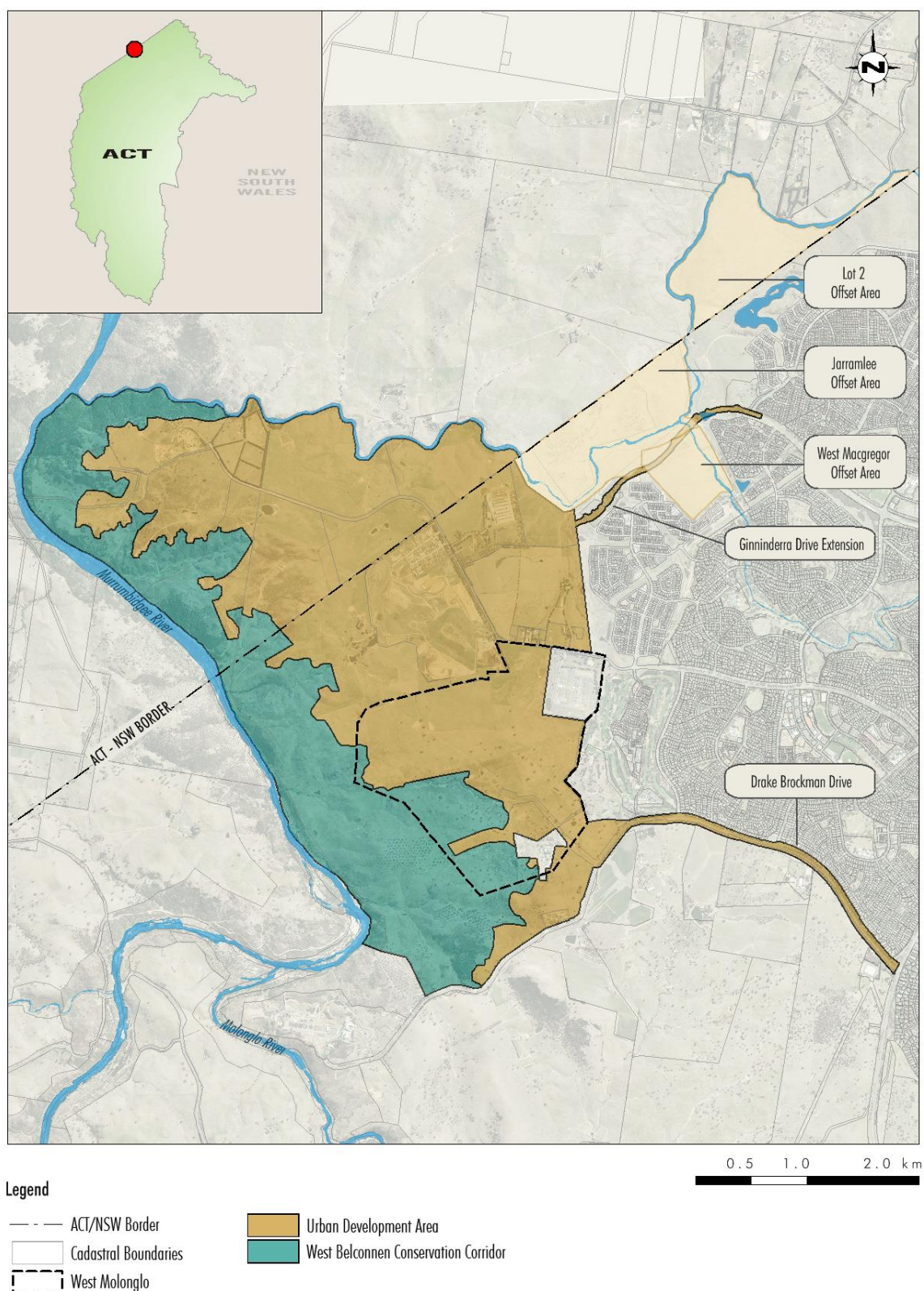


Figure 2: Project site

2.2 Molonglo Valley NES Plan

The Molonglo Valley plan for the protection of Matters of National Environmental Significance (the NES Plan) was published by the ACT Government in September 2011 and endorsed by the Commonwealth Minister for the Environment on 7th October 2011. The plan focused on urban development in the area known as east Molonglo but also included west Molonglo (the area shown on Figure 2). In the Molonglo NES Plan the ACT Government committed to avoiding impacts on MNES within west Molonglo and undertook to deliver the following conservation outcome:

“e) Maintenance and enhancement of the Box-Gum Woodland that occurs within the West Molonglo component of the strategic assessment area”.

This commitment was reflected in two proposed actions. The first (action item 21) related to the ongoing management of box gum woodland under current land use arrangements; these consist of a rural lease management plan that has been prepared by the current lessee and approved by the ACT Government (Territory and Municipal Services Directorate). The management plan dates from the period prior to the preparation of the Molonglo Valley NES plan and does not specifically provide for the management of the woodland for conservation purposes. The intent was that it be revised to meet the NES commitment however this intention will now be overtaken by the outcomes of this program. The second (action item 22) is relevant to the West Belconnen program, the two action items are as follows:

Table 1: Extract from Molonglo Valley NES Plan

Action	Responsibility	Timing
<p>21. Manage the Box-Gum Woodland that occurs in West Molonglo in accordance with the terms of a Land Management Agreement (LMA). LMAs are required by Part 9.7 of the Planning and Development Act 2007 for all non-urban leases. The LMA covering the BGW in West Molonglo contains a Land Action Plan which ensures that:</p> <ul style="list-style-type: none"> • the ecological functioning and integrity of BGW on the lease is retained and improved; • the extent and character of the BGW is preserved; and • there is an Action Plan which details the activities, timeframes and performance measures put in place to ensure the conservation outcomes are met. 	Territory and Municipal Services Directorate	Ongoing
<p>22. West Molonglo is zoned broadacre and is not part of the ACT Government's current land release program. In the event that West Molonglo is developed in the future for broadacre uses or residential development then, subject to confirmatory ecological assessment of Box-Gum Woodland, the area of EPBC Act Box-Gum Woodland that occurs there will be set aside as a Nature Reserve.</p>	Environment and Sustainable Development Directorate	The Nature Reserve will be established prior to construction in West Molonglo commencing

The actions that will be undertaken in accord with this (West Belconnen) program will fulfill the requirements of Action 22 of the Molonglo Valley NES Plan.

3.0 The development

The general intent of the development is discussed in detail in the reports “West Belconnen Draft Variation 351 Planning Study” (A T Adams Consulting, 2014b) and “Planning Proposal for Parkwood being the NSW part of the West Belconnen Project” (Knight Frank, 2014) . The master plan that describes the proposed development is provided below (Figure 3). The master plan will be put into effect by way of a series of rezonings which are discussed in subsequent sections.

The Project Area included in the master plan covers 1,583.3 hectares of land that straddles the Australian Capital Territory and New South Wales border, west of the Canberra suburbs of Higgins, Holt, and Macgregor. It is bounded by the Murrumbidgee River to the west, Ginninderra Creek to the north, Macgregor to the east, and Stockdill Drive to the south. Land that will be impacted by the proposed Ginninderra Drive Extension, which links the current Ginninderra Drive terminus to the proposed development area is also subject to assessment. The Strathnairn Arts Association land is not included in the Project Area.

The proposed land use zones are based on the approach that has been taken to the project which has been to develop the master plan in response to:

- The physical form of the site
- The landscape setting, particularly the dramatic visual relationship of the site to the Brindabella ranges and to the hills to the north and north west
- The need to protect the local and global environment and to achieve a 6 star new community rating
- The extensive urban edge between residential development and the Conservation corridor
- The need for a full spectrum variety of housing types across all affordability levels
- The need, recognising that Canberra land prices are amongst the highest in Australia, to achieve land development economies wherever practical
- The need to focus density along transport routes and near centres
- The need to create a sense of place for West Belconnen as a whole and for neighbourhood scale precincts within it; this is an essential element if resilient and robust communities are to form, and grow over time

The zones that reflect the intent of the master plan and which are therefore to be applied at west Belconnen include in the ACT:

- NUZ1 Broadacre
- NUZ3 Hills ridges and buffers
- NUZ4 River corridor
- CFZ Community facility (including areas nominated as indicative school sites)
- CZ1 Commercial core
- CZ3 Commercial services
- CZ5 Commercial mixed use

- RZ1 Suburban residential
- RZ3 Urban residential
- RZ5 High density residential
- IZ2 industrial mixed use
- PRZ1 Urban parks and recreation
- TSZ2 Transport and services zone

and in NSW:

- E3 Environmental protection
- R1 General residential

Specific controls within these zones will be tailored to meet the intent of the master plan and respond to the particular characteristics of the site. Additions and amendments to these zones may occur over time as detailed implementation of the project proceeds.

The land fill site is currently being utilised for several waste disposal and management functions within the terms of its current licensing arrangements. These functions will continue for a 5 – 10 year period following which the site is expected to be converted to a range of uses including parkland, community uses, recycling activities and the like. Residential development will not be permitted. The range and pattern of uses will be determined following a master planning process that will be a prescribed outcome of DV 351.

DV 351 prescribes a series of “clearance zones” within which residential and other uses sensitive to odour are prohibited, pending the modification or relocation of the activities that create the potential nuisance. The clearance zones are as follows:

Land fill site:	500m
Green Waste facility:	1000m
Poultry (egg) farm:	750m
Lower Molonglo Water	
Quality Control Centre:	2400m

The Program aims to provide a third urban development front within the ACT (in addition to Gungahlin and Molonglo), which extends into bordering NSW. This will occur by extending the existing urban area of Belconnen west and north. It is anticipated that a total of 11,500 dwellings over a 30 to 40 year period (approximately 300 dwellings per year) will be provided to house approximately 30,000 people (A T Adams Consulting, 2014b). This long timeframe is a key aspect of the project; the development area has been nominally divided into 29 stages which will be progressively developed, commencing in the vicinity of Stockdill Drive, as illustrated on Figure 4.

The Riverview Group is aiming to create a sustainable community in the nation’s capital that will be recognised with a ‘six star – a world leader in sustainability’ rating under the Green Building Council of Australia’s Green Star Community Pilot Rating Program (Green Community Rating). The Program has the opportunity to incorporate best practice sustainability design, building and urban management techniques into a suburban scale development that also aligns with ESD principles.

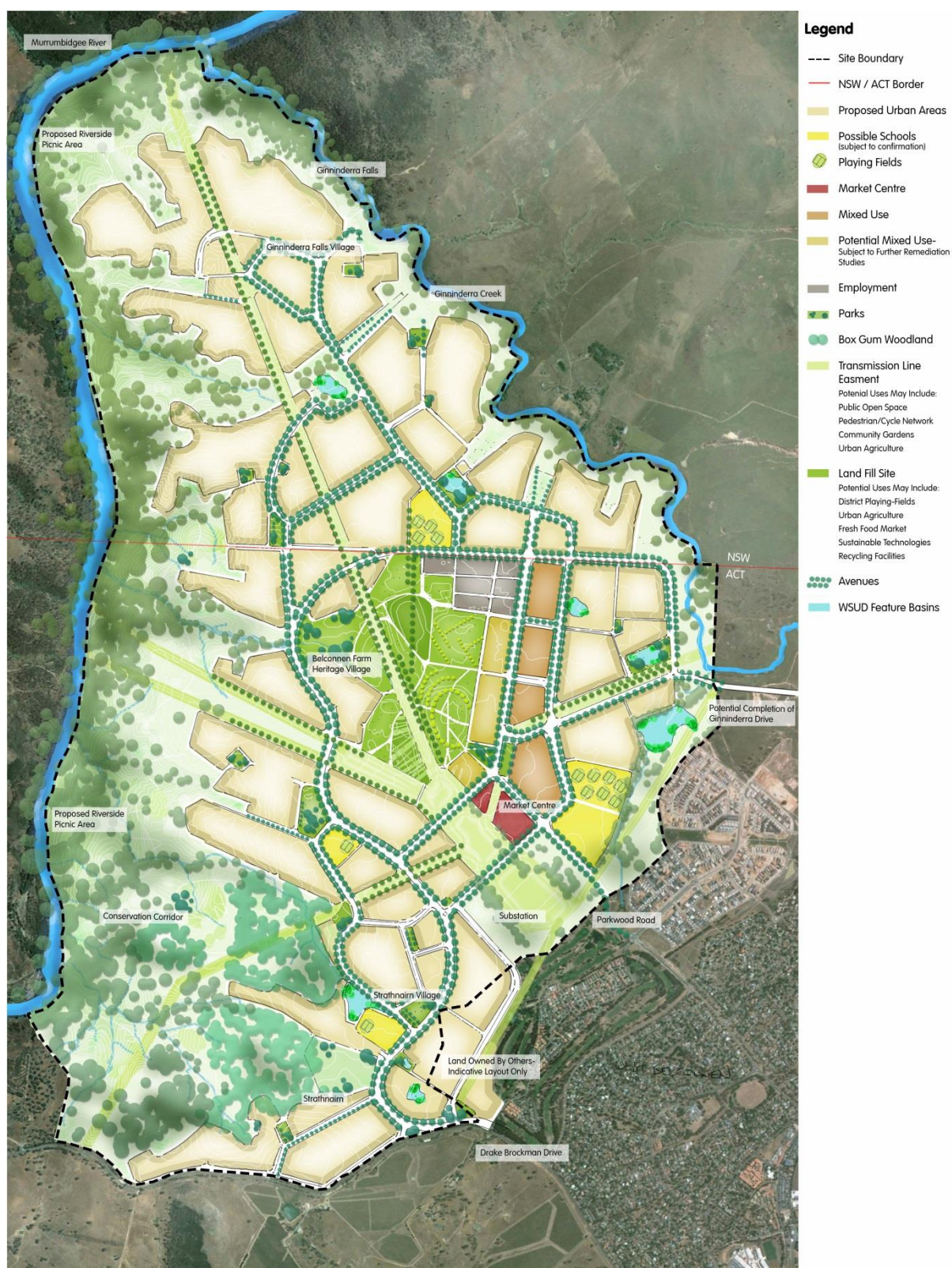


Figure 3: West Belconnen illustrative master plan

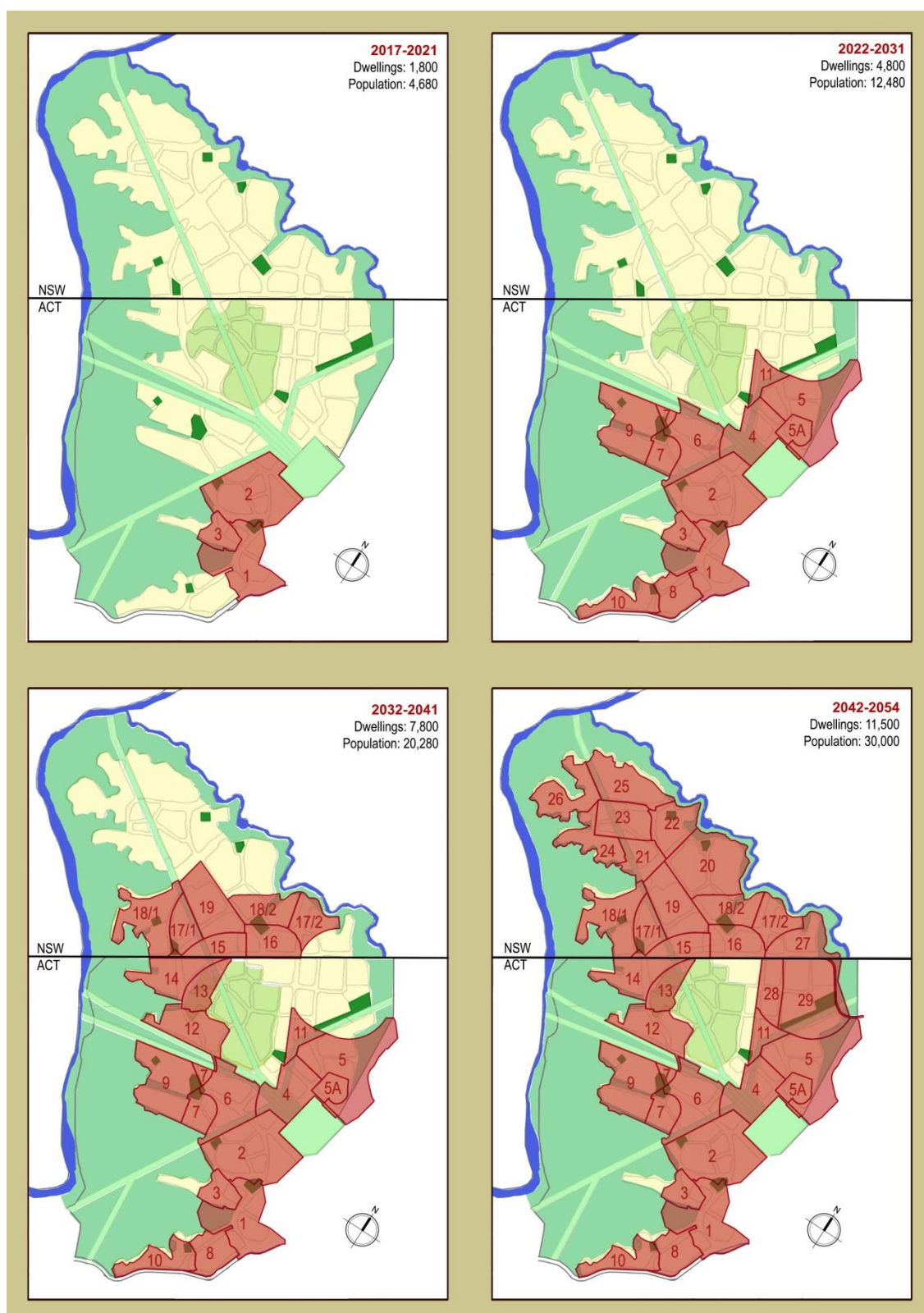


Figure 4: Indicative Project Staging

3.1 Summary of actions

The west Belconnen project envisages the construction of an extensive urban area, to accommodate ultimately a population of about 30,000 people. This will include a great variety of actions to be implemented over a long, 40 year, timeframe. At this point the project will be notionally complete but, as with any such area, renewal and rejuvenation of land uses and infrastructure will continue indefinitely within the urban area and in the land devoted to conservation purposes. All future actions will be subject to statutory approval processes discussed in Section 3.3; these processes will incorporate the requirements of this Strategic Assessment.

With the exception of two significant actions discussed at Section 3.2, the scale and timeframe of the program is such that identification of specific actions is not practical. In general terms the program will provide for urban development and conservation at West Belconnen, including:

- Construction and operation of residential, commercial, community, light industrial and open space land uses, and related urban development and infrastructure, including the completion of Ginninderra Drive (refer to Section 3.2.1), within the district of Belconnen in the ACT and the Shire of Yass in NSW over the next 40 years subject to approval under the ACT Planning and Development Act 2007 and the Yass Valley Shire Local Environment Plan (YLEP) ;
- Variation to the Territory Plan and an amendment to the National Capital Plan to reflect changes in land use in the ACT identified in this document;
- Rezoning of land by way of an amendment to the YLEP, to reflect changes in land use in NSW identified in this document;
- A biodiversity offsets package for GSM which will place an additional 86.8 hectare site (lot 2 Wallaroo Road NSW) supporting threatened species into protected areas; The site includes 11.9 ha of land currently occupied by GSM and 19.4 ha suitable for GSM, currently unoccupied.
- Construction of Ginninderra Drive extension
- Off site road improvement works on local and arterial roads within the existing Western Belconnen urban area (discussed in detail in (Aecom, 2014a) including:
 - Southern Cross Drive
 - the existing portion of Ginninderra Drive and
 - local streets
 - Widening of Drake Brockman Drive to create a dual carriageway road between the project area and William Hovell Drive.
 - The creation of a conservation corridor along the Murrumbidgee River and Ginninderra Creek totaling 549.9 ha encompassing PTWL habitat and an area of box gum woodland. Works will occur within this corridor in locations that will be specified progressively as development applications for works are lodged and approved over the course of the project development phase, including
 - Construction of a sewer tunnel within the river corridor by direct drilling so as to pass beneath Pink tailed worm lizard (PTWL) and box gum woodland habitat and involve limited surface works outside but close to PTWL habitat refer to (refer to Section 3.2.2)

- Recreation and tourist facilities including buildings picnic areas, carparking and access roads and walking and cycling tracks
- Bushfire and maintenance management access tracks
- Bushfire management measures including vegetation management by way of slashing, controlled burning and livestock, including access tracks.

The corridor will incorporate 100% of the box gum woodland that is within the project area, and 145.8 ha of PTWL habitat. The status of the land will be upgraded to “nature reserve” ensuring the long term protection of the MNES; this together with enhancements to the connectivity between PTWL areas and an increase in overall area of PTWL habitat will offset the loss of 16.4 ha of disaggregated patches of PTWL habitat that will be subsumed within the urban development area.

3.2 Significant actions that may directly impact MNES

3.2.1 Ginninderra Drive extension

The Program proposes to extend Ginninderra Drive (see Figure 5) to provide a third arterial road access to the Project Area and service the final stages of the development. The road will be a two lane carriageway (single lane in each direction) with a posted speed limit of 60 kilometres per hour and will be in addition to the two other arterial road connections at Drake Brockman / Stockdill Drive and Parkwood Road/Southern Cross Drive (Brown, 2014a).

The first alternative for the Ginninderra Drive Extension is to not proceed and exclude this aspect of the proposal from the Program. This would result in the development having to depend on the connections at Drake Brockman/Stockdill Drive and Parkwood Road/Southern Cross Drive. Under this option there would be no impacts to the established environmental offset areas and associated MNES.



Figure 5: Ginninderra Drive proposed alignment

Although technically feasible, not constructing the Ginninderra Drive extension will result in a need to upgrade the capacity of both Drake Brockman/Stockdill Drive and Parkwood Road/Southern Cross Drive. These upgrade works would require additional maintenance and infrastructure works to occur before the Program is completed (Brown Consulting, 2014a). Traffic modelling has also indicated that the longer travel times and distances lead to significantly increased greenhouse gas emissions and other associated impacts such as reduced efficiency of public transport networks. Given these factors, the option to not construct the Ginninderra Drive extension is undesirable as it will lead to significant, adverse social and environmental impacts that would otherwise be avoidable and by limiting access to the Project Area to two arterial connections, sustainability of the Program is not optimised.

The current alignment of Ginninderra Drive has been designed and built to service the increased usage levels that will be associated with the Program. Extending Ginninderra Drive is not only consistent with the original design intent, but also realises the value of the original investment in constructing Ginninderra Drive to its existing standard. It is therefore a more sustainable alternative as construction costs will be limited and existing infrastructure will be used more efficiently.

In planning for the extension of Ginninderra Drive, a total of eleven alignment options have been considered. The route options, and the characteristics of each are discussed in detail in Brown 2014a.

3.2.2 Sewer tunnel alignment

An important component of the Program that must be considered is the provision of infrastructure for services and utilities such as sewerage, potable water, electricity, gas, and communications. Of these, the sewer alignment requires further discussion due to the potential for impacts to MNES as a result of its development.

Existing sewer services within west Belconnen converge upon the Ginninderra sewer tunnel, which runs generally north – south through the ACT portion of the Project Area, and empties at the Lower Molonglo Valley Water Quality Control Centre (located approximately one kilometre to the southwest of the Project Area). The Ginninderra sewer tunnel includes an overflow structure and sewer vent, three mechanised odour / scrubbing control units, and an adjoining gravity sewer that runs through Macgregor West. The sewer infrastructure plans are explained in detail in (Brown, 2014). A key element is a trunk sewer connection from the urban area to the Ginninderra sewer tunnel that will traverse the proposed conservation corridor.

The existing Ginninderra sewer tunnel has sufficient capacity to service the urban development proposed under the Program, therefore both trunk sewers will empty into it. There are a number of construction methods that may be used for these connections, which in turn influence their final alignment. The range of alignment options are discussed below and form part of the analysis of alternatives for the Program.

The two key methods of construction for the sewer are trenching and micro-tunnelling. In general, trenching is limited to following the natural contours of the land in order to take advantage of gravity for flow and is generally the cheapest construction method. It can be augmented with pump stations at locations where gravity cannot be relied upon; or through the installation of above ground pipes to cross watercourses or other features whilst maintaining a gravity-fed flow. These additional elements are engineering solutions that add additional cost and ongoing maintenance liabilities. This includes the requirement of the provision and maintenance of an access road along the alignment in order to maintain the serviceability of the sewer over its operational life. In areas of steep country, this can lead to extensive cut and fill requirements to facilitate stable and safe access.

Alternatively, micro-tunnelling results in minimal surface impacts. It is typically used to install pipes under areas that are constrained by natural values or other high value or critical infrastructure (e.g. railways, roads, rivers, or environmentally sensitive areas). Surface impacts are limited to an approximately 20 metre by 20 metre construction area for each of seven vertical shafts. These shafts are used to lower the tunnelling equipment which bore tunnels to the next shaft, and are then used to fit and grout the pipes into place. The shafts are retained after construction is complete as manhole access points (Brown, 2014). While this construction method is more expensive in terms of capital outlay, it has negligible surface impacts, allows for the entire system to be gravity-fed, and avoids many ongoing liabilities.

The alternatives considered for the Murrumbidgee River catchment are discussed in detail in (Brown, 2014), the selected option is for microtunneling.

Microtunneling has been selected as it:

- decrease the environmental impacts within the Murrumbidgee River corridor;
- maximise the size of the catchment serviced by gravity sewers;
- has lower ongoing operational costs; and
- has no requirements for noise or odour buffers compared with pump station options.

The high upfront costs of microtunneling may be mitigated by implementing staged construction that will delay these costs over a period of time (Brown, 2014a).

3.3 The development approval process

The rezoning processes described above do not, of themselves, provide for any development activities to occur. Rather, the various zones prescribe the types of development that may be permitted as well as development that is prohibited within the zone.

Different types of development are permissible or prohibited in different zones; for example in the River Corridor zone in the ACT the types of development that are permitted are limited to those that are compatible with the objectives, including the conservation objectives, of the zone. Conversely a much broader range of development types are permitted within the residential and commercial zones. It is also common for the zoning controls to include limitations on the design and siting, scale and other aspects of a particular type of development. The full suite of controls applicable to development proposals within the zones are complex, they are set out in the relevant statutory planning instruments: the Territory Plan in the ACT and the Yass Valley Local Environmental Plan in NSW.

Any proposal for development must be submitted as a development application to the relevant responsible authority, the Yass Valley Shire in NSW and the ACT Planning Authority in the ACT. The development application will be assessed against the requirements of the statutory planning instrument and any other relevant matters, and either approved or refused as appropriate.

In the ACT a development application may be required to be assessed under the “impact” track if certain environmental impact criteria are triggered because of the nature of the proposed development. This will be the case at West Belconnen because of the presence of a variety of listed species and ecological communities and ordinarily an environmental impact assessment would be required prior to a development application being considered. The opportunity exists under section 211 of the ACT Planning and Development Act for a proposal to be exempted from the requirement for an impact assessment if sufficient recent studies have been completed. The suite of studies that support this assessment together with a number of studies that have been completed as background

documentation for draft Territory Plan Variation 351 constitute the necessary “recent studies” and will be cited in an application under section 211 for an exemption from the requirement to prepare an impact assessment.

For a development application to be approved it must be compliant with all relevant requirements and in the case of West Belconnen this will include any requirements prescribed by an endorsed MNES program. This is because a development approval is required to be compliant with Commonwealth legislation.

Where an endorsed MNES plan includes specific requirements applicable to a particular activity or place then these can be taken directly into account in the assessment of a development application. Alternatively where an endorsed MNES plan requires an action to be taken such as the preparation of a reserve management plan then a development application will be assessed for compatibility with the reserve management plan.

Importantly, where an endorsed MNES plan requires something such as a reserve management plan, but the plan has not yet been produced, then a development application would have to be set aside pending completion of the reserve management plan. This is not an unusual process and is analogous to a requirement for a “development control plan” to be prepared for a precinct to provide a context within which subsequent development applications may be assessed.

3.4 The ACT Rezoning

The ACT component of the development at West Belconnen will be achieved through approval by the (ACT) Minister for Planning of a variation to the Territory Plan as well as a number of other administrative processes discussed in more detail in the planning report that supports the rezoning proposal (A T Adams Consulting, 2014b). The proposed zoning is shown at Figure 6.

The rezoning coverage differs in some respects from the development area identified at Figure 2 above; the differences and reasoning are set out below:

- The substation (refer to Figure 2) is excluded from the program area because no changes are proposed to the land use in either the sub-station or its surrounding buffer area. The Territory Planning Authority has determined that a more appropriate zoning for this site would be “TSZ2 Services” rather than its current “Broadacre” zoning and this change has been included in DV351 as a matter of convenience.
- The Macgregor offset area is incorporated in total in the proposed rezoning, again as a matter of convenience. Only a small area of the reserve is likely to be impacted by the development proposal and consequently only that area was included in the development area but it is nevertheless logical that the entire site be rezoned to reflect its reserve status.
- The Strathnairn property (refer to Figure 2) is excluded from the development area because no changes are proposed to the land use on this site. The Territory Planning Authority has determined that a more appropriate zoning for this site would be “CFZ Community Facility” rather than its current “Broadacre” zoning and this change has been included in DV351 as a matter of convenience.

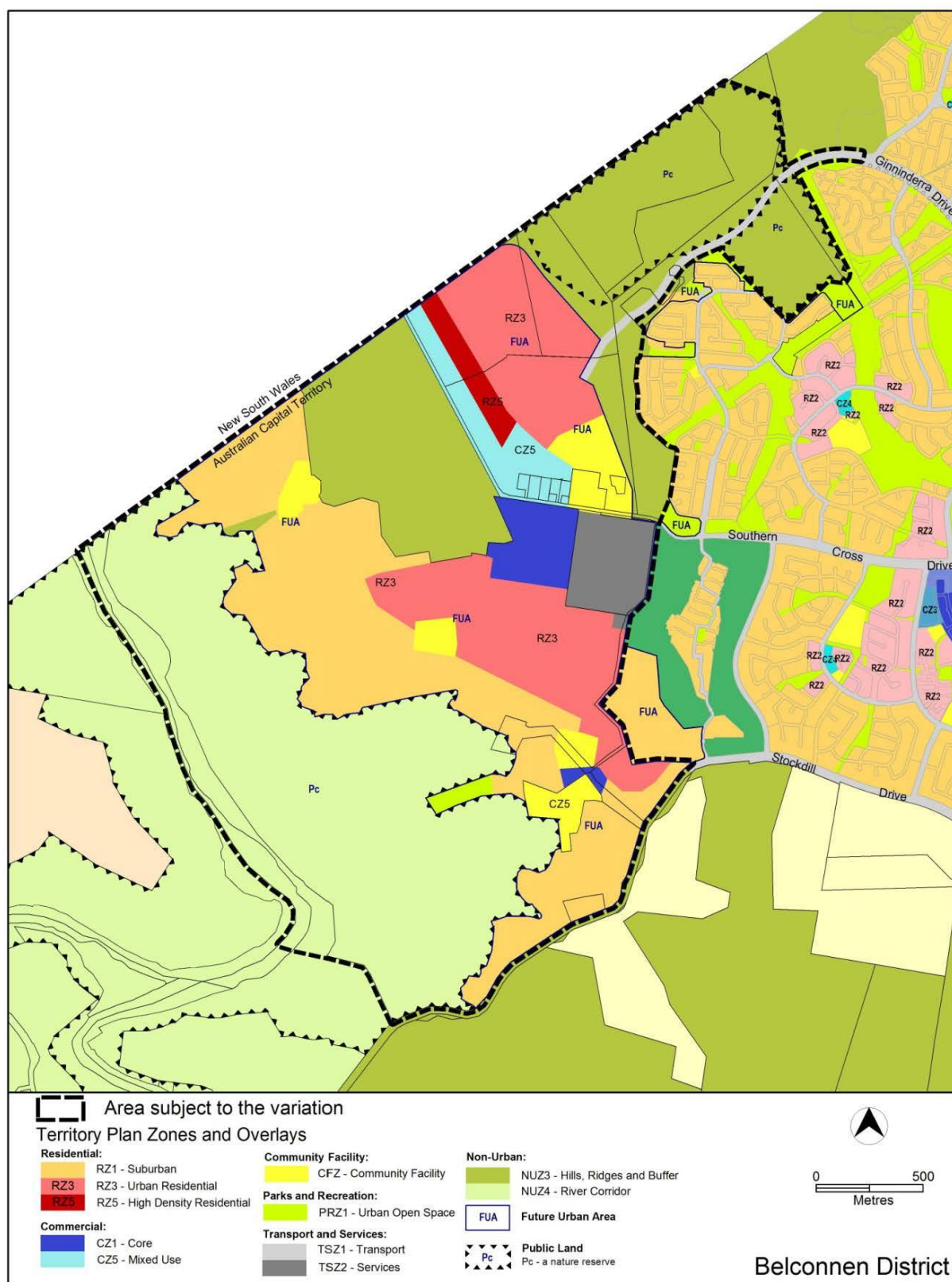


Figure 6: Proposed ACT zoning

3.5 NSW Rezoning

The purpose of the Planning Proposal seeks the following amendments to the Yass Valley Local Environmental Plan 2013 (YLEP) to enable the urban development and the setting aside of lands for conservation purposes by:

- 1) Amending of the YLEP 'Land Application Map' to remove the subject land from the YLEP and replacing the YLEP with a principal LEP applying only to the subject land and to be referred to as the draft Yass Valley Local Environmental Plan (Parkwood).
- 2) To make provision in the draft Yass Valley Local Environmental Plan (Parkwood) for the following specific planning controls :

The zoning of the land from RU1 Primary Production to principally R1 General Residential and part E3 Environmental Management

To modify the existing E3 Environmental Management zone boundary to more accurately reflects the known ecological values of the land

The applying of a minimum E3 Environmental Management zone and the R1 General Residential zone with additional uses in addition to those applying in the YLEP. The additional uses are consistent with the proposed approach to a sustainable urban community and the use of the land to be set aside for conservation purposes.

Consideration to two potential options as the determining of minimum lot sizes consistent with ensuring an integrated approach to the design and siting of dwellings at the neighbourhood scale.

The applying of an amended Natural Resources Biodiversity Map based on the ecological surveys and studies supporting this Planning Proposal.

The application of provisions in the Yass Valley Local Environmental Plan (Parkwood) that address the proposed urban release area by specific reference to infrastructure, servicing and a development control plan.

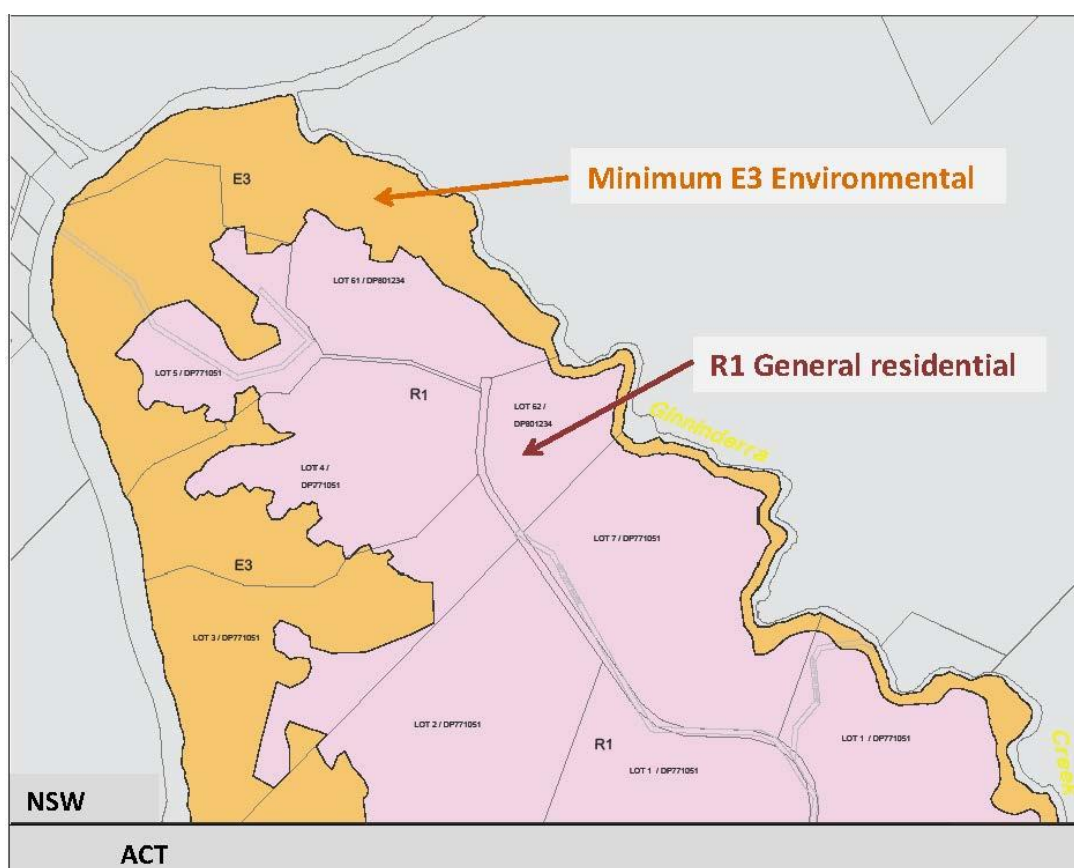


Figure 7: Proposed NSW zoning

3.6 The proposed Conservation corridor

A conservation corridor (illustrated at Figure 3 & Figure 11) encompassing areas of habitat for the endangered Pink tailed worm lizard and Yellow Box Red Gum Grassy woodland will be created. The corridor adjoins both the Murrumbidgee River and Ginninderra Creek and makes up a total area of 549.9ha (ACT and NSW). In addition to the protection that will be afforded to the vulnerable species and communities existing in the corridor the creation of this reserve will mean that the Ginninderra Creek corridor, which commences at Mulligans Flat in Gungahlin and extends through Gungahlin and Belconnen, will be linked to the Murrumbidgee River which in turn connects to the Molonglo and upstream Murrumbidgee corridors, which respectively link to Canberra City and Namadgi National Park.

The corridor will be managed as an IUCN1 Category IV reserve that employs a best-practice approach to:

- protect and restore biodiversity and ecosystem functions and ecological connectivity across the regional landscape to the Murrumbidgee River Corridor and other reserves
- manage the urban edge to protect both the values of the Reserve and the amenity, health and safety of the urban community
- provide quality recreation experiences for the enjoyment of visitors and local residents
- encourage active learning and engagement in management by the community, organisations, the local Aboriginal community and research and educational institutions
- provide an adaptive management framework through monitoring, research and periodic review of the management plan enabling evidence-based adjustments as needed.

The activities within the corridor will be limited by the statutory zoning provisions (“River Corridor” zone with a “nature reserve” overlay in the ACT, and “Environmental Management” zoning in NSW), and will include:

- Ecological restoration and threatened habitat protection
- Riverside management
- Managing the urban edge
- Science, active learning and community stewardship
- Integration of Aboriginal values
- Sustainable recreation and commercial uses (including interpretation).

Conservation will be the primary use of the proposed conservation corridor and other uses, such as recreation will only be allowed where they are compatible or have no significant adverse impact on conservation.

The creation of the corridor will be achieved by rezoning the land as discussed above. Separate rezoning processes are applicable in the ACT and NSW which are discussed below. In summary:

- A river corridor currently exists in the ACT, zoned as “river corridor” consisting of two parts

- The bulk of the corridor (within block 1605, totaling about 260 ha) has a “special purpose reserve” overlay, which is intended for recreation and other uses, without specific reference to conservation values.
- A second smaller portion comprises a narrow strip of land along the immediate river frontage (within block 1631, approx. 30 Ha) which is part of the larger Woodstock nature reserve and consequently has a “nature reserve” overlay.

The total corridor area is to be enlarged from 290.8ha to 359.2ha and have a “nature reserve” overlay applied which is specifically aimed at achieving environmental conservation outcomes.

- In NSW the corridor is largely contained within an existing “Environmental management (E3)” zoning which is defined by arbitrary property boundaries and does not reflect environmental values. The boundary is to be realigned to reflect the findings of scientific field investigations, particularly related to the Pink tailed worm lizard habitat areas (Osborne & Wong, 2013) .

Definition of the new eastern boundary of the proposed river corridor conservation areas, which differs from the existing zoning boundaries, was driven by the location and extent of (i) the Pink-tailed Worm Lizard habitat and (ii) the Box-Gum Woodland; less important criteria are (iii) topography and (iv) management practicality. Application of these criteria to define a new corridor boundary was undertaken in two steps based on ground-truthing of habitat features guided by expert ecological and management advice.

Initially, confirmed Pink-tailed Worm Lizard habitat (Osborne & Wong, 2013) was marked out using aerial photography backed up by field inspections. This was followed by careful testing of the entire boundary by on-ground inspections, first by the consultant team and later with ACT government officers from ESDD and TAMS and NSW DoP. The proposed boundary and the ecological, habitat, and management criteria used to derive it were agreed to by all parties.

The eastern edge of the proposed reserve was determined on site through agreement of the study team and ACT and NSW government officers and recorded using GPS equipment.

Figure 8 & Figure 9 illustrate the box gum woodland and PTWL habitat areas within the project area. Key elements are:

in the ACT portion of the corridor:

- 11.7 Ha of box gum woodland that is currently within the existing river corridor zone will have enhanced protection as the reserve status is upgraded from “special reserve” to “nature reserve”
- 59 Ha of box gum woodland that is currently unprotected in the “broadacre” zone will be included in the enlarged river corridor zone with a nature reserve overlay ensuring enhanced protection.
- This will result in 100% of the box gum woodland area (68.2ha) being included in the River Corridor zone with “nature reserve” status.
- There are a total of 133.7 Ha of high quality PTWL habitat in the ACT. 114.4 Ha (86%) of this is currently in the River corridor zone; the enlargement of the zone will encompass a total of 124.3 Ha of high quality PTWL habitat, 93% of the total. The level of protection will be enhanced by the upgrading of the reserve status to “nature reserve”.
- 7% (9.4 ha) of the high quality PTWL habitat in vestigial patches will be subsumed in the urban development area.

- There are a total of 7.9 Ha of low quality PTWL habitat in the ACT. 3.2 Ha of this (41%) is currently within the river corridor zone. the enlargement of the zone will encompass a total of 4.3 Ha of low quality PTWL habitat, 54% of the total. The level of protection will be enhanced by the upgrading of the reserve status to “nature reserve”.
- 46% or 3.6 Ha of low quality PTWL habitat in vestigial patches will be subsumed in the urban development area.

in the NSW portion of the corridor:

- There are a total of 16.7 Ha of high quality PTWL habitat in the NSW portion of the project area. Of this 15.9 Ha or 95% will be included in the River corridor subject to an “environmental management” zoning. 0.8 Ha or 5% of the total will be subsumed within the urban development area.
- There is a small area (2.8 ha) of low quality PTWL habitat in the NSW portion of the project area. Of this 0.2 Ha or 7% will be included in the River corridor subject to an “environmental management” zoning. 2.6 Ha or 93% of the total will be subsumed within the urban development area.

The above outcomes are summarised in Table 2.

Table 2: River corridor habitat areas

<i>River corridor habitat areas (ha.)</i>	<i>ACT</i>	<i>NSW</i>	<i>Total</i>
Box gum woodland retained	70.7	0	70.7
Box gum woodland within development area	0	0	0
High quality PTWL habitat retained	125.3	15.9	141.2
High quality PTWL habitat within development area	9.4	0.8	10.2
Low quality PTWL habitat retained	4.3	0.2	4.5
Low quality PTWL habitat within development area	3.6	2.6	6.2

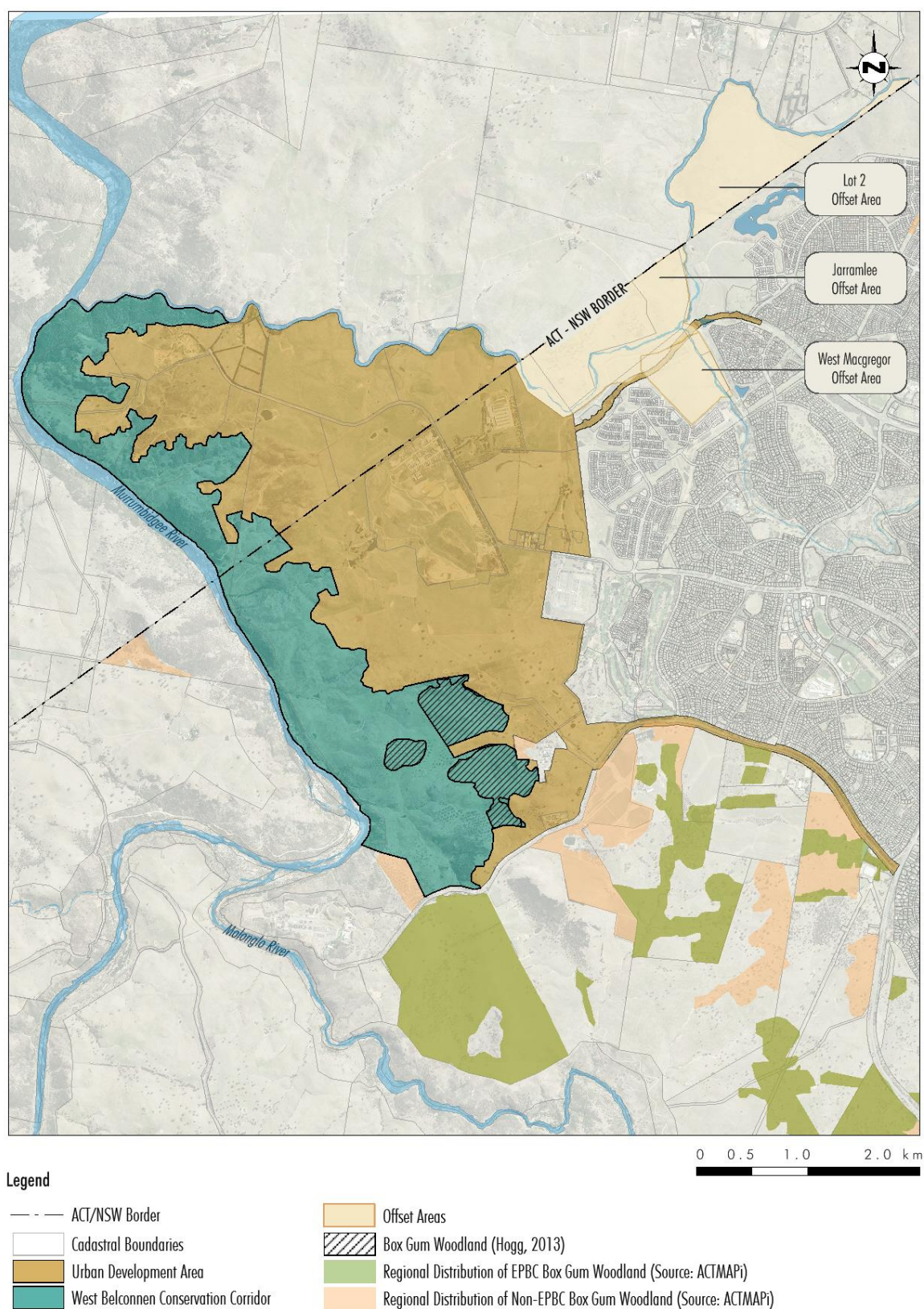


Figure 8: Yellow box red gum grassy woodland

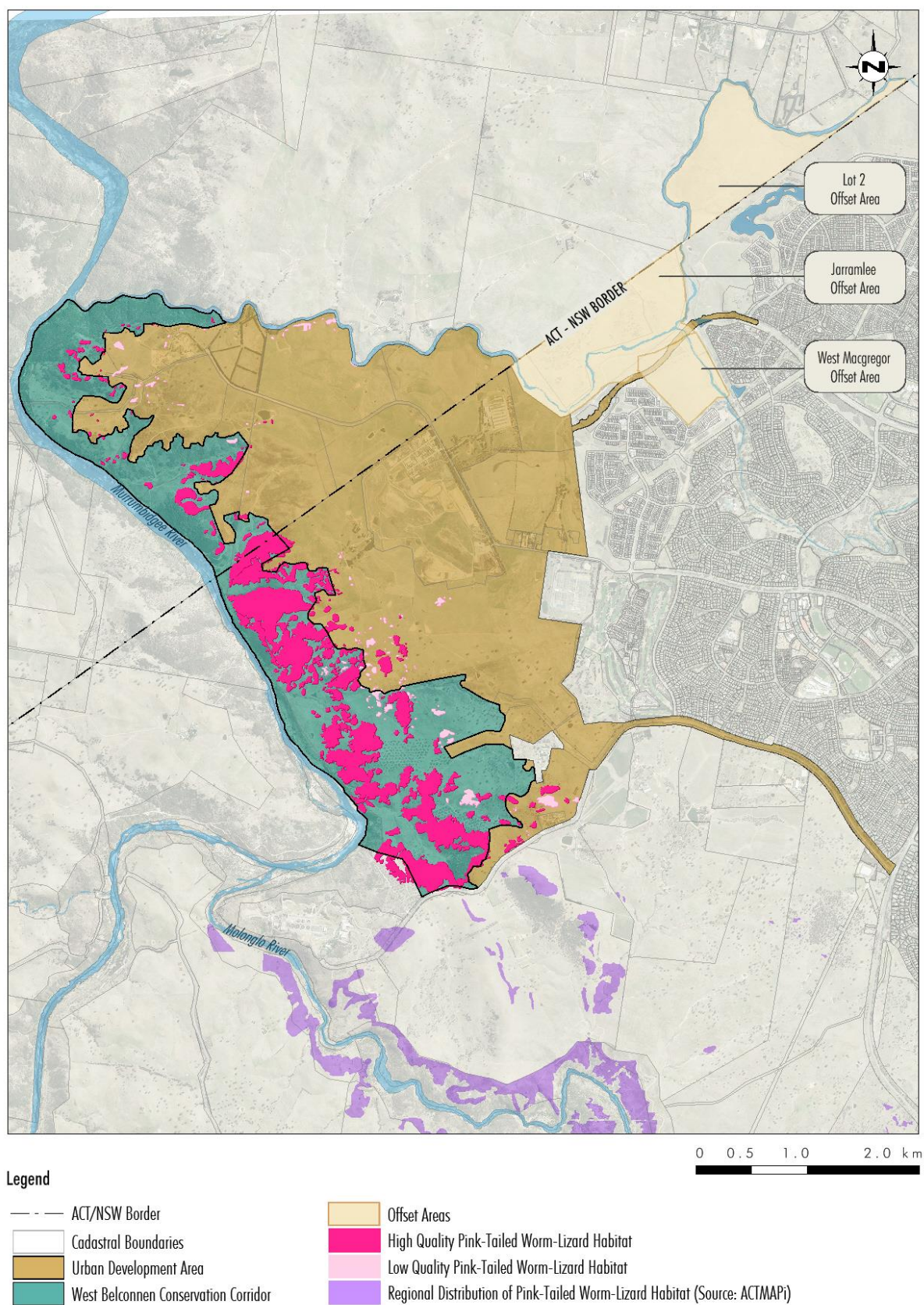


Figure 9: Pink tailed worm lizard habitat

3.6.1 Conservation corridor timing of implementation

Control of the conservation corridor will be transferred to the proposed environmental management trust (EMT) in stages as the project development proceeds. The corridor transfer staging areas will be defined by catchment boundaries as described indicatively on Figure 10. Transfers will be timed to precede any construction on adjacent development zones occurring that would affect the catchment or catchments contained within each transfer stage area.

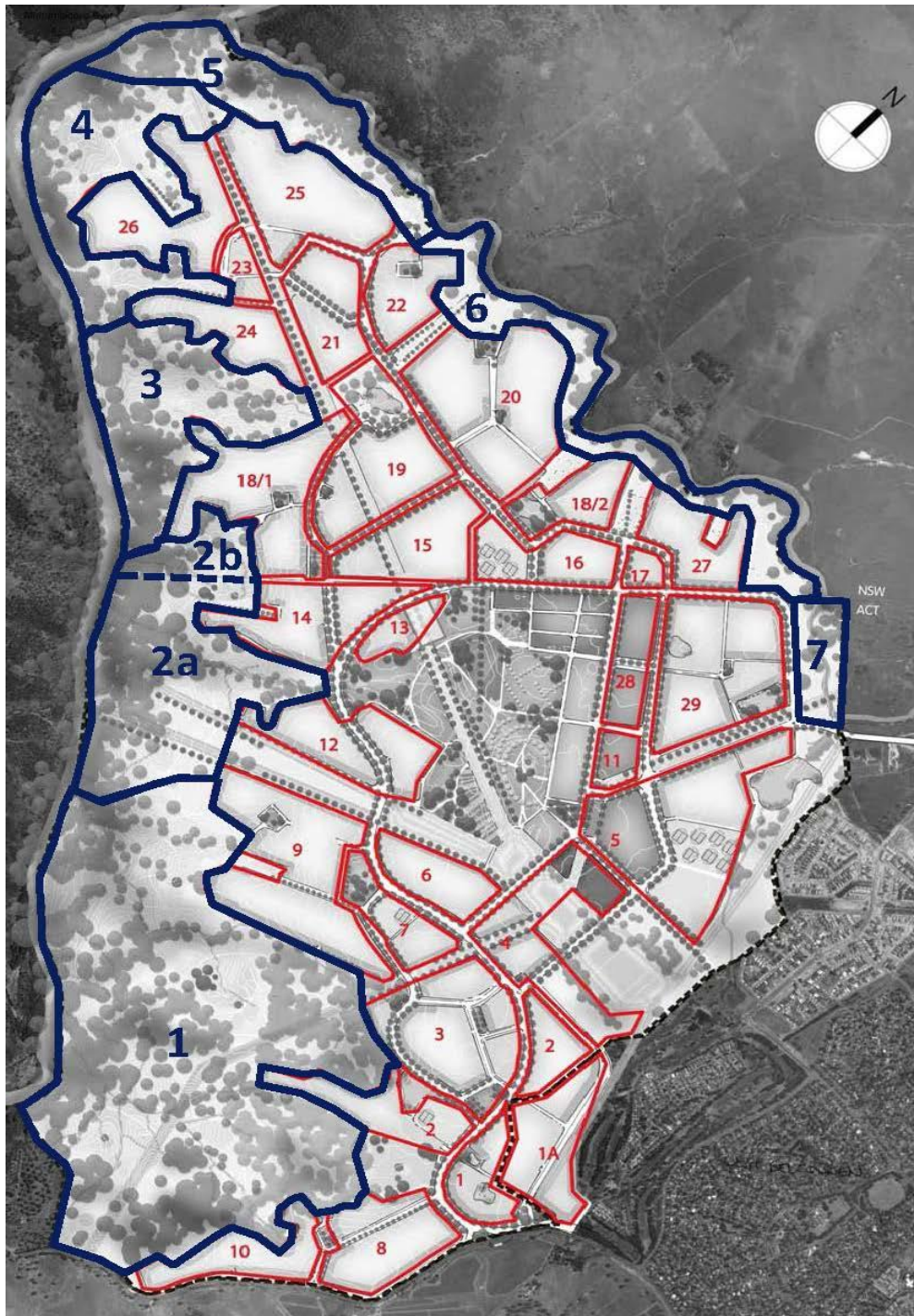


Figure 10: Conservation corridor indicative staging

3.6.2 Conservation Corridor access and activity nodes

Potential use and development options for the conservation corridor (refer to Section 3.6) are discussed in a report by McGregor Coxall that sets out proposals for the open space within the urban area and for the conservation corridor, including a draft plan for the corridor (McGC, 2014). The draft plan is at Figure 11; it provides for recreation and picnic areas, vehicular access to the River at two points and a number of unsealed tracks and trails for pedestrian and cycle access and bushfire management. This is a draft plan and will be reviewed and revised by the EMT prior to adoption as part of the RMP. Implementation of all infrastructure within the corridor, including access roads and tracks, picnic areas and visitor facilities, interpretative and other signage, fencing, and service infrastructure will adhere to the following principles:

- Recognise the importance of enhancing connectivity between MNES habitat areas.
- Ensure that there is no net reduction in total MNES habitat areas.
- The design of all infrastructure will be informed by advice from relevant scientific experts, particularly with regard to protecting and avoiding impacts to MNES and their habitat areas.
- Roads and tracks will follow existing alignments where feasible.
- Unused existing tracks will be rehabilitated to enhance connectivity between habitat areas where they fragment existing habitat areas.
- Roads and tracks will incorporate raised grating or similar design techniques to enhance connectivity between habitat areas that will be bisected or separated by a road or track.
- Vehicle track widths will be a maximum width of 6m, other tracks and trails a maximum width of 2.5m.
- Prior to development of WBCC infrastructure, site surveys of threatened flora and fauna species will be conducted and populations of threatened flora and fauna species will be avoided or impacts managed in accord with the RMP and EPBC Act.

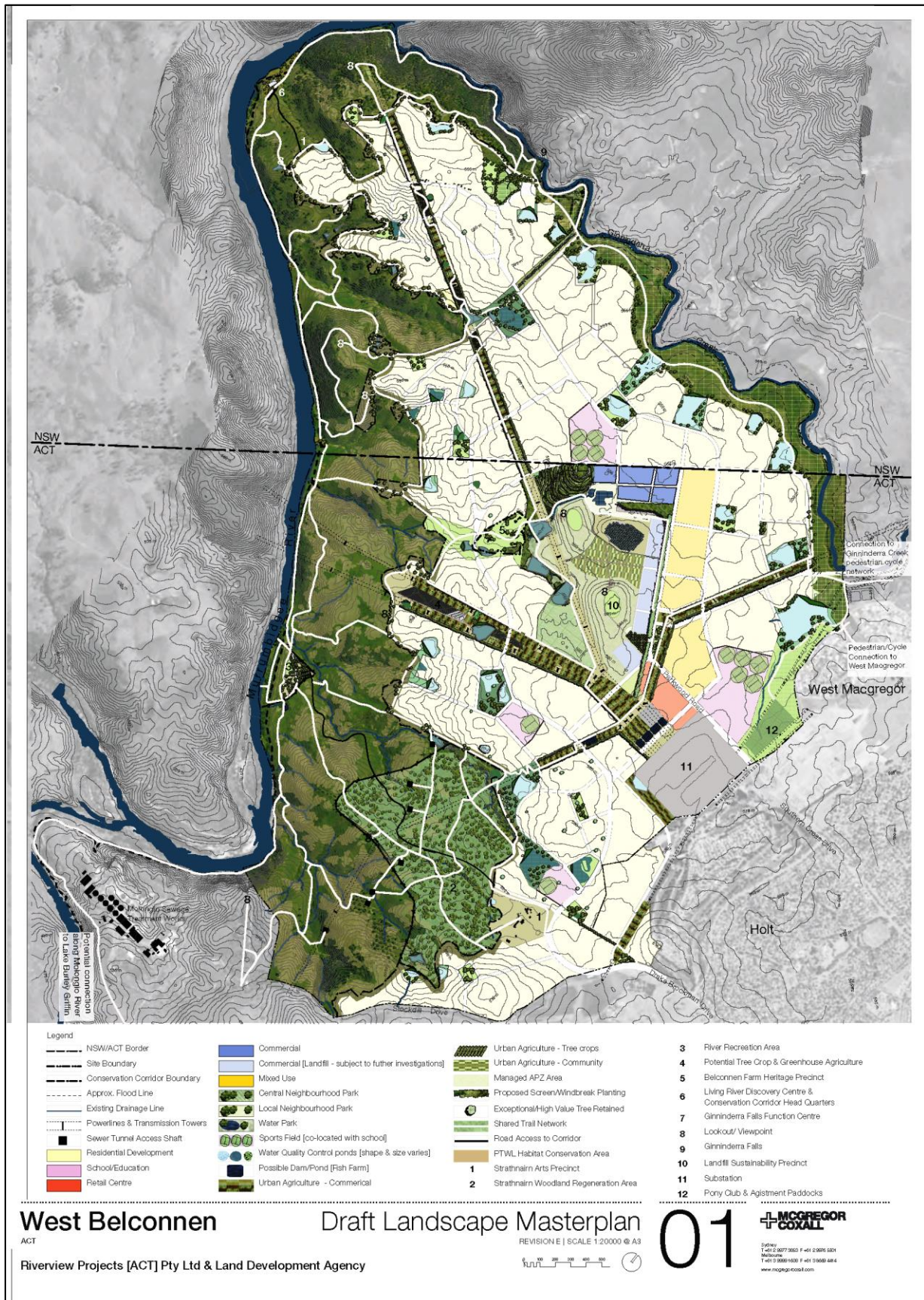


Figure 11: Conservation corridor

3.6.3 Conservation boundary relative to the Molonglo MNES report

The conservation reserve boundary shown on Figure 11 differs slightly from the area of box gum woodland identified by Hogg (2013) as shown on Figure 10. The differences are caused by two factors:

- Following finalisation of the Hogg study the boundary was refined with further on-site inspection, having regard particularly to the definition of a practical boundary for management purposes. This process is described in Ecological (June 2014) which says as follows: “The eastern edge of the proposed river and woodland reserve was determined on site through agreement of the study team and ACT government officers (from ESDD and TAMS)”.
- A small area of woodland is within the boundary of the Strathnairn property (Block 1332 Belconnen) which is excluded from the west Belconnen assessment study area.

A strict interpretation of the commitment made under The Molonglo Valley NES Plan has led to the conclusion that the plan does not provide for the type of boundary adjustment set out in the first item above, the Molonglo NES Plan commitment is as follows (Action 22):

“West Molonglo is zoned broadacre and is not part of the ACT Government’s current land release program. In the event that West Molonglo is developed in the future for broadacre uses or residential development then, subject to confirmatory ecological assessment of Box-Gum Woodland, the area of EPBC Act Box-Gum Woodland that occurs there will be set aside as a Nature Reserve.”

It is therefore necessary that the entirety of the woodland that is the subject of this assessment be placed within the river corridor/nature reserve area. The rezoning that will create the conservation corridor as described on Figure 3.2 is in train and will be finalised. In order to meet the Molonglo NES commitment the boundary will subsequently be amended to incorporate all of the woodland identified by Hogg within the reserve area (excepting the Strathnairn part, see below). This is a straightforward matter¹ and will be implemented under the provisions of Part 96A of the (ACT) Planning and Development Act (2007), which says as follows:

“96A Rezoning—boundary changes

(1) The planning and land authority may vary the territory plan under section 89 (Making technical amendments) to change the boundary of a zone or overlay if the change is consistent with—

(a) the apparent intent of the original boundary line; and

(b) the objective for the zone.

(2)”

The woodland area within the boundary of the Strathnairn block will be a matter for later consideration and action by the ACT Government, which is the owner of the land.

The outcomes discussed below take into account the boundary adjustment discussed above.

¹ Part 96A of the Act cannot be applied to leased land; block 1605 is currently leased but will be surrendered to the Territory when the land is rezoned and will become unleased territory land, it will then be able to be dealt with under Part 96A.

4.0 MNES Impacts

This section provides a detailed analysis of the MNES that have been identified as potentially being affected by the Program.

The beginning of this section provides a description of the avoidance and mitigation strategies that are used for a number of threatened communities and species under the Program. These are the WBCC and associated Management Plan, CEMPs, and Water Sensitive Urban Design (WSUD) principles.

For the purposes of this discussion, the Murrumbidgee River and Ginninderra Creek have been included within the Project Area as many actions undertaken by the Program will have impacts upon them. It should be noted however, that management measures will not occur within the aquatic areas themselves. Rather they will extend to the south bank of Ginninderra Creek and the east bank of the Murrumbidgee River, and will occur with the cooperation of the ACT and NSW Governments who have management responsibility for the aquatic areas.

4.1 Threatened Ecological Communities

The Project Area was once typified by a range of natural habitats including grasslands, woodlands, open forest, and riparian corridors. Most of the communities that were present at lower elevations (namely box gum woodland and small areas of natural temperate grassland) have been severely modified by agricultural and urban land uses post 1750. Ecological communities that occur at higher elevations and within the Murrumbidgee River Corridor have been less severely modified, and provide important habitat connectivity for threatened fauna species.

Two threatened ecological communities that are listed under the EPBC Act occur within the Project Area. These are:

- white box – yellow box – Blakely’s red gum grassy woodland and derived native grasslands (box gum woodland); and
- Natural Temperate Grassland of the South Eastern Highlands (natural temperate grassland).

Direct impacts to natural temperate grassland will be avoided by the Program of urban development and the alignment of Ginninderra Drive and is not discussed further in this section. Impacts to box gum woodland as a result of the Program are discussed below. The grassland is within the Jarramlee reserve as illustrated on Figure 12 which is extracted from the Jarramlee Offset Management Plan (ACT Government, 2013).

4.1.1 Box Gum Woodland

White box – yellow box – Blakely’s red gum grassy woodland and derived native grasslands (box gum woodland) is listed under the EPBC Act as a CEEC, and under the NC Act and the TSC Act as an EEC.

Box gum woodland has been extensively mapped and assessed within the ACT. It is considered that the distribution of the community within the ACT is generally well understood, however the knowledge of woodland quality is considered to represent a gap.

Information utilised for the identification of box gum woodland has included the following data sources:

Targeted Surveys:

- David Hogg Pty Ltd (2013) West Belconnen Woodland Areas: Confirmatory Ecological Assessment;
- KMA (2014) Ecological Studies West Belconnen Australian Capital Territory; and
- KMA (2009b) West Belconnen Project ACT and NSW Land Flora and Fauna Studies.

Information in the David Hogg Pty Ltd (2013) assessment was prioritised as it is the most recent, was conducted at the Project Area scale, and utilised the EPBC Act definition of box gum woodland to identify patches.

Subsequent to the detailed analysis by David Hogg Pty Ltd (2013), KMA (2014) undertook further targeted validation of vegetation boundaries in collaboration with ACT Government specialists. This resulted in slight amendments to the extent of the woodland community as previously mapped such that a total of 72 hectares is considered to be present within the Project Area. This figure includes approximately 3.8 hectares of vegetation assumed to be box gum woodland on a precautionary basis within the Drake Brockman Drive corridor and the remaining 68.2 hectares associated with the west Molonglo component of the Project Area.

As a consequence of this, the concept master plan for the Program was developed in order to avoid all direct impacts to the West Molonglo Woodland community (as defined in the Molonglo Valley NES Plan discussed at Section 2.2).

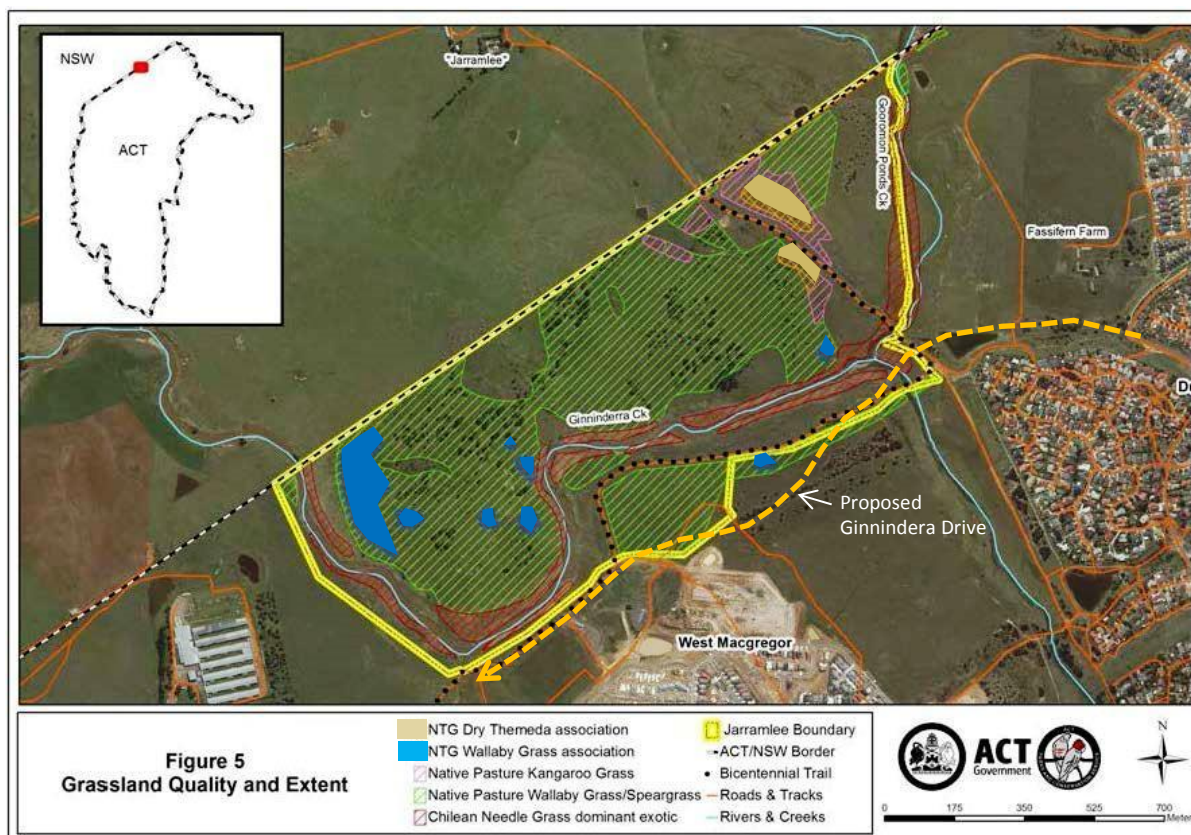


Figure 12: Jarramlee reserve grasslands

Direct, Indirect, Cumulative, and Facilitated Impacts

Indirect impacts that may affect retained box gum woodland within the Project Area include edge effects, weed invasion, and changes in hydrological conditions that could affect species composition.

Cumulative impacts to retained box gum woodland may arise from increased public access to the WBCC and the introduction of associated services and infrastructure. These may lead to damage to the understorey and regrowth success, invasive species introduction, eutrophication and other pollution. The provision of visitor infrastructure may also facilitate further impacts in the foreseeable future, as it promotes the use of the WBCC for recreational purposes and makes it more accessible to the public.

Measures to Avoid and Mitigate

Impacts to box gum woodland will be avoided by inclusion of all existing patches as mapped by KMA (2014) within the WBCC. The WBCC will connect the remnant box gum woodland to forest and woodland patches along the Murrumbidgee River and Ginninderra Creek. The WBCC RMP will also contain provisions to enhance the quality of this woodland in the long-term.

Impacts (indirect and cumulative) that will occur within the WBCC as a result of recreational activities, increased public access, and service delivery (e.g. sewerage pipes) will be avoided during the design and planning phase, and mitigated through CEMPs and the WBCC RMP.

Indirect impacts to retained box gum woodland from the urban development component of the Program will be mitigated through the implementation of CEMPs, WSUD principles, and the WBCC Management Plan. These processes are outlined in more detail in Section 5.0 of this report. Actions specific to box gum woodland protection will include:

- WSUD principles:
 - Stormwater flow retardation based on geotechnical, surface water, and groundwater assessments to reduce impacts to hydrological systems.
- CEMPs that:
 - Define clearing procedures and boundaries, including the retention of selected significant trees, clearing outside of threatened bird breeding seasons, and fauna rescue procedures.
 - Implement weed management during construction.
 - Enforce sediment and erosion controls to prevent site run-off during construction.
- WBCC RMP:
 - ongoing habitat improvement;
 - ongoing quality monitoring; and
 - avoidance of box gum woodland patches.

These plans will be prepared prior to construction commencing in accordance with relevant guidelines.

Facilitated impacts within the WBCC will be avoided or mitigated by the WBCC RMP.

Measures to Offset Impacts

Impacts on the 3.8 hectares Drake Brockman Drive woodland patch will be offset by enhanced management of the West Molonglo patch to achieve biodiversity outcomes over and above the requirements of the Molonglo NES Report.

Upon approval of the Program, measures to transfer the entirety of the WBCC into secure tenure and conservation zoning will be implemented in addition to the commencement of management consistent with the Program objectives. A further twenty years has been allowed for in order to implement management practices that will enhance the site condition by targeting diversity of ground layer vegetation, condition in relation to the prevalence of non-native species and improvements in structure by encouraging natural and assisted regeneration of currently degraded sections. The entire area of box gum woodland within the WBCC will be subject to offsetting actions under the Program, above the commitment by the Molonglo Strategic Assessment which proposed only to protect the woodland from future development. The modest improvement in quality is achieved by targeting site condition. This would result in a wider extent of box gum woodland that is recognisable by its woodland form as opposed to the derived native grassland, a reduced incidence of non-native species and an increase in the diversity of associated diagnostic flora species.

4.2 Threatened Fauna

This section provides a detailed discussion of the potential impacts of development on the threatened fauna species considered likely to be affected by the Program.

4.2.1 Birds

Five bird species listed as threatened under the EPBC Act were identified as having the potential to be affected by the Program. These were Australian painted snipe, regent honeyeater, swift parrot, superb parrot and painted honeyeater. Impacts to these species are assessed together in the following section due to the impacts and the avoidance, mitigation, and offset measures being the same for each species.

Information utilised for the identification of threatened bird species has included the following data sources:

- Targeted Surveys:
 - KMA (2013b) West Belconnen Woodland Project ACT and NSW Land Targeted Bird Surveys;
 - KMA (2014) Ecological Studies West Belconnen Australian Capital Territory;
 - KMA (2013a) West Belconnen Project NSW Land Flora and Fauna Studies;
 - KMA (2009b) West Belconnen Project ACT and NSW Land Flora and Fauna Studies; and
 - Geoff Butler and Associates (2000) The Revegetation of Ginninderra Creek Between Barton Highway and Macgregor, ACT.

Information in the KMA (2013b) assessment is the most recent and targeted assessment of avian diversity within the Project Area and also targeted the threatened species of interest to this assessment.

Direct, Indirect, Cumulative, and Facilitated Impacts

The Program will impact woodland vegetation of low quality, none of which meets the criteria to be considered box gum woodland in accordance with the EPBC Act. It will also result in the loss of selected mature trees across the Project Area (both within and outside of the WBCC).

The forest, woodland, and riparian areas to be protected within the WBCC will potentially be impacted (indirectly and cumulatively) by increased public access, recreational activities, and service provision (including maintenance). These may result in localised removal or damage to habitat structures (e.g. fallen timber, river banks), pollution, increased disturbance due to human presence and activities, and invasive species introduction. However, as a consequence of the comprehensive approach to planning the proposed development in addition to the geographic and topographic characteristics of the Project Area, there are unlikely to be additional developments facilitated by implementing the Program beyond the program area. The primary impacts to woodland birds and Australian painted snipe as a consequence of the proposed action relates to indirect impacts within the riparian corridor and WBCC, in general as a result of activities already identified.

Indirect impacts from the urban development component of the Program that may affect threatened bird species include edge effects, weed invasion, and changes in hydrological conditions. While the Program commits to 100 percent containment of cats there may also be the chance of occasional disturbance and predation by other unrestrained domestic animals.

Measures to Avoid and Mitigate

The primary avoidance strategy with regards to habitat for threatened bird species is creation of the WBCC. Detailed planning of the urban open spaces will also result in the retention of a range of mature trees and as part of a mitigation plan, will enhance the value of retained trees with an open space tree management and replacement strategy.

Potential impacts to habitat values in the WBCC as a result of increased public access, recreational activities, and service delivery (e.g. sewerage pipes) will be avoided during the design and planning phase, and mitigated through the implementation of CEMPs and the WBCC RMP. This management plan will be overseen by a single entity proposed to be under a trust structure that coordinates management of values in both the ACT and NSW parts of the Project Area.

Indirect impacts from the urban development component of the Program will be mitigated through implementation of CEMPs, WSUD principles, and the WBCC RMP. This process is outlined in more detail in Sections 5.0 and 6.0 of this report and Sections 4.0 and 5.0 of the Strategic Assessment Report. Specific actions targeting impacts to birds including threatened species involve:

- WSUD principles based on geotechnical, surface water, and groundwater assessments that:
 - retard stormwater flows and the increased run-off from the urban development area before they enter the WBCC. This will minimise the impact of altered hydrological regimes on vegetation upon which avifauna will rely; and
 - provide suitable wetland habitat for water birds where appropriate.
- Mitigation actions during the construction phase implemented through CEMPs prepared prior to construction commencing in accordance with relevant guidelines:

- Definition of clearing procedures and boundaries that include the retention of trees; avoid with appropriate buffers threatened bird species nesting trees; clear outside of threatened bird species' breeding seasons, and outline faunal rescue procedures.
- Recovery and beneficial use for the purpose of fauna habitat enhancement of fallen timber, including logs and tree sections containing hollows.
- Invasive species management.
- Sediment and erosion controls to prevent site run-off.
 - Operation phase management including:
 - Domestic pet containment policies within the proposed residential development.
 - Ongoing management actions as outlined in the WBCC Management Plan.

Facilitated impacts will be avoided or mitigated through the implementation of the WBCC Management Plan.

4.2.2 Fish and Amphibians

Three species of EPBC Act threatened fish species were identified as having the potential to be impacted by the Program. Macquarie perch and trout cod are listed as endangered, and Murray cod is listed as vulnerable. One EPBC Act listed amphibian – Booroolong frog (endangered) may also be affected by the Program.

There has been no detailed assessment of the presence of fish or amphibian species within the Project Area (inclusive of the relevant reaches of the Murrumbidgee River and Ginninderra Creek). ACT and Australian Government landscape and regional scale mapping and survey databases were examined as outlined below:

- ACT Government (2015a) ACTmapi ACT Government Online Interactive Maps;
- ACT Government (2007) Action Plan No. 29 Ribbons of Life: ACT Aquatic Species and Riparian Zone Conservation Strategy; and
- Australian Government (2015b) Species Profile and Threats Database.

Records within these data sets only indicate presence, not absence. Where no records of a species within the Project Area were identified, details of habitat preference and location of the nearest known populations were used to determine the likelihood of occurrence.

Direct, Indirect, Cumulative, and Facilitated Impacts

As the Program does not include works within the Murrumbidgee River or associated creeks it will not directly impact threatened fish or amphibian species.

Indirect impacts may occur from increased public access (and its associated infrastructure) into the Murrumbidgee River and Ginninderra Creek for recreational purposes including an increased incidence of recreational angling, and the proposed urban development upstream in accordance with the concept master plan. These impacts include changes to hydrology (increases in run-off and associated changes to flow regimes), increased erosion and stream incision, sedimentation, pollution, weed invasion, and habitat disturbance. With respect to Booroolong frog, this may also include the inadvertent introduction of chitrid fungus from increased human presence. The RMP will include provision for monitoring frogs and include measures to manage the risk of Chitrid introduction.

Facilitated impacts that may be foreseeable include increased public access into and use of the WBCC however these are generally included in the range of activities proposed within the river corridor. These will result from the introduction of infrastructure that will increase ease of access and encourage recreational use of the riparian areas within or adjacent to the WBCC.

Measures to Avoid and Mitigate

Direct impacts to threatened fish and amphibian species will be avoided by the Program.

Indirect and cumulative impacts to threatened fish and amphibian species will be managed through the implementation of a number of mechanisms:

- WBCC RMP Plan to be implemented prior to allowing public access to include reference to:
 - Controls on recreational fishing such as bag limits, prohibitions on taking certain species, and licensing requirements in line with those that already exist within the ACT and NSW.
 - Controls to public access and use of the riparian areas post construction.
 - Incorporation of WSUD principles into the Master Plan that aim to:
 - maintain stormwater run-off to acceptable levels; and
 - treat urban runoff to reduce urban pollutants to acceptable levels before discharge to the Murrumbidgee River or Ginninderra Creek.
 - Implementation of CEMPs to be prepared prior to construction commencing, in accordance with relevant guidelines. CEMPs will target among other environmental values:
 - erosion and sediment controls;
 - water treatment standards before release in the Murrumbidgee River or Ginninderra Creek;
 - flow controls;
 - pollution and waste management; and
 - avoidance of riparian habitat areas.

Facilitated impacts have been anticipated by the Program, and will be avoided or managed through the WBCC Management Plan.

4.2.3 Golden Sun Moth

Golden sun moth is an EPBC Act critically endangered species that historically occurs in natural temperate grasslands and open grassy woodlands. Flying season generally runs from late spring into early summer, though exact timing varies depending upon weather conditions. During this time adults live for up to four days after they emerge, and males fly over the grassland in search of females. Its habitat requirements are very specific as its larvae feed only on the roots of C3 grasses (namely wallaby grasses, spear grasses, and the exotic Chilean needle grass), and females require bare ground between tussocks from which they display.

Targeted surveys for golden sun moth and its required habitat have been conducted throughout the Project Area (Rowell 2013 and 2015), the Jarramlee offset (Biosis, 2015; ACT Gov't 2013), and the Macgregor offset (Braby 2005).

Information utilised for the identification of golden sun moth habitats has included the following Targeted Surveys:

- Rowell Ginninderra Drive extension golden sun moth Surveys (Rowell A. , 2015);
- Rowell West Belconnen golden sun moth Surveys (Rowell A. , 2013);

Current Condition and Threats

Prior to European settlement the species was widespread throughout southeast Australia; occupying primary and secondary native grasslands and open woodland. Now, it is estimated that less than one percent of this habitat remains; and the species is only found in a few small areas within its historical range (Rowell A. , 2013).

Within the broader west Belconnen area, there are several populations known along Ginninderra Creek and its tributaries. These occur on the north-eastern boundary of the Project Area and denote the western limit of ACT golden sun moth distribution (Rowell A. , 2013). In 2010, David Hogg Pty Ltd (David Hogg Pty Ltd, 2010) classified habitat throughout Canberra, based on vegetation quality and patch size. Whilst new populations have been identified since this study, it established the importance of the broader west Belconnen area populations for the region.

Direct, Indirect, Cumulative, and Facilitated Impacts

Rowell (2013) identified areas of land within the Project Area as being potentially suitable for golden sun moth, but unoccupied now and never having been known to be occupied. This land will be directly impacted by the urban development of the Program. Some low quality patches will be avoided by their placement within the WBCC, however this is due to other environmental values they hold (e.g. secondary box gum woodland). These unoccupied areas are considered unlikely to be utilised by golden sun moth in the future as a result of separation distance from the nearest golden sun moth populations. Owing to the limited dispersal ability of females it is highly unlikely recolonisation of areas formerly occupied will occur naturally. Therefore impacts to these areas are not considered to be of relevance to golden sun moth (Rowell A. , 2013).

Direct impacts to occupied habitat for the species will occur as a result of the Ginninderra Drive extension. Whilst the areas with the greatest densities of golden sun moth within the existing offset areas will be avoided, the current preferred alignment (route 5) is proposed to remove 0.85 hectares of golden sun moth habitat. A further 0.96 hectares of habitat may be affected as a result of overshadowing by the proposed bridge over Ginninderra Creek. The total impact will therefore be in the order of 1.8 hectares of golden sun moth habitat affected. There are unlikely to be any facilitated impacts as a result of the Program that will affect golden sun moth.

As shown in Figure 13 direct impacts resulting from the preferred alignment are minimised by route selection. The bridge is indicated by the grey section within which direct impacts from construction will be limited to the driving of piles in order to support the bridge with smaller areas of habitat removed as a result of the construction. The estimates of impact to habitat have been based on the footprint design with the addition of a further two metres buffer to account for access and other unavoidable impacts during construction.

As noted above, the alignment of the Ginninderra Drive extension has also been selected to correspond with an area that does not support golden sun moth as a result of tree plantings that are now well established. Golden sun moths are absent from this area potentially as a result of reduced grass growth under the trees and the barrier to flight created by the trees themselves. During the most recent surveys (Rowell A. , 2015) in addition to earlier assessments, there were no moths observed flying through this area of tree plantings supporting the conclusion that it presently represents a barrier to movement between proximate areas of habitat.

The bridge design has considered minimising impacts to golden sun moth habitat connectivity and appreciation for the Chilean needle-grass paradox. The height of the bridge is proposed to be in the order of four metres above ground level at the point where it crosses Ginninderra Creek and the location where golden sun moth numbers are their highest along the alignment. This design option seeks to mitigate the potential impact of introducing an overhead structure which may impact the willingness for flying moths to move under the bridge. In comparison to the current situation in the Macgregor offset where the tree plantings are, the bridge scenario differs in at least one important aspect. Habitat on the other side of the trees may not be visible to the moths, plus the obstacles the trees are likely to represent at flying height will limit the ability of moths to traverse the woodlot. The bridge by comparison will have a clear view from one side to the other with the only obstructions being the piles spaced at 50 metre intervals and the overhead structure itself which will be above usual moth flying height.

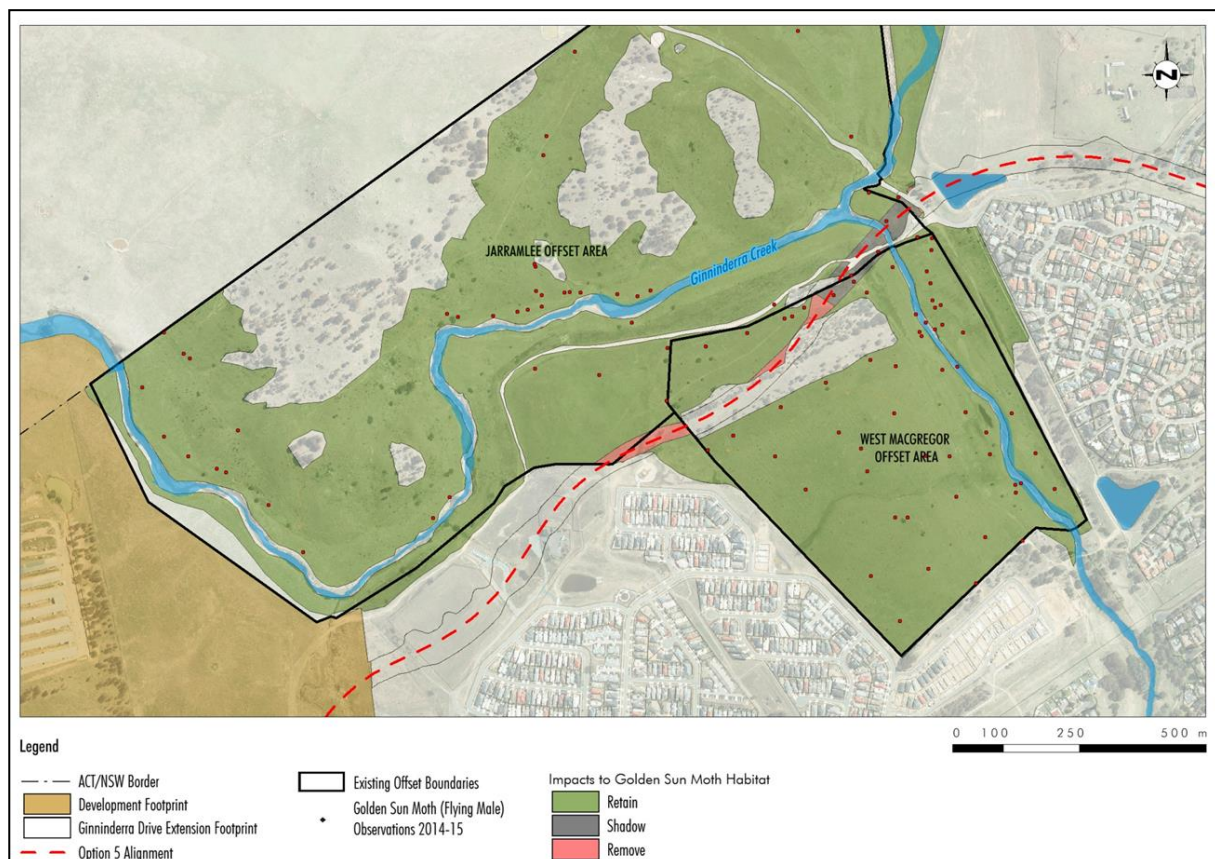


Figure 13: Ginninderra Drive impacts

Measures to Avoid and Mitigate

Selection of the proposed Ginninderra Drive extension alignment has been based on a comprehensive assessment of alternative alignments from the perspective of social, economic and environmental values. In general it was found that:

- The alternative of not constructing the Ginninderra Drive extension results in no impacts to golden sun moth, however has significant adverse impacts to the environment and overall sustainability as a result of increased travel time, compromised public transport options, and upgrades to existing infrastructure that are necessary to support the increased traffic volumes. This avoidance strategy is unacceptable.
- To completely avoid impacts to the existing offset areas and the golden sun moth habitat it supports will have unacceptable impacts to community values in terms of aesthetics and noise by constructing an arterial road within the power easement in a location where original planning for the affected communities did not allow for vehicle noise and where the construction of a road immediately adjacent to power line towers poses a safety risk.
- Minimising the area of golden sun moth habitat affected by following the existing alignment of the Jarramlee homestead access road resulted in significant engineering costs (two bridges plus cut and fill due to terrain) and also had the effect of impacting other values for MNES such as woodland birds and natural temperate grassland while still resulting in fragmentation of golden sun moth habitat.
- Alternatives that included minor variants to the preferred option also had the effect of either increasing the footprint of the road construction over golden sun moth habitat or increasing other social and/or economic impacts.
- The preferred option represents the optimal outcome from a triple bottom line perspective.

By considering direct impacts to golden sun moth habitat throughout the design phase of the Ginninderra Drive extension, impacts to habitat along Ginninderra Creek have been minimised by selecting an alignment that coincides with unsuitable habitat (see Section 3.2.1 and Figure 13) as defined by the presence of tree plantings. Given characteristics of all the other options, no other avoidance option is considered feasible.

Design features of the road and treatments following the conclusion of construction activities are also aimed at mitigating the impact of the road. Such treatments include landscaping with native grass species in order to restore golden sun moth habitat to sections that are 'at grade'. It is also proposed to remove all trees within the area that presently do not support golden sun moth in the Macgregor offset. The planting of trees in this area has reduced viability of the habitat although the ground layer vegetation in this area retains the necessary native grasses that would otherwise be suitable for golden sun moth. By restoring this area to grassland, the Program seeks to mitigate a component of the impact of habitat removal and improve the potential for movement across the road to occur in the future. As the construction of the Ginninderra Drive extension is unlikely to be required for about 20 years after commencement of the proposed action, it allows for a substantial period during which habitat enhancement can be undertaken in order to minimise the magnitude of direct impacts.

Detailed design of the extension will also provide opportunities for mitigating direct and indirect impacts as a result of changes to hydrology and the design standard of the road. This would be carried through into the construction phase for which the implementation of a CEMP would ensure there are no inadvertent impacts to adjacent habitat that is not within the footprint of the construction area. This will also include anticipating and managing the potential effects of weed invasion through the construction and operation phases as a result of poor site hygiene and landscaping species selection. Road mortality is unlikely to be a significant threat to the local population however may be the cause of death for an occasional moth.

It is also proposed that upon approval of the Program, the management plans for Jarramlee and Macgregor West will be consolidated and incorporated into the Reserve Management Plan (RMP) in order to simplify management of golden sun moth and other environmental values. While this is effectively an administrative mitigation measure, the simplified approach to ongoing management will reduce overhead costs of maintaining separate reporting, monitoring and review processes. This will lead to a reduced proportion of available resources being expended on measures that have no direct benefit on the environmental values of the affected area.

It is also proposed as part of the overall conservation works within the environmental offset area to enhance connectivity between the existing habitat patches supporting golden sun moth and other patches supporting the species. This will also be accompanied by stream bank restoration along Gooromon Ponds Creek as part of a riparian strategy that extends from the Murrumbidgee River, along Ginninderra Creek and further on Gooromon Ponds Creek up to Wallaroo Road. This will

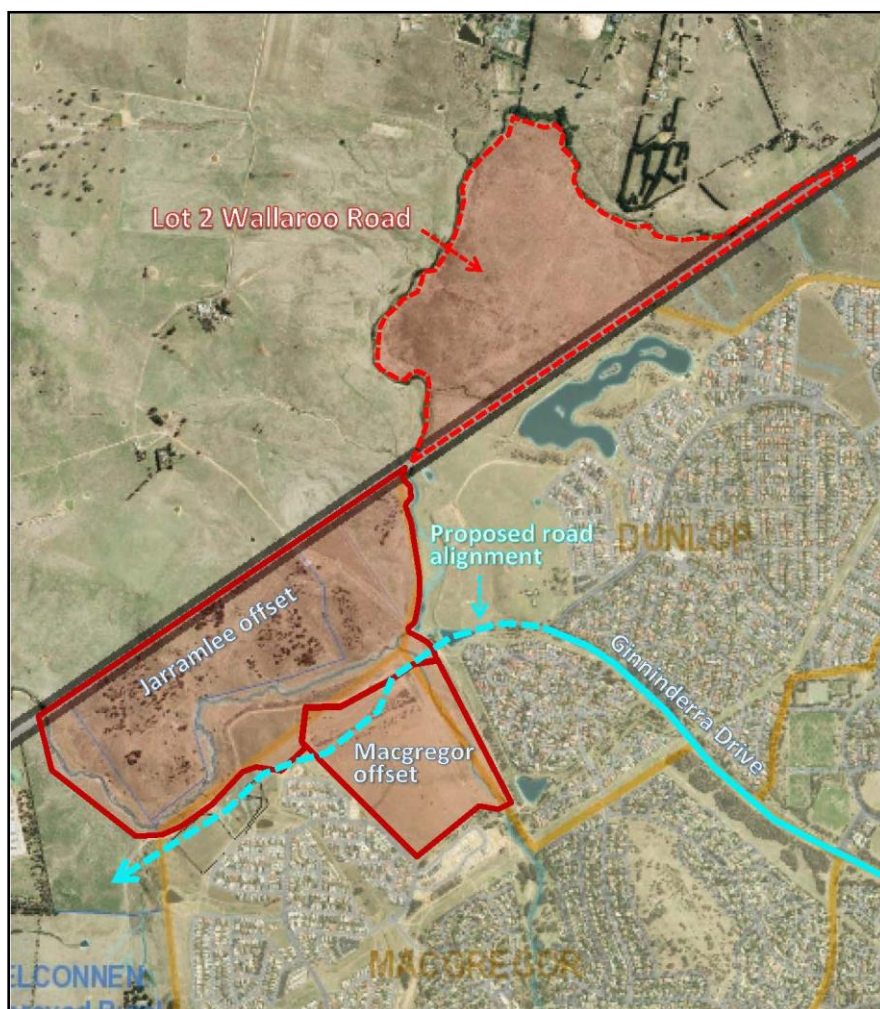


Figure 14: Environmental offset areas

further enhance the environmental outcomes of the Program by addressing a regional connectivity objective to improve linkages along the western side of the ACT, between the northern woodlands and the Murrumbidgee River.

Measures to offset impacts

Field research by Rowell (Rowell A. , 2015) has confirmed the presence of a substantial population of golden sun moth on a parcel of land in NSW adjacent to the ACT border and in close proximity to the Jarramlee reserve – Lot 2 Wallaroo Road, which totals some 86.8 ha.in area (Figure 14). The site includes 11.9 ha of land currently occupied by GSM and a further 19.4 ha suitable for GSM but currently unoccupied. The ACT Government has purchased this land to use it as an environmental offset against the impacts on 1.8 Ha of golden sun moth habitat that will be caused by the Ginninderra Drive extension. The new site (Lot 2) will be managed in combination with the West Macgregor and Jarramlee reserves as a single complex. The objectives of the existing reserves as well as those to be formulated for the additional site will be incorporated in the RMP. There is potential for this offset area is rezoned as E3 Environmental Management as part of the overall NSW West Belconnen rezoning process.

4.2.4 Pink-Tailed Worm-Lizard

Pink-tailed worm-lizard is listed as vulnerable under the EPBC Act, the NC Act, and the TSC Act. It is most commonly found sheltering under small, shallowly embedded rocks where it may remain for long periods.

Information for the assessment of impacts to pink-tailed worm-lizard predominantly used data from targeted surveys conducted by Osborne and Wong (Osborne & Wong, 2013) throughout the Project Area, which also incorporated results from previous surveys.

Quality of habitat was determined by the level of disturbance at a site. Suitable habitat was ranked as either high or moderate and contained areas that were well drained, with a partial cover of 10 – 30 centimetre, igneous or metamorphic embedded rocks. Highest quality sites were dominated by kangaroo grass and other disturbance sensitive species. Moderate quality sites contained a less diverse ground cover, usually dominated by wallaby or spear grasses and had a lower abundance of native forb species. Low quality habitat was considered to be highly disturbed and degraded and would be likely to no longer support the species.

The maps produced by Osborne and Wong (2013) did not delineate high and moderate quality habitat due to the large amount of fragmentation of high quality habitat across the Project Area. Both habitat types have thus been treated equally within this impact assessment.

Direct, Indirect, Cumulative, and Facilitated Impacts

There is a total of 162.1 hectares of pink-tailed worm-lizard habitat within the Project Area. Of this area, approximately ten percent will be affected by the proposed action comprising 10.1 hectares of high/moderate quality habitat and 6.2 hectares of low quality habitat. Of these areas, a number are uninhabited however display attributes conducive to the species requirements. Table 3 summarises the split between quality and impact of the Program on pink-tailed worm-lizard habitat.

Table 3: Summary of impacts on Pink-tailed Worm Lizard habitat (Ha)

	Avoided	Impacted	Total
High Quality	141.3	10.1	151.4
Low Quality	4.5	6.2	10.7
Total	145.8	16.3	162.1

The areas affected by the urban footprint are generally small and isolated and have therefore been assessed as not playing an important role in the overall population's viability. They have been mapped as 176 discrete patches with an average area of 0.09 hectares, only three of which exceed one hectare and none exceed 1.4 hectares in size. However, it has been noted in a general sense by Osborne and Wong (2013) that:

Although the long-term survival of such small populations is very unlikely – it does indicate that small isolated patches of habitat should still be considered if these areas are subject to further development. Moreover if the patches occur close together they may act as a corridor for movement through poorer quality parts of the landscape. This highlights the importance of such small and less obvious habitat patches in maintaining connectivity and assisting in the long-term conservation of the species. Small patches located at important points in the landscape are likely to be important (for example near and within the Lower Molonglo Water Quality Control Centre and in the extreme north of the study area near Ginninderra Creek). It is very likely that they will act as steppingstones between larger areas of occupied habitat.

Indirect impacts to the habitat retained within the WBCC potentially include edge effects such as weed invasion, changes to hydrological conditions, pollution, and sedimentation and erosion.

Cumulative impacts will arise from increased public access to the WBCC for recreational purposes. The provision of infrastructure and services to accommodate visitor use combined with the promotion of the area as an important aspect of the lifestyle and identity of the west Belconnen community will facilitate further impacts in the foreseeable future as access and use are increased.

As a result of the alignment selected for the sewer construction, additional impacts to pink-tailed worm-lizard habitat will not occur. Disturbance to small areas (20m x 20m) to enable tunnelling and shaft construction will occur. The access to the shaft locations and construction sites, have been located in order to avoid direct impacts on habitat areas.

Measures to Avoid and Mitigate

The boundary of the WBCC has been designed so that the vast majority of pink-tailed worm-lizard habitat will be avoided and subsequently protected under the Program. Direct impacts to approximately 16 hectares of habitat from the installation of sewer pipes through the WBCC have also been avoided through the choice of construction method and alignment options.

Direct impacts (clearing 16.3ha) to the areas of habitat within the footprint of the proposed urban area are not considered important for maintenance of the local population due to the low occupancy rates of these small and isolated patches and the likelihood that they do not contribute to the gene pool of the rest of the population. Following the conclusions of Osborne and Wong (2013)

such areas may retain importance for pink-tailed worm-lizard however given the spatial arrangement of these affected patches of habitat within the Project Area, they are unlikely to be considered important.

Patches that may provide “stepping stone” connectivity to the north and south are included in the corridor; these are considered to be significant by Osborne and Wong who say (in the summary to their report):

The extensive habitat found along the Murrumbidgee River Corridor, including the more isolated patches that form “stepping stones” through the landscape in NSW, provide a link with the rugged, rocky woodlands near Ginninderra Falls (Hyles property). To the north of Ginninderra Creek there is a potential link through private properties to the few poorly known sites that have been found north of this area near the Murrumbidgee River. To the south, the large population in the Murrumbidgee Corridor links directly with the regionally important populations along the Molonglo River in the ACT.

The majority of pink-tailed worm-lizard habitat is retained within the WBCC on steeper slopes and in areas that have a substantially better quality of understorey vegetation.

Areas retained within the WBCC may also be subject to limited indirect impacts as a result of developing recreational and management infrastructure such as walking trails and access tracks. Where such development occurs, design will need to ensure connectivity between patches is not compromised. Connectivity is likely to be severed by expanses of bare ground, paved surfaces (including pathways) and while there is already likely to be an element of fragmentation from the existing farm track network, objectives of the RMP will include measures to enhance connectivity through design responses that adopt a philosophy of avoidance and mitigation and rehabilitation.

Areas of habitat have been included within the development footprint as a result of a process of design including consideration of the longer term viability of small isolated patches, feasibility of their management for conservation values and determining an optimal configuration for retention of areas of conservation value. The avoidance strategy has incorporated all medium-high quality habitats in the WBCC in a configuration that minimises management costs and the risk of failure.

Indirect impacts to pink-tailed worm-lizard will be mitigated through the implementation of a number of mechanisms:

- WBCC RMP (refer also to Section 3.6):
 - controls to guide public access within the WBCC;
 - controls of permitted activities within the WBCC;
 - implementation of measures as appropriate that are prescribed by the ACT Government’s Action Plan 29 (ACT Gov’t 2007) and recovery planning documents specific to pink-tailed worm-lizard ((ACT Government, 1995) (NSW Government, 2015c) (ACT Government, 2007), and Australian Government Conservation Advice;
 - consideration of pink-tailed worm-lizard habitat when designing infrastructure and services, including maintaining an effective buffer around known populations; and
 - implementation of habitat improvement strategies (such as controlled grazing and fire management) targeting pink-tailed worm-lizard.
- Incorporation of WSUD principles into the Master Plan to maintain stormwater run-off and associated pollutants to acceptable levels or better.

- Implementation of CEMPs, particularly targeting
 - erosion and sediment controls;
 - water treatment standards before release;
 - flow controls;
 - pollution and waste management; and
 - avoidance of riparian habitat areas.

CEMPs will also be prepared to guide pre-construction activities such as geotechnical sampling and ensuring direct and indirect impacts to sensitive areas are avoided. The primary risks during these activities are from uncontrolled vehicle access and discharge of sediment laden water from the drilling process or as runoff from excavated soil. Best practice measures to manage the potential effects from these activities will be incorporated in to the CEMPs.

These mechanisms will be developed prior to construction and public access to the WBCC beginning. Cumulative and facilitated impacts will be avoided or mitigated through the WBCC RMP.

Measures to Offset Impacts

The entirety of the avoided area of habitat will be brought into the 549.9 hectare WBCC and managed as a conservation area. This is comprised of numerous patches of habitat separated by areas of native vegetation within the river corridor and currently by exotic pastures across the proposed urban development area.

Without the proposed offset, the calculations predict a decline in quality of the pink-tailed worm-lizard habitat. This is based on the encroachment of weeds and an associated change in diversity, particularly within areas along the upper slope, nearer to the pasture. As a result of the change in the management there will be improvements to habitat quality variables due to a decrease in threats and weed management in addition to increased certainty from the transition to conservation zoning.

It is the intent of the Program to establish the WBCC with a formalised plan for recreation that will direct human activity away from areas of greatest ecological sensitivity such as pink-tailed worm-lizard habitat. This concept will be effective in avoiding incursions into areas of ecological value. With implementation of the management plan and avoidance of pink-tailed worm-lizard habitat on the layout of the proposed facilities and movement corridors (e.g. vehicle access, walking trails, etc.), the effect of any future recreation is likely to be negligible.

4.3 Threatened Flora

Five flora species listed as being either endangered or threatened under the EPBC Act were identified as having the potential to be impacted by the Program. Small purple pea, Tarengo leek orchid, and Hoary sunray are all listed as endangered; Pale pomaderris and Austral toadflax are both listed as vulnerable under the EPBC Act.

Despite none of these species being known to exist within the Project Area it is considered likely that Small purple pea, Pale pomaderris and Austral toadflax occur and that there is potential habitat for Tarengo leek orchid and Hoary sunray.

In the following section, impacts to these species will be discussed together as the impacts and the avoidance, mitigation, and offset measures are the same for each species.

Numerous flora and vegetation assessments have been undertaken within the Project Area. Earlier studies focused on classifying vegetation types to guide future, more targeted flora surveys that occurred on the developable land.

Information utilised for the identification of threatened flora species has included the following data sources:

- Targeted Surveys:
 - KMA (2014) Ecological Studies West Belconnen Australian Capital Territory;
 - KMA (2013a) West Belconnen Project NSW Land Flora and Fauna Studies;
 - KMA (2009a) Further Flora and Fauna Studies: Land at West Molonglo and Ginninderra Creek New South Wales Australian Capital Territory;
 - KMA (2009b) West Belconnen Project ACT and NSW Land Flora and Fauna Studies;
 - David Hogg Pty Ltd (2013) West Belconnen Woodland Areas: Confirmatory Ecological Assessment; and
 - Geoff Butler and Associates (2000) The Revegetation of Ginninderra Creek Between Barton Highway and Macgregor, ACT.

Direct, Indirect, Cumulative, and Facilitated Impacts

There are no known threatened flora species within the Project Area; therefore there will be no direct impacts expected to these species. Areas of potential habitat include the woodland or riparian areas that would be protected by the WBCC and therefore not directly impacted by the Program.

Indirect impacts from the Program that may affect the WBCC include edge effects such as weed invasion and changes to microclimates, changes to hydrological conditions, fire regimes, pollution, sedimentation, and erosion.

Cumulative and facilitated impacts to threatened flora habitat may occur as a result of increased public access to the WBCC for recreational use. These may include disturbance and destruction of habitat from the provision of infrastructure, pollution, and damage to plant growth as a result of informal track creation.

Measures to Avoid and Mitigate

All potential threatened flora habitats within the Project Area will be avoided and protected by the creation of the WBCC.

Indirect impacts to the WBCC will be managed through the implementation of CEMPs during the construction phase, WSUD principles within the Master Plan, and the WBCC RMP during the operational phase of the Program. These mechanisms should specifically include:

- Implementation of CEMPs, particularly targeting
 - prescriptions for pre-clearing surveys for listed species prior to the commencement of any construction activities such that further avoidance and mitigation measures can be incorporated where cost effective and practicable;
 - erosion and sediment controls;

- water treatment standards before release;
- flow controls;
- pollution and waste management;
- weed management;
- appropriate definition of clearing boundaries; and
- avoidance of the WBCC.
 - Appropriate storm water management based on geotechnical, surface water, and groundwater assessments and WSUD principles to reduce impacts to hydrological systems.
 - WBCC RMP:
- controls to public access and use of the habitats within the WBCC;
- bushfire hazard and fuel management prescriptions that are not inconsistent with biodiversity conservation objectives; and.
- conservation management actions that target the improvement of overall environmental and habitat values of the area (i.e. a landscape approach).

5.0 Outcomes and commitments for MNES

5.1 Summary of conservation actions targeting MNES

The proposed conservation outcomes relevant to each MNES are summarised in Table 4.

Table 4: Conservation outcomes and actions for MNES

Conservation outcome	Action	Responsibility	Timing
Previously unidentified MNES			
Protection of Matters of National Environmental Significance that are identified in pre-construction surveys for permitted construction work in the WBCC	1 Prior to development of WBCC infrastructure, site surveys of threatened flora and fauna species will be conducted and populations of threatened flora and fauna species will be avoided or impacts managed in accord with the RMP and EPBC Act.	Riverview Group Environmental Management Trust	Ongoing The survey of PTWL and NTG will occur within 12 months of Ministerial endorsement of the Program, and will be made public.
Golden Sun Moth			
Protection and enhancement of habitat whilst allowing for the intrusion of the Ginninderra drive alignment. (refer to (ACT Government, 2013) (David Hogg Pty Ltd, 2011))	2 Vary the Territory Plan to establish conservation reserves at the Jarramlee and West Macgregor offset areas, with provision for Ginninderra Drive	Riverview Group	Prior to commencement of construction of Ginninderra Drive extension
Mitigation of the impact of Ginninderra Drive extension on GSM habitat in Jarramlee and West Macgregor offset areas	3 ACT Government to Purchase Lot 2 Wallaroo Road (86.8 Ha) from the Commonwealth catering for the following components: <ul style="list-style-type: none"> 1.8 Ha as replacement of impacted areas of occupied GSM habitat, 11.9 Ha of occupied GSM habitat, 	Economic Development Directorate	Land purchase prior to commencement of construction of infrastructure to service the residential estate, habitat restoration prior to commencement of construction of Ginninderra Drive extension

Conservation outcome	Action	Responsibility	Timing
	<ul style="list-style-type: none"> 19.4 Ha of unoccupied GSM habitat, and, Implementation of GSM habitat restoration as a connectivity measure between Jarramlee and Dunlop Grasslands Reserve. 		
	<p>4</p> <p>Apply a conservation covenant requiring the long term protection and enhancement of GSM habitat on lot 2 Wallaroo Road</p> <p>Whilst the covenant will provide long term protection for the Wallaroo Rd offset area, further investigations should occur for the potential to rezone the land to E3 Environmental Management.</p>	Riverview Group to request Yass Valley Council to implement the statutory covenant.	To be implemented concurrently with the amendment to the Yass Valley LEP.
	<p>5</p> <p>Prepare a combined offset management plan (OMP) addressing the preservation and enhancement of GSM habitat in Jarramlee and West Macgregor offset areas and Lot 2.</p> <p>Actions in the OMP to include research and trials for golden sun moth larvae translocation.</p> <p>Incorporate the management plan into the WBCC RMP.</p> <p>Lot 2 GSM habitat area to be increased from current 11.9 Ha to 33.1 Ha.</p>	<p>Riverview Group to prepare first draft.</p> <p>Environmental Management Trust to seek approval and implement the plan.</p> <p>Plan to be endorsed by the ACT Conservator and approved by the Minister for the Environment (ACT component) and endorsed by the ACT Conservator of Flora and Fauna (NSW component) in consultation with the NSW Office of Environment and Heritage</p>	<p>Plan to be finalised within 2 years of Ministerial endorsement of the Program, reviewed at intervals of no more than five years thereafter.</p> <p>GSM habitat area increase to be achieved prior to construction of Ginninderra Drive extension</p>
Establishment of a governance regime for reserve land (Macgregor, Jarramlee and	<p>6</p> <p>Establish a West Belconnen Environmental Management Trust (EMT).</p>	Riverview Group	Within 2 years of Ministerial endorsement of the Program and prior to construction of

Conservation outcome	Action	Responsibility	Timing
Lot 2).			Ginninderra Drive extension.
Implementation of program for research and trials for the translocation of golden sun moth larvae	7	Research and trials to be undertaken to assist habitat restoration and golden sun moth larvae translocation Environmental Management Trust	Research programs and trials to begin with the commencement of the OMP plus 5 years.
Restoration of GSM habitat	8	Restore habitat area into which golden sun moth larvae will be translocated, subject to concurrence by the EMT that sufficient evidence exists to ensure a successful outcome. May include further translocation trials of golden sun moth subject to consultation with the Conservator of Flora and Fauna and approval by the Department of the Environment. Restoration may also include stream bank restoration from the Murrumbidgee River along Ginninderra Creek and along Gooromon Ponds Creek up to Wallaroo Road to improve linkages along the riparian areas. Environmental Management Trust Restoration area should be a site of importance to landscape connectivity determined in conjunction with the ACT Environment and Planning Directorate.	Completion of restoration and then monitored for 15 years.
Translocation of GSM larvae from sites that will be impacted by construction of the Ginninderra Drive extension	9	Translocate GSM larvae from sites that will be impacted by construction of the Ginninderra Drive extension to suitable habitat restoration sites at lot 2 Wallaroo Road using method as refined through the program of research and trials. Environmental Management Trust Translocation research should build on existing knowledge and trials, undertaken elsewhere in the ACT	Approval of the OMP plus 20 years, and prior to the construction of Ginninderra Drive extension.
Ongoing monitoring of	10	Adopt field data recorded by Rowell (Rowell A. , 2015) Environmental Management Trust	Every two years from date of endorsement.

Conservation outcome	Action		Responsibility	Timing
impacts on habitat		as baseline data and ensure that monitoring methods are consistent with those used to measure GSM population and habitat quality and extent across the ACT.	Monitoring to be timed so that it is consistent with GSM monitoring across the ACT.	Monitoring period to be reviewed if impacts have stabilised.
Establishment of a process of independent third party review of RMP	11	Prepare an annual report addressing MNES outcomes achieved in the previous year; lessons learned; include a financial audit; report to be made publicly available. Report to be submitted to the ACT Conservator of Flora and Fauna.	Environmental Management Trust.	Within 2 months of the end of each financial year
Box Gum Woodland				
A conservation area that includes 100% of identified box gum woodland (68.2 Ha) in conservation area.	12	Vary the Territory Plan, amend the National Capital Plan for all proposed land use changes	Riverview Group to obtain relevant rezoning and related approvals	Zoning to be in place prior to commencement of construction in ACT.
Preservation and enhancement of woodland habitats. Actual hectares will be used in area measurements.	13	Manage activities in the WBCC in accordance with a Reserve Management Plan. A Reserve Management Plan is a statutory document under the provisions of the Nature Conservation Act. It will need to be determined whether to do a RMP over that area of land not already covered by the Murrumbidgee River Corridor Plan of Management, or whether one plan will be produced for the entire corridor.	Riverview Group to prepare first draft RMP. Environmental Management Trust to seek approval and implement the plan. Plan to be approved by the ACT Conservator and Minister for the Environment (ACT component) and endorsed by the ACT Conservator (NSW component) in consultation with the NSW Office of Environment and Heritage	Plan to be finalised within 2 years of Ministerial endorsement of MNES plan, reviewed at intervals of no more than five years thereafter.
Establishment of a land management	14	Establish a West Belconnen Environmental	Riverview Group	Within 2 years of Ministerial

Conservation outcome	Action		Responsibility	Timing
governance regime.		Management Trust (EMT)		endorsement of the MNES plan and prior to commencement of construction.
Maintenance and enhancement of connectivity between box gum woodland habitat areas. No appreciable long term net reduction in total box gum woodland habitat areas.	15	<p>All works that may affect box gum woodland to be informed by relevant scientific expert advice and:-</p> <p>Roads and tracks to follow existing alignments where feasible and incorporate appropriate design techniques such as raised grating</p> <p>Vehicle tracks max 6m wide other tracks/trails max 2.5m wide</p> <p>Unused existing tracks to be rehabilitated</p> <p>Picnic and other facilities involving buildings and car parking to avoid known high value habitat areas</p>	Environmental Management Trust	Ongoing
Protect habitat from domestic predators	16	Impose a cat containment policy for the entire West Belconnen development area and prohibit off-leash dogs in the Conservation corridor	TAMS Environmental Management Trust	<p>Cat Containment mandated by changes to the relevant instrument under the provisions of the Domestic Animals Act prior to commencement of any works in the ACT</p> <p>Cat containment in NSW to be implemented if suitable legislation comes in to force. In the absence of specific legislation, environmental planning laws such as planning agreements and/or conditions attached to</p>

Conservation outcome	Action		Responsibility	Timing
				development consents will be used to impose the controls. Dog control regime to be established by the EMT.
Monitoring of impacts on habitat is ongoing Monitoring will be consistent with box gum woodland monitoring across the ACT.	17	Adopt field data recorded by Nash & Hogg 2013 as baseline data. Periodic field research will be conducted to assess change in the extent and quality of BGW habitat.	Environmental Management Trust	Every two years from date of endorsement. Monitoring period to be reviewed if impacts have stabilised.
Establishment of a process of independent third party review of RMP	18	Prepare an annual report addressing MNES outcomes achieved in the previous year; lessons learned; include a financial audit; report to be made publicly available Report to be submitted to the ACT Conservator of Flora and Fauna	Environmental Management Trust	Within 2 months of the end of each financial year
<i>Pink Tailed Worm Lizard</i>				
A conservation area that includes 90% of identified PTWL habitat (146.4 Ha).	19	Variation to the Territory Plan, amendment to the National Capital Plan and amendment to the Yass Valley Shire local Environment Plan for all proposed land use changes	Riverview Group to obtain relevant rezoning and related approvals	ACT zoning to be in place prior to commencement of construction in ACT. NSW zoning to be in place prior to commencement of construction in NSW
Preservation and enhancement of PTWL habitats. Actual hectares will be used in area measurements.	20	Manage activities in the WBCC in accordance with a Reserve Management Plan.	Riverview Group to prepare first draft. Environmental Management Trust to review the draft and adopt and implement the plan when approved by the Conservator. Plan to be approved by the	Plan to be finalised within 2 years of Ministerial endorsement of the Program, reviewed at intervals of no more than five years thereafter.

Conservation outcome	Action		Responsibility	Timing
			ACT Conservator and Minister for the Environment (ACT component) and endorsed by the ACT Conservator (NSW component) in consultation with the NSW Office of Environment and Heritage	
Establishment of a land management governance regime	21	Establish a West Belconnen Environmental Management Trust.	Riverview Group	Within 2 years of Ministerial endorsement of the Program and prior to commencement of construction.
Maintenance and enhancement of connectivity between PTWL habitat areas. No appreciable long term net reduction in total PTWL habitat areas.	22	All works that may affect PTWL habitat to be informed by relevant scientific expert advice and:- Roads and tracks to follow existing alignments where feasible and incorporate appropriate design techniques such as raised grating Vehicle tracks max 6m wide other tracks/trails max 2.5m wide Unused existing tracks to be rehabilitated Picnic and other facilities involving buildings and car parking to avoid known high value habitat areas Active habitat restoration works will be undertaken.	Environmental Management Trust	Ongoing
Pink tailed worm lizard protected from domestic predators	23	Impose a cat containment policy in the for the entire West Belconnen development area. Prohibit off-leash dogs in the Conservation corridor	TAMS Yass valley Shire Council Environmental Management Trust	Cat Containment in the ACT to be mandated by changes to the relevant instrument under the provisions of the Domestic Animals Act prior to commencement of any

Conservation outcome	Action		Responsibility	Timing
				works. Cat containment in NSW to be implemented if suitable legislation comes in to force. In the absence of specific legislation, environmental planning laws such as planning agreements and/or conditions attached to development consents will be used to impose the controls. Dog control regime to be established by the EMT.
Ongoing monitoring of impact on habitat. Monitoring will be consistent with PTWL monitoring across the ACT.	24	Adopt field data recorded by Osborne & Wong 2013 as baseline data. Conduct periodic field research to assess change in the extent and quality of PTWL habitat.	Environmental Management Trust	Every two years from date of endorsement. Ability to review monitoring period if impacts have stabilised.
Establishment of a process of independent third party review of RMP	25	Prepare an annual report addressing MNES outcomes achieved in the previous year; lessons learned; include a financial audit; report to be made publicly available Report to be submitted to the ACT Conservator of Flora and Fauna	Environmental Management Trust	Within 2 months of the end of each financial year
Natural temperate grassland				
Management Actions as prescribed in the most recent approved version of the Jarramlee	26	In accord with the Jarramlee Offset Management Plan	Environmental Management Trust	Ongoing

Conservation outcome	Action		Responsibility	Timing
Offset Management Plan (ACT Government, 2013)				
Implementation of assessment process for additional unanticipated impacts to any area dominated by native grasses that is part of a larger patch of native grassland which includes high or moderate quality pink-tailed worm-lizard habitat as mapped by Osborne and Wong (2013).	27	<p>Follow the defined process strategy (see s5.3.4 of this Program Report). When triggered the strategy involves:</p> <ol style="list-style-type: none"> 1. Assess the impact using data collected from site-based field verified surveys as per EPBC guidelines 2. Implement avoidance & mitigation measures where practicable 3. Determine offset requirements for any residual impacts 4. Identify an appropriate offset and establish <p>Prepare & implement an offset management plan to incorporate in the WBCC management plan or a standalone plan</p>	Riverview Group Environmental Management Trust	Ongoing
Major changes to infrastructure location (e.g. sewer alignment)				
Implementation of assessment process for additional unanticipated impacts to MNES within the Project Area due to major changes to infrastructure location (e.g. sewer alignment).	28	<p>Follow the defined process strategy (see s5.3.4 of this Program Report). When triggered the strategy involves:</p> <ol style="list-style-type: none"> 1. Assess the impact using data collected from site-based field verified surveys as per EPBC guidelines 2. Implement avoidance & mitigation measures where practicable 3. Determine offset requirements for any residual impacts 4. Identify an appropriate 	Riverview Group Environmental Management Trust	Ongoing

Conservation outcome	Action		Responsibility	Timing
		offset and establish 5. Prepare & implement an offset management plan to incorporate in the WBCC management plan or a standalone plan		
Threatened Bird Species				
Mitigate indirect impacts from urban development on threatened bird species.	29	Implementation of CEMP's, WSUD principles, and the WBCC RMP. Replace affected farm dams with the provision of constructed wetlands where possible.	Riverview Group Environmental Management Trust	Ongoing

5.2 Environmental Management Trust

5.2.1 Background

The West Belconnen Conservation Corridor will be managed as a single unit (including both the ACT & NSW components) which is logical given that it is a single landscape unit. Management will be by way of an independently funded community trust, referred to herein as the West Belconnen Environmental Management Trust or the EMT. The EMT and board will be established by the proponent and will include community and relevant Government agency representatives. Conservation, fire management and recreation and indigenous and European cultural objectives will be equally represented (Elton, 2014g). In the initial 5 year period an interim board may be established comprising Riverview, Government and community representatives. This arrangement is proposed as an alternative to the “business as usual” approach whereby the relevant ACT Government agencies will be directly responsible for the management of the ACT component of the Corridor and, separately, a specialist EMT being responsible for the NSW component.

The approach, based on sustainability principles, that has been taken to the West Belconnen project includes community ownership and respect for ecosystem functions, the intrinsic value for the Murrumbidgee River corridor and Ginninderra Creek environments, ecological restoration of conservation areas and recognition of Aboriginal and non-Aboriginal cultural values.

The Conservation corridor will be established as a best-practice protected area that will:

- extend across the ACT/NSW border and the existing ACT Murrumbidgee River Corridor
- be a single, cross-border governance arrangement
- be established under a secure method that enable long term protection and restoration of MNES
- contribute to biodiversity conservation, the protection of other natural and cultural values, public appreciation those of values and sustainable public recreation and tourism
- contribute to local and regional connectivity conservation through linkages to protected and other natural areas
- be of a standard to be classified as an IUCN Category IV protected area (a habitat/species management, defined as an area of small, semi-natural or modified ecosystems close to urban areas that require active conservation intervention for restoration and management)
- be accepted as part of the National Reserve System
- be managed collaboratively with the community.

To achieve these outcomes an EMT entity will be established that will have responsibility for the management of the conservation corridor in perpetuity.

Additionally, the EMT will take responsibility for the management of environmental offset areas for PTWL and GSM;

The ACT currently has responsibility for the management of the Jarramlee Offset area and it is understood from discussion with the Village Building Company (VBC) that responsibility for the Macgregor offset area will pass from VBC to the Territory in due course in accordance with the EPBC agreement that covers this site.

An additional offset area is to be established on Lot 2 Wallaroo Road NSW, discussed at section 0.

5.2.2 Objectives and structure of the EMT

The primary objectives of the EMT will be conservation of MNES, other natural values and bushfire fuel management. Other objectives pertaining to education, heritage, research, recreation, tourism, and community involvement will also inform EMT operations. The EMT will be administered as a not-for-profit entity by a company (the Company) with a skills-based board comprising government, community, and other relevant stakeholder representatives. A Land Management Committee, a Social Sustainability Committee, and a Public Fund Committee will be set up to ensure objectives pertaining to land management, community engagement, and funds management is achieved, respectively.

Subject to the overarching control of the Board, the Land Management Committee will be responsible for upholding and reviewing a reserve management plan that meets legislative obligations and provides for conservation of natural values and bushfire fuel management. It will provide technical advice as necessary, manage recreational uses of the land, and facilitate tertiary-level research opportunities in the corridor.

The Social Sustainability Committee will be responsible for ensuring participatory process through liaising with residents regarding community aspirations and priorities, informing the community about activities, facilitating community participation in events, and managing volunteers interested in contributing to management of the corridor.

The Public Fund Committee will assist with the financial sustainability of the EMT by recommending to the board how budgets are allocated and spent and by investigating fundraising opportunities. Such opportunities may be through government grants, various types of private contributions, or through other forms of social enterprise within West Belconnen.

The Project will deliver, through a staged approach, the initial capital works within the corridor and offset areas and absorb any related costs until such assets are handed over to the EMT. The EMT will acquire annual income for its operations through the contribution of a percentage of sale proceeds from NSW lots (to establish a capital fund that will generate income in perpetuity) and an annual contribution from the ACT Government equal to those costs of managing the ACT portion of the corridor and the offset areas.

The proposed management arrangement will have the following characteristics:

- Not-for-profit Company limited by guarantee
- Incorporated under ASIC
- Cross-border scope
- Membership based (local community membership)
- Establishes the 'Trust' through a Trust Deed
- Establishes a Public Fund Committee to administer EMT
- Can undertake 'operational' activities through NFP company and administer donations received through the EMT
- Members elect Board members, but Riverview, Yass Valley Council and ACT Government reserved one spot each on the board

The not for profit company will have the following purpose:

- Own the NSW land, hold the lease of the ACT land and manage the land in the Corridor and offset areas seamlessly
- Deliver conservation objectives of the Program relevant to the WBCC, Jaramlee, West Macgregor and Wallaroo Rd offset areas
- Develop, maintain, have approved, and deliver the Reserve Management Plan and the management plans relevant to offset areas
- Annually report performance against the RMP
- Establish the Trust (money into the Trust must be spent in accordance with its purpose)
- Seek deductible-gift-recipient status for the Trust

The principal purpose of the EMT will be to deliver protection and management of the West Belconnen Conservation Corridor and offset areas. In pursuit of this purpose, the EMT shall:

- restore, regenerate and manage the natural environment in the West Belconnen Conservation Corridor and offset areas;
- implement the RMP for the West Belconnen Conservation Corridor and offset areas;
- provide education and information related to the natural environment in the ACT and surrounding regions;
- engage volunteers in natural environment restoration, regeneration, investigation and monitoring activities in the Murrumbidgee Conservation Corridor and offset areas;
- innovation to improve the understanding, restoration, regeneration, management and promotion of the natural environment in the Murrumbidgee Conservation Corridor and offset areas;
- provide recreation, education and eco-tourism initiatives that help connect the community to the natural environment and inspire them to care for it;
- support broader regional initiatives that will have a positive impact on the biodiversity and cultural values of the Murrumbidgee Conservation Corridor and offset areas; and
- manage activities that have potential for environmental impacts (including recreation) consistent with environmental protection objectives.

5.3 Avoidance and Mitigation Strategies

This section outlines the overarching avoidance and mitigation strategies that have been incorporated into the Program. These strategies are discussed in general here and where they apply to specific MNES in Sections 4.1, 4.2 & 4.3.

5.3.1 West Belconnen Conservation Corridor Reserve Management Plan

The EMT will be responsible for the development, effective implementation, and the ongoing review of the West Belconnen Conservation Corridor (WBCC) Reserve Management Plan (RMP). Details of the EMT structure and funding for the WBCC are outlined in section 0.

The primary role of the WBCC is to deliver the conservation outcomes of the Program, including avoidance and offsets for MNES. The primary strategy is to protect the natural environmental and heritage values within and adjacent to the riparian corridors by limiting development within these areas to that which is compatible with the conservation objectives. This is particularly important for protecting the pink-tailed worm-lizard population and box gum woodland patches.

This primary aim is integrated with the development goals of the Program that intend to produce a sustainable, integrated, and collaborative community (Roberts Day, 2014). The proximity of the WBCC to the residential area of west Belconnen creates the opportunity for these values to improve the overall amenity and vitality of the community.

The EMT will operate in accord with a “reserve management plan” that will be prepared in accord with part 10.4 of the (ACT) Planning and Development Act 1997 (and pursuant to part 8.3 of the Nature Conservation Act). The plan will cover all of the land under the control of the EMT including the conservation corridor, the existing Jarramlee and Macgregor offset areas and the Lot 2 Wallaroo Road offset area. The preparation of such a plan is a statutory requirement in the ACT as the land will be defined as “public land” under the Territory Plan. The terms of the EMT deed will require that a similar process be followed for NSW land. Incorporation of the Jarramlee and West Macgregor reserves into a new combined offset area will necessitate an amendment to the existing Jarramlee and Macgregor offset agreements. Provision for varying these agreements is available under Section 143 of the EPBC Act.

The RMP must be prepared in consultation with the public, the ACT Planning Authority, and the Conservator of Flora and Fauna, NSW OEH, and Yass valley Shire Council. It must be periodically updated as required. A maximum period between reviews of 10 years is specified in the legislation, a five yearly review is recommended.

The ACT component of the plan will be subject to the approval of the ACT Minister for the Environment and Conservator.

The NSW component of the plan will require the endorsement of the ACT Conservator of Flora and Fauna who will consult with the NSW OEH.

The reserve management plan will include, but will not be limited to:

- Measures for the conservation and enhancement of MNES including but not limited to:
 - Measures regarding the fragmentation of habitat areas
 - Weed management
 - Stock management
 - Management arrangements for walking, cycling, fishing, swimming and boating
 - Feral animal control including the imposition of a cat containment policy in the entire West Belconnen development area and prohibitions on off-leash dogs in the Conservation corridor.
 - Rock and firewood collection to be prohibited, educational signage to be installed
 - Horses will not be permitted within the reserve.
- Bushfire management measures to protect the conservation values of the corridor; note that fire management within the corridor is not intended to

provide protection for urban areas. Fire protection measures for urban areas will be provided in an asset protection zone external to the conservation corridor.

- Indicative monitoring program for:
 - All MNES affected by the Program,
 - MNES not affected by the program but which are listed at the time of endorsement of the program (including the small purple pea, Tarengo leek orchid and hoary sunray), and MNES not listed which may be listed in the future, to ensure that appropriate measures will be incorporated in the management plan. If a significant impact is anticipated the impact will be avoided if possible otherwise mitigation measures based on scientific advice will be incorporated in the RMP. Residual impacts following mitigation will be offset in accord with EPBC Act offset policies.
- reporting requirements and frequency for:
 - standard activities including monitoring, financial performance, measured outcomes;
 - reporting requirements for unanticipated or unapproved incidents.
 - process for review, improvement, approval and incorporation of new procedures within an adaptive management framework;
 - Guidelines and protocols for the construction of infrastructure, for education, recreation, tourism and other activities within the conservation corridor and offset areas.
 - Protocols for visitor management

In regard to cat containment across the project area, the ACT component of the development will be a cat containment area where the provisions of the *Domestic Animals Act* relating to cat containment apply.

This Program will also impose cat containment within the NSW portion of the development. However there is currently no equivalent to the ACT *Domestic Animals Act*. The NSW Natural Resources Commission highlighted in its “*Shared Problem, Shared Solution: Pest Animal Management Review*” (2016) report to the Premier of NSW (August 2016) that the use of these mechanisms (such as planning agreements and/or conditions attached to development consents, to either impose controls or prohibit the ownership of domestic cats) to achieve control is unwieldy, difficult to implement and a barrier to adoption.

The NSW Natural Resources Commission submitted the above report to the NSW Premier in August 2016 with a recommendation that the NSW Government should amend the *NSW Companion Animals Act 1998* to enable local governments to declare and enforce cat confinement areas. If this occurred cat containment could easily be achieved on the Parkwood peninsula and provide greater opportunities to link with other landscape conservation measures to protect native wildlife. We understand that the NSW Government is still to consider the Natural Resources Commissions report and release their response.

Urban development within the NSW portion of the site is not programed to occur until after 2032. It is therefore realistic to expect the NSW Government will introduce legislative amendments to enable local governments to declare and enforce cat confinement areas prior to the commencement of residential development on the Parkwood peninsula. In the unlikely absence of specific legislation to declare and enforce cat confinement areas in NSW, environmental planning laws, such

as planning agreements and/or conditions attached to development consents, will be used to impose controls on the ownership of domestic cats.

The reserve management plan will be subject to periodic review and re-approval at five yearly intervals.

The RMP will meet Commonwealth, ACT, and NSW legislative requirements in a cross-border and cohesive framework.

Implementation of the WBCC RMP will be staged to coincide with the urban development. The first stage will target core management operations, basic visitor infrastructure, and aim to establish the importance of the conservation principles to the community. It will be operational prior to the first residents moving in so that strategies may form a part of the community from the outset, and protect values from early visitor access (TRC Tourism, 2015b).

A draft WBCC Management Plan (TRC Tourism, 2015a) has been prepared for consideration, finalisation and adoption by the EMT immediately on the establishment of the EMT. The Plan prioritises the numerous environmental commitments of this program with cultural, recreational, and amenity values present within the WBCC (refer to Section 3.6). In general this will require the protection of the MNES values and broader natural values (e.g. habitat and species diversity, connectivity, and ecosystem function) whilst permitting certain recreational activities (e.g. walking, cycling, fishing, swimming, boating). Cultural integration, active learning, and community awareness initiatives will also be promoted and will link with other community spaces within the development (TRC Tourism, 2015b; TRC Tourism, 2015a)

These activities and the infrastructure associated with them will create impacts within the WBCC as discussed in this program report (Section 4.0). These will be addressed by the EMT and through the implementation and review of the RMP. In this way the management of the WBCC also acts as an avoidance and mitigation strategy for ongoing and potential future impacts.

Management strategies and principles that will be included in the RMP are:

- Identification of management zones so that direct impacts to MNES and their habitats do not occur. This includes the development of visitor hubs which will form the centre of access networks.
- Mechanisms (such as stakeholder engagement) that allow for the integrated consideration of all values.
- Consultation and collaboration with community, government, and expert stakeholders.
- Utilisation of existing infrastructure and resources, including knowledge and experience of existing conservation and land managers;
- Compliance with legislative requirements.
- An adaptive management process based on a monitoring regime that will address cumulative impacts and changing knowledge frameworks in future planning and management actions.

5.3.2 Construction Environment Management Plans

CEMPs are implemented to avoid and mitigate impacts that may occur throughout the construction phase of the Program. They will specify regulations for practices such as erosion and sediment control, clearing procedures, boundary identification, rehabilitation activities, and monitoring and reporting requirements.

In addition to the specific requirements set out in the following sections and discussed in Section 4.0 (sections 4.1.1.2, 4.2.1.2, 4.2.2.2, 4.2.3.3, 4.2.4.2, & 4.3.1.2) for impacted MNES, CEMPs implemented under the Program must ensure that the following are implemented:

- waste management procedures;
- worker and public health and safety policies;
- traffic and access controls;
- monitoring and compliance strategies;
- appropriate surface remediation post-construction; and
- buffer zones around sensitive values.

The CEMPs will be prepared in accordance with Government guidelines in addition to any specific requirements of the WBCC RMP for mitigation of indirect impacts from adjacent development. CEMPs will be prepared prior to construction commencing and be maintained until after construction and remediation activities have been finalised.

5.3.3 Water Sensitive Urban Design

The change in surface run-off that will occur as a result of the Program will need to be managed so that it will not result in unacceptable changes to the hydrology within surrounding riparian corridors. This is necessary not only for environmental health in general but also in order to avoid potential impacts to MNES including threatened fish species that occur in the Murrumbidgee and lower reaches of Ginninderra Creek below the falls, and to migratory birds.

In the ACT, stormwater management is subject to two separate codes:

- the 'Water Use and Catchment General Code' (ACT Government, 2009b); and
- the 'Waterways Water Sensitive Urban Design General Code' (ACT Government, 2009c).

The purpose of the 'Water Use and Catchment Code' is to identify the environmental values and permitted water uses of ACT waterways, and note criteria for water quality and streamflow that will protect these uses and values.

The purpose of the 'Waterways Water Sensitive Urban Design General Code' is to implement the principles of WSUD, so that the water cycle may be integrated into the urban development process.

A number of water-sensitive urban design guides are available through NSW Government agencies and where appropriate these will be applied to land development in the Yass Valley Shire.

WSUD within the Program includes a broad range of measures that aim to:

- reduce reliance on the town water supply system;
- optimise the opportunities for the use of stormwater and reuse of wastewater;

- maintain the export of stormwater run-off and associated pollutants to pre-development levels or better;
- work within existing natural ephemeral drainage lines;
- avoid MNES habitat and significant trees;
- minimise the take of developable land, development costs, and affects to existing infrastructure;
- consolidate the number of ponds and infrastructure required;
- consider maintenance requirements; and
- fit within the urban open space system of the Master Plan (Aecom, 2014).

Key components that could potentially be incorporated in the stormwater system include a network of bio-retention swales, wetlands, and basins that will capture, cleanse, recycle, and infiltrate water on-site, before discharging environmental flows into the Murrumbidgee River and Ginninderra Creek. Rainwater collected at households can be harvested for household use and will then be used for passive street scaping. Water quality of stormwater collected in wetlands and ponds will be improved by filtration through aquatic vegetation. A centralised harvesting and treatment scheme will supply recycled stormwater throughout the residential areas, with potential for off-site irrigation also. Any excess stormwater will be held in detention ponds and discharged at pre-development peak flows to the existing drainage lines.

Combinations of these measures, integrated into a system that will meet and exceed the regulatory requirements and which will contribute to the Green Star Rating for the Program are under investigation and will be subject to a triple bottom line evaluation to be conducted by specialist consultants Aither (Aecom, 2014).

5.3.4 Defined Process Strategy

This component of the Program seeks to define a process that will apply to future development within the Project Area; which will be implemented when either of the following occurs:

- Proposal to develop any area dominated by native grasses that is part of a larger patch of native grassland which includes high or moderate quality pink-tailed worm-lizard habitat as mapped by Osborne and Wong (2013). ([Action 27](#))
- Additional servicing or infrastructure requirements within the WBCC that impact MNES beyond what is already described by the Program. ([Action 28](#))

In these instances, the Defined Process will provide the Commonwealth with the confidence that impacts to MNES from actions outside of those specified in the Program will be consistently and appropriately assessed and managed. In achieving this outcome the relevant conservation advice, recovery plans, significant impact assessment guidelines and offset policy under the EPBC Act will be applied in order to ensure a consistent outcome for MNES across the implementation of the Program.

In summary, the Defined Process relating to MNES within the Project Area is as follows:

1. Where development within the Project Area triggers the need to implement the Defined Process Strategy, assess the impact of the proposed development using data collected from site-based, field verified surveys that are consistent with EPBC Guidelines.
2. Implement avoidance and mitigation measures to the greatest extent practicable through design.
3. Determine offset requirements for any residual impacts using the criteria outlined above and applied in assessment of the Program.
4. Identify an appropriate offset and establish according to the relevant State or Territory jurisdiction.
5. Prepare and implement an offset management plan either for incorporation into the WBCC management plan or as a stand-alone plan in the instance that the offset cannot be co-located in or adjoining the WBCC. Any management plan will include all aspects that apply to other MNES such as adaptive management and ensuring delivery of the offset and environmental values in perpetuity.

Any actions undertaken and offsets established using the Defined Process will be included in the Program's annual report. Any amendments to the Defined Process or offset assessment criteria will be managed through the adaptive management process and also reported annually.

As no impacts are currently known, the Defined Process Strategy is not subject to detailed assessment in this report. In lieu of this, two scenarios are described in Section 4.7 of the Strategic Assessment Report to demonstrate the application of the Defined Process.

The following two hypothetical examples are provided to demonstrate the application of the Defined Process Strategy:

- 'Scenario One' considers impacts to natural temperate grassland as a result of development within the Urban Development Area.
- 'Scenario Two' demonstrates the application of the Defined Process Strategy in the event that detailed design of infrastructure within the WBCC exceeds the impacts assessed in this report.

In each scenario, the design process will address feasible alternatives in terms of the key components of sustainability. This would adopt a triple bottom line approach to cost-benefit analysis triggered by a previously unquantified impact to any MNES. Considerations will include the cumulative effect of previous small scale impacts that have not been addressed through a targeted offset in addition to the current matter being considered. Specifically this will involve the following considerations (but not be limited to):

- Ecological benefit / cost for avoidance, including consideration of:
 - connectivity to other retained areas
 - relative condition of the vegetation

- overall area / size of impacted patch; and
- presence of other MNES or species of statutory conservation value in NSW or the ACT.
- Economic implications of avoidance, including consideration of:
 - ongoing cost of maintenance to conserve ecological benefits in perpetuity; and
 - cost implications of service provision and construction.
- Social aspects including consideration of:
 - practicality of protection of avoided area from uncontrolled access and other threats to biodiversity from unrestrained dogs and vehicles
 - impacts to urban connectivity; and
 - other potential social costs or benefits through opportunities for education, research, and monitoring.

Scenario One

Due to the revised listing criteria for natural temperate grassland, vegetation that meets the current definition of the CEEC has not been identified prior to the preparation of the Strategic Assessment; therefore, impacts have not been quantitatively assessed to the same level of detail as other MNES.

In this hypothetical scenario, a two hectare patch of pink-tailed worm lizard habitat within the urban development area has been identified within an area to be impacted. While this assessment report has considered the impacts to pink-tailed worm-lizard, due to natural temperate grassland also being generally coincident consideration of the impact to the grassland community is required. Due to this, the Defined Process will be applied to determine the significance of this impact and identify the need for and what represents an appropriate offset in the event that offsets are required.

Step 1 – Identify Extent and Quality of Affected Area

Targeted survey for natural temperate grassland be undertaken in accordance with criteria set out in the Commonwealth Conservation Advice (TSSC 2016), including consideration for survey timing and plot size and number. In addition, surveys will gather data sufficient for determining the quality of habitat using the criteria established in this report; and map the results at a refined scale.

The data provided by the surveys will then be used to assess the potential impacts of the Program on natural temperate grassland. The impact assessment will be undertaken in accordance with EPBC Policy with consideration for the Significant Impact Guidelines 1.1.

For this scenario, it is found through field survey that the area of natural temperate grassland is approximately 3.5 hectares and includes the entirety of the pink-tailed worm-lizard habitat.

Step 2 – Assess Relative Benefits of Avoidance

Once the extent and condition of the natural temperate grassland is known in the area to be affected, avoidance and mitigation measures will be considered for their practicality and cost

effectiveness. At Step 2 the triple bottom line considerations identified above will be addressed in order to determine the most appropriate design response from a sustainability perspective.

For the purpose of this scenario, it has been determined that avoidance is impractical as a result of adverse social and economic impacts that cannot be balanced against the potential ecological benefits of avoiding the area of the community.

Mitigation measures consistent with those discussed in Section 4.3 of the Strategic Assessment Report will be incorporated into the preferred option to ensure that indirect impacts do not affect reserved areas, including MNES within the WBCC.

Step 3 – Assess Significance of Impact

As natural temperate grassland is a critically endangered ecological community, assessment against the Significant Impact Guidelines 1.1 determines that a significant impact would result from most instances. For the scenario, impact to 3.5 hectares is considered a significant impact; therefore, an offset is required.

Using the criteria set out in Section 5.2.4 of the Strategic Assessment Report, the quality of natural temperate grassland would need to be quantified.

Step 4 – Identification and Assessment of Suitable Offset

In order to consolidate the ecological benefits of the WBCC and in acknowledgement that the extent of the endangered ecological community is probably more extensive than the mapped habitat of pink-tailed worm-lizard, the first offset opportunity to be investigated are areas within the WBCC. Based on the ecological principles outlined in general for the Defined Process Strategy, areas of pink-tailed worm-lizard habitat will be targeted to identify natural temperate grassland. This will include addressing for each potential offset area, consideration of Steps 1-2 for the offset scenario as opposed to the development scenario.

Once identified and described in terms of its extent and habitat quality the potential offset area will be assessed against the criteria described in Section 5. The preferred offset will be the outcome that is consistent with the EPBC Act offset policy in meeting more than 90 percent of the required offset as a land-based offset.

Once identified, the WBCC RMP will be updated to designate the relevant area as also being an offset for natural temperate grassland. Management measures will be incorporated into the RMP to ensure appropriate actions including monitoring and reporting in accordance with the RMP framework are implemented.

In the event that no suitable areas are available within the WBCC, additional locations may be considered in order to meet the offset requirement. This should initially consider the Lot 2 Wallaroo Road offset site and then subsequently any other site with a preference for locations closer to the impact area.

Scenario 1 Outcome

The outcome for MNES under scenario one would include:

- loss of 3.5 hectares of natural temperate grassland
- dedication of an area of appropriate size and quality to be recognised as being an offset for natural temperate grassland; and

- consolidation of offset areas within the WBCC.

In most circumstances it is anticipated that pink-tailed worm-lizard habitat will also be natural temperate grassland. However, it is also anticipated that areas of natural temperate grassland will be more extensive than the lizard habitat.

As the offset outcome for each MNES is being considered under this strategic assessment concurrently and in recognition of the patchiness of the pink-tailed worm-lizard habitat, a good environmental outcome would be for the concurrent development of offsets for the lizard and the grassland in the WBCC. This would result in a more coherent offset strategy and conservation area of greater overall ecological value.

This outcome is considered appropriate and consistent with the EPBC Act offset policy.

Scenario Two

While the Program considers the river access road and sewer construction in addition to a range of recreational facilities within the WBCC, this scenario considers the potential for a previously unidentified infrastructure requirement within the WBCC, which results in an impact to any MNES. This scenario only applies to development activities associated with and as described by the Program or as necessary to implement the Program. Ancillary and third party infrastructure is not considered part of the Strategic Assessment and would not be consistent with actions associated with implementing the Program.

For the purpose of this hypothetical scenario, the need for a sewer rising main from a recreational facility which forms part of the Program is identified as being necessary to give effect to the Master Plan. As this has not been a specifically identified component of the master plan and implementation would affect areas of MNES within the WBCC, this triggers the need to apply the Defined Process Strategy.

Approach

This approach would initially consider the Strategic Design Principles (Section 1.2.3 of the Strategic Assessment Report); however, in the event that those principles cannot be complied with the second scenario would need to apply Steps 1-3 of the Defined Process (discussed above). This would identify the impact, assess the relative impact, and determine the need for an offset.

The likely outcome in this scenario if the Strategic Design Principles cannot be satisfied is that any impacts to MNES within the WBCC from activities not addressed by the Program would result in an impact to an existing offset. In this case the infrastructure must either be reconsidered through an alternative design solution that does not compromise on the ecological outcomes or be abandoned.

Where an existing offset is not impacted, the offset identification process generally as described by Step 4 would be implemented.

For the purpose of this scenario, an existing offset would include:

- any area of pink-tailed worm-lizard habitat within the WBCC as mapped by Osborne and Wong (2013)
- any part of the Jarramlee or West Macgregor offset areas
- any part of the golden sun moth habitat dedicated as offset on Lot 2 Wallaroo Road; or

- any area of natural temperate grassland already dedicated as offset through implementation of the Defined Process Strategy.

In the event that an existing offset will be affected, the action cannot be considered through the Defined Process Strategy and must be referred to the Minister for the Environment under Part 3 of the EPBC Act.

Outcome for Scenario 2

Under Scenario Two, outcomes are guided by the intent of the offset policy to establish offsets in perpetuity and drive to solutions that do not compromise the perceived strategic benefits of implementing the Program as it has been considered in this assessment. As an impact to an offset introduces a greater deal of complexity to an assessment, it is considered appropriate that should this eventuality arise, it is appropriate that it be subject to additional public scrutiny and assessment by DoEE through the referral process.

6.0 Program timeframes

6.1 Environmental Management Trust

The EMT will be established as a legal entity as described in section 5.2 above as a first step in the implementation of the program, and prior to any construction. It is envisaged that this will occur immediately following the rezoning of the land. On its establishment the EMT will take responsibility for the ongoing preparation and periodic review of the reserve management plan and for administration and management of the conservation lands (including the conservation corridor and offset reserves) in perpetuity.

6.2 Reserve management plan

The proponent will prepare a draft reserve management plan in consultation with relevant agencies and make this available to the EMT within 2 years for adoption as the initial reserve management plan immediately on its establishment. This will be subject to periodic review as discussed in section 7.0. The reserve management plan, with periodic updates, will continue in perpetuity.

7.0 Evaluation and Monitoring

7.1 Monitoring and Reporting Program Outcomes

In order to measure the efficacy of the Program, it is necessary to establish a framework for monitoring and reporting on the process of implementation of each of the main actions and the results or outcomes, against a set of relevant biodiversity measures. This framework will encompass each of the three MNES for which actions are proposed to be taken under the program as a direct consequence of the development:

- Yellow Box Red Gum Grassy Woodland
- Pink tailed worm lizard
- Golden sun moth

The program will also incorporate the programs previously approved for the Jarramlee and Macgregor offset areas. Consequently monitoring will also be required for a fourth MNES that, whilst not affected by the West Belconnen project, is included in these two reserves:

- Natural temperate grassland

There are four main elements to the reporting framework:

- 1) A public annual report including but not limited to:
 - Commentary on the progress of implementation of each of the actions;
 - Commentary on the conservation outcomes, referenced against the outcomes listed in Table 4, achieved in the previous year, assessed against relevant biodiversity measures;
 - Commentary on governance and financial matters
- 2) A review of the Program every five years (measured from the date of endorsement of the program) for the life of the Program to assess progress in achieving the objectives of the Program and ensuring investments remain targeted to the affected matters in the most effective manner.
- 3) An independent audit every five years (measured from the date of endorsement of the Plan) for the period of the Program.

The monitoring and reporting process will provide the basis for the five yearly revision of the reserve management plan discussed at section 5.3.1.

7.1.1 Annual Report

An annual report highlighting the implementation of the actions and relevant conservation outcomes achieved in the reporting period (financial year) will be published by the Proponent and provided to DoE. This report will be completed within two (2) months of the end of the reporting period and will be made publicly available on the internet. The report will address objectives described in the Program with respect to MNES and provide an update on the status of investments, project success or failure.

The key aspects of the annual report will be to provide an understanding where relevant of the:

- report on commitments for conservation actions identified in the Program and EMT reserve management plan;
- progress in meeting commitments for the affected MNES;
- lessons learnt from project implementation and opportunities for improvement;
- changes with respect to management and resourcing of the proponent;
- summary of findings from monitoring activity associated with implementing the Plan;
- findings of any internal reviews into implementation and management of the Plan;
- amount of investment in each of the direct and indirect actions; and
- innovations or design adaptations that might have resulted from the design review and assessment process and how these will be implemented through the adaptive management process described in 7.2.

This report will be published on the internet for public information, and in order to meet the criteria for suitable offsets under the EPBC Act offset policy, in particular ensuring transparent reporting including having performance being readily measured, monitored, reviewed and enforced.

7.1.2 Five yearly Program Review Report

The second element in the evaluation framework for the Program will be a concurrent review of both the relevant biodiversity measures and the RMP every five years. The purpose of the review will be to summarise progress over the preceding five years in achieving the conservation gains as defined by the Program, referenced against the outcomes at Table 4. This will also allow for review of the specific actions in light of knowledge gained through implementation of the Program and consider consistency with action plans, policy and legislation by allowing for flexibility in the event of statutory review of these guiding documents. The Program Review Report will be submitted within six months of the end of the reporting period (five years from endorsement of the Plan). The preparation of the Program Review Report will follow the preparation and submission of the Annual Report for that year to allow incorporation of its findings into the Plan review.

Following consultation with the NSW Office of Environment and Heritage the report will be submitted to the ACT Conservator of Flora and Fauna for endorsement; in considering whether or not to endorse the report the Conservator will have regard to the views of the NSW Office of Environment and Heritage. The Conservator may require amendments to the report or additional information prior to providing an endorsement of the report. The finalised report will be provided to DoE and also be made publically available.

7.1.3 Independent Audit

The final element in the evaluation framework for the Program will be an independent audit of the Program every five years for the life of the Program. The purpose of the audit is to independently verify the outcomes being reported in the Annual and Program review reports.

The audit will be conducted by a person with appropriate scientific qualifications who is independent of the project. The auditor will be appointed by the EMT with advice from the ACT Conservator of Flora and Fauna and relevant NSW agencies. The audit will be completed within a timeframe that enables the results to inform the Program Review Report.

7.1.4 Summary of Monitoring and Reporting Commitments

The following table summarises the proposed monitoring and reporting commitments. In all instances the 'reporting period' commences from the endorsement of the plan.

Table 5: Monitoring & reporting commitments

Monitoring and reporting Commitments related to:	
<ul style="list-style-type: none"> • Yellow Box Red Gum Grassy Woodland • Pink-Tail Worm-Lizard • Golden Sun Moth • Natural Temperate Grassland 	
Public annual report	
Purpose and content	<p>To highlight the implementation of actions and relevant conservation outcomes achieved in the prior financial year. To contain:-</p> <ul style="list-style-type: none"> • Reports on commitments for conservation actions identified in the Program and WBCC reserve management plan • Progress in meeting commitments for the affected MNES • Lessons learned from project implementation and opportunities for improvement • Changes with respect to management and resourcing of the proponent • Summary findings from monitoring activity associated with implementing the Plan • Findings of any internal reviews into implementation and management of the Plan • Amount of investment in each of the direct and indirect actions • Innovations or design adaptations that might have resulted from the design review and assessment process and how these will be implemented through the adaptive management process.
Timing	Annually, within two months of the end of the reporting period
Responsibility	Riverview Group
Consultation and endorsement	Nil
Distribution	<p>Provided to DoE</p> <p>To be made publically available on the internet</p>
Review of program every five years	
Purpose and content	To summarise progress over the preceding five years in achieving conservation gains, as defined by the Program
Timing	<p>Every five years, to be prepared within six months of the end of the reporting period (five years from the endorsement of the plan)</p> <p>To be prepared following the preparation of the Annual Report for the year preceding, to allow its findings to be incorporated into the review.</p>

Responsibility	Riverview Group
Consultation and endorsement	Consultation with NSW Office of Environment and heritage during preparation Endorsement by ACT Conservator of Flora and Fauna
Distribution	Provided to DoE To be made publically available
Independent Audit	
Purpose and content	To independently verify the outcomes being reported in the Annual and Program review reports
Timing	Within a timeframe that enables the results to inform the Program Review Report
Responsibility	To be prepared by an independent expert with appropriate scientific qualifications To be appointed by the EMT with advice from the ACT Conservator of Flora and Fauna and relevant NSW agencies
Consultation and endorsement	None specified
Distribution	Non specified

7.2 Adaptive Management

One of the key actions involves establishment of an EMT to implement the Plan. The EMT will be responsible for monitoring, review and reporting against the objectives of the Program with respect to each of the actions described in the Plan.

The EMT will be established on a framework of adaptive management which is described by the guide to undertaking strategic assessments (Aust. Government, 2011) as a systematic process for continually improving management practices through learning from the outcomes of previous management. Figure 15 is reproduced from the guide and illustrates the process of adaptive management.

An Adaptive Management Framework will be an integral component of the reserve management plan discussed at Section 7.4.

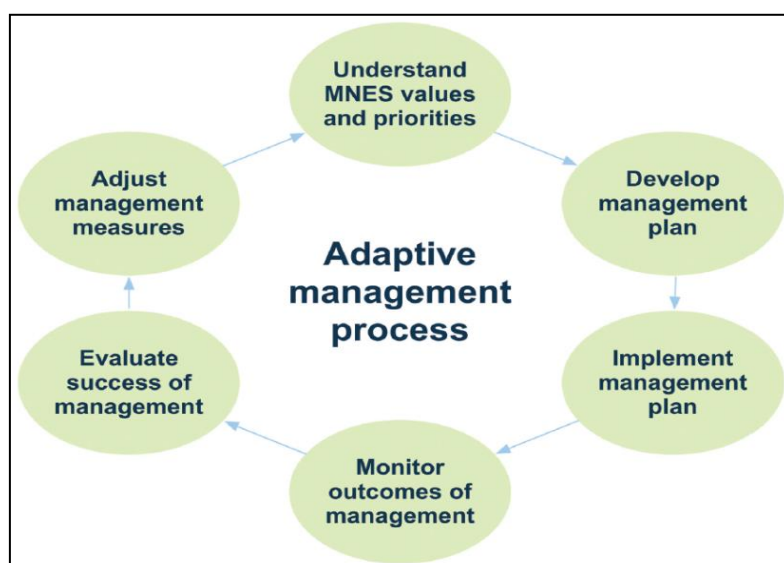


Figure 15: Adaptive management process

7.3 Contingency against failure of the management trust

Whilst the establishment of the trust will be on the basis that it continues to operate in perpetuity, the possibility exists that for reasons that cannot be foreseen circumstances may arise such that it ceases operation either in the ACT, NSW or both. Provision must be made so that should this occur outcomes proposed for MNES continue to be achieved. For this reason the trust will be established on the following basis:

- In the event that the trust ceases to manage the NSW land within the WBCC, then ownership and management of the land will transfer to the Shire of Yass valley. To ensure that, if such a transfer should occur, adequate resources are available to provide for the ongoing management of the land to achieve the MNES outcomes, the trust deed will require that the cash reserves of the trust financial reserves never fall below a pre-determined amount (nominally \$2m) which will be transferred to the council for use in the ongoing management of the land.
- Acknowledgement of this responsibility and agreement as to the reserved dollar amount will be inherent in the approval of the rezoning of the NSW land by the NSW Department of Planning and Yass Valley Shire.
- In the event that the trust ceases to manage the ACT land within the WBCC, then custodianship and management of the land will revert to the ACT Government and the land would be managed as part of the ACT system of nature reserves. Responsibility for the achievement of MNES outcomes will be inherent in this and will be implemented as are such commitments elsewhere in the nature reserve system.

7.4 Dealing with Uncertainty

The RMP will operate in accord with the timeframes discussed at section 6.0; the program will continue in operation subject to successfully meeting stated objectives as discussed at section 5.0. The outcomes will continue to be achieved under the ongoing management regime of the EMT which is intended to continue in perpetuity.

The critical function of the adaptive approach to effective implementation and management of the corridor and offsets is to allow for a feed-back of knowledge into the decision making process, informing and re-informing progressive editions of the reserve management plan. This allows for the Program to be responsive to changes that may not have been anticipated. This provides for uncertainty to be managed over time. Uncertainty with respect to the Program will be associated with:

- timeframe for implementation;
- unforeseen influences and factors for which the Program has limited ability to respond to (eg. climatic extremes); and
- direct and indirect offsets where success is dependent upon assumptions of practicability.

Examples of uncertainties that may arise in relation to the Program are summarised below:

- **Implementation timeframe.** The timeframe for implementation of the program will exceed by many years the life of the current and subsequent governments at territory, state and Commonwealth levels. Uncertainty in this aspect relates to change of government priorities and policy. Also, delivery of the full package of avoidance and offsets and the resultant conservation gains as set out in section 5.0 is also subject to the urban development proceeding as planned.

The avoidance and offset measures are tied to progress of development. In the event that West Belconnen is not developed in the manner described by this Program, individual developments and conservation outcomes will be considered on a project by project basis under the relevant regulatory requirements of each jurisdiction.

- **Achievement of objective gains in habitat quality.** Despite a high level of confidence that the objectives of the Program can be met, there is uncertainty as to the specific amount of improvement in habitat quality that might be achieved. This uncertainty will be addressed through the adaptive management framework described in Section 7.2.
- **Climate change.** There is a level of uncertainty about the extent that climate change may affect the conservation outcomes envisaged under the Program. Given the long time frames involved and the uncertainty associated with climate change predictions, it is difficult to determine how climate change may further impact (either positively or negatively) or increase pressure on issues associated with enhancement of the preserved vegetation communities or individual species/habitats.
Notwithstanding, the approach proposed in the Program is to focus on the conservation of larger (and hence more viable) habitat areas by enhancing the existing reserve network with resulting improvements in connectivity, edge to core ratios and structural functionality. This approach will encourage the development robust ecosystems with greater resilience to climate extremes and the uncertainties of climate change.
- **New species listings.** The potential exists for new species and communities to be listed under EPBC Legislation during the course of the Program. The Adaptive Management Framework will provide scope for CEMPs, design and master planning, Reserve Management Plans and Land Management Agreements to be amended to include protection to newly listed MNES if required.
- **Species de-listing.** The potential exists for species that are currently classified as MNES and the subject of this program to be de-listed.
- **Vandalism or similar malicious actions.** May occur and require action or responses that vary from normal requirements.

Regardless of the uncertainties, the adaptive management framework which the EMT will implement will ensure uncertainty is managed in a way that ensures the delivery of conservation gains that are efficient, effective, timely, transparent, scientifically robust and reasonable.

In the event that ongoing monitoring confirms that environmental outcomes consistently meet performance targets for maintenance and enhancement, then the EMT will review the frequency of ongoing monitoring as part of the five yearly review. This will occur in consultation with the ACT Conservator of Flora and Fauna and relevant NSW agencies. In the event of monitoring that identifies significant unforeseen environmental impacts, the EMT may be revised to enable more frequent or an alternative monitoring schedule to allow those impacts to be understood and appropriately managed.

7.5 Remedial Actions

As identified in the preceding section, there are a range of uncertainties associated with implementation of the Program. In order to ensure delivery of the outcomes, a range of further actions are to be undertaken in the event it becomes apparent that performance indicators are not being met. Examples where this may occur include:

- nature reserves are not created;
- mitigation measures do not avert risk and unanticipated impacts to MNES occur;

- habitat improvement targets are not achieved;
- habitat values as determined by regular monitoring and reporting identifies a declining trend;
- populations of MNES decline.

Instances where a decline in MNES values may occur could be categorised in one of two ways, the first being circumstances under which the EMT has no influence (e.g. climate change). Where it can be demonstrated that this has been the case it is not proposed to undertake additional actions beyond the scope of the Program as described. Adaptive management principles will be followed in order to identify feasible improvements to the Plan implementation regime.

Alternately, in circumstances where the EMT has the ability to remediate, and declines were the result of otherwise avoidable events, further actions will be undertaken to ensure the Plan's stated outcomes are delivered. Remedial actions may include either:

- directing a third party (for example a contractor) to remediate an area as a result of that party's actions; or
- undertaking remedial actions in response to actions that could have been avoided.

The trigger for undertaking remedial actions will be either the result of an observed breach of the commitments in the Program during the construction phase (e.g. CEMP prescriptions not followed resulting in 'environmental harm'), or trends in monitoring MNES indicates a decline in values over time. A summary of this assessment will be provided in the Annual Report. For circumstances where damage to MNES occurs as a result of actions that are inconsistent with approved program, the EMT will direct the responsible party, at their own cost, to remediate the damage and return the site to a condition equivalent or better than prior to the incident. If this cannot be achieved, an offset that complements the Plan will be identified, secured and managed by the responsible party to the satisfaction of DoE.

Should it be determined through the Program Review Reports that a decline in MNES values over time has occurred, the cause for the decline will be investigated by the EMT. The investigation will consider what factors are likely to have led to the decline in order to determine what was responsible. It will also determine whether it was caused by a factor that could be controlled or anticipated by the EMT such that an alternative management regime if implemented under the adaptive management framework was likely to have averted the decline. In the event that it is deemed to be a controllable factor that caused the decline, a remediation plan will be developed to the satisfaction of DoE. This plan may involve a range of actions depending on the matter affected, the significance of the impact and what may practicably be implemented. Actions will be commensurate with the magnitude of the decline relative to the protected matter's conservation status and may include actions such as:

- Additional habitat restoration activities; and / or
- Additional offset areas.

In any circumstance, the first action will be an investigation of the reason for the decline or damage to MNES values. The outcome of this investigation will inform the EMT of the next step to be taken.

7.6 Compliance and Enforcement

Commitments made in the Program regarding the protection and management of MNES will be achieved through development of a reserve management plan administered by the EMT in consultation with the relevant ACT and NSW Government agencies and experts as appropriate with reference to the specific objectives in the Program. The reserve management plan will provide the detailed basis for all conservation actions under the Program.

As detailed in Section 7.1, implementation of commitments made in the Program regarding the protection and management of Matters of National Environmental Significance (MNES) will be reviewed and reported on an annual basis. The review shall be undertaken by the EMT as a part of the annual reporting process.

Findings of the review will be incorporated into the Annual Report and/or Program Review Report as appropriate in order that relevant improvements to implementation of the Program can be incorporated through the adaptive management process.

Further to the review of annual performance, the EMT will also engage a third party independent auditor to investigate the financial aspects of the Program's implementation and to report on the investment in MNES commitments described in the Program and reserve management plan. This will be prepared in order that it can be included in the annual report which is the responsibility of the EMT.

Existing structures of compliance and enforcement exist with respect to ensuring CEMPs (in NSW and in the ACT) are prepared and implemented as approved. The EMT will ensure matters relevant to the Program are included in this process in order to ensure that commitments relevant to the construction phase are met and the associated outcomes achieved. The framework of the relevant ACT and NSW legislation provides a regulated system for compliance and enforcement including a range of penalties according to the significance of 'environmental harm' caused.

Incidents of non compliance with the commitments of the Program that have the potential to impact MNES will be reported to the Department of the Environment within 24 hours of being brought to the attention of a member of the EMT. The EMT will consult with the department on handling, mitigation, remediation or legal action required.

8.0 Cost of Implementing the Proposal

8.1 Financial Commitment

Table shows the proposed arrangements for funding the conservation reserves. The funds will be administered by the EMT.

Table 6: Formula for Program Implementation Funding

Conservation Areas	Area (ha)	Formula for Funding	
		Reserve establishment. Start-up period – initial 3 years of establishment	Ongoing management. Following establishment – in perpetuity
River corridor (ACT)	371	Establishment funding as required by West Belconnen project	ACT Government contribution on a per hectare basis equivalent to reserve management costs per Ha for equivalent reserves managed by TaMS ² .
River corridor (NSW)	206	Establishment funding as required by West Belconnen project	Contribution by developers to a capital investment fund equivalent to 1% of retail value of all lots sold or otherwise transferred.
Macgregor reserve	50ha approx.	Established	ACT Government contribution on a per hectare basis equivalent to reserve management costs per Ha for equivalent reserves managed by TaMS.
Jarramlee reserve	112	Established	ACT Government contribution on a per hectare basis equivalent to reserve management costs per Ha for equivalent reserves managed by TaMS.
Lot 2 Wallaroo Road	86.8	ACT Government Purchase from Commonwealth plus Establishment funding as required by West Belconnen project	ACT Government contribution on a per hectare basis equivalent to reserve management costs per Ha for equivalent reserves managed by TaMS.

² The Gungahlin Strategic Assessment Report March 2013 quotes (P. 39) a cost of “\$1,530 per hectare per year to manage environmental matters to the level of statutory duty of care”. This provides a basis for funding of the proposed West Belconnen land. It will be adjusted annually as a component of the ACT Government budget. Taking into account the relatively high concentration of MNES at West Belconnen a figure of approximately \$2120 per Ha per year is proposed, subject to budget processes.

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