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## Glossary

dB	Decibel, which is 10 times the logarithm (base 10) of the ratio of a given sound pressure to a reference pressure; used as a unit of sound.
dB(A)	Unit used to measure 'A-weighted' sound pressure levels.
$L_N$	Statistical sound measurement recorded on the linear scale.
$L_{AN}$	Statistical sound measurement recorded on the "A" weighted scale.
$L_{A10}(\text{Time})$	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
$L_{A10}(\text{1 hour})$	The $L_{A10}$ level measured over a 1-hour period.
$L_{A10}(\text{18 hour})$	The arithmetic average of the $L_{A10}$ levels for the 18-hour period between 0600 and 2400 hours on a normal working day. It is a common traffic noise descriptor.



# 1. Introduction

GHD was commissioned by the Australian Capital Territory Planning and Land Authority (ACTPLA) to prepare a traffic noise impact assessment for Stage 1 concept design of the proposed Molonglo Valley development.

## 1.1 Project Overview

The proposed project involves a new land development in the Molonglo Valley. Stage 1 of the project involves an assessment of the first two suburbs of the Molonglo Valley development.

The aim of this desktop noise impact assessment is to assess the potential impact of road traffic noise, at concept stage, from the proposed North-South Arterial Road on the proposed adjacent residential areas within the Molonglo Valley development.

Figure 1-1 shows Stage 1 of the proposed Molonglo Valley development as well as the existing suburbs of Duffy, Holder and Weston.

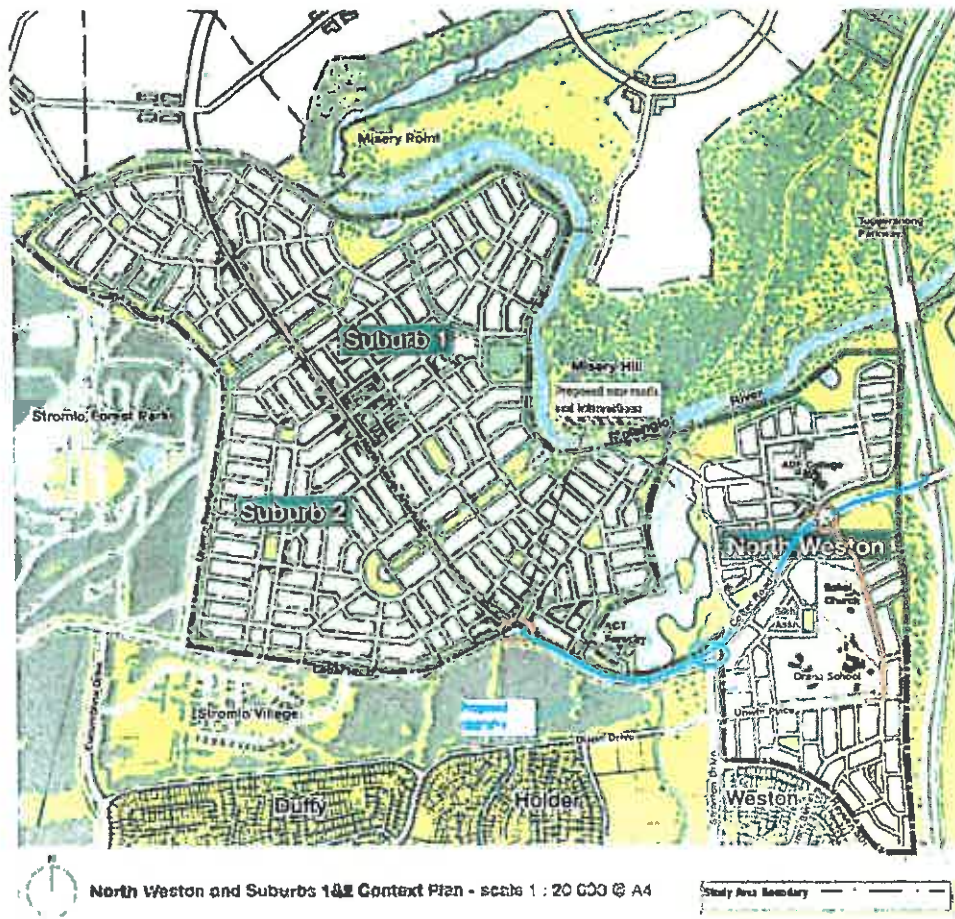


Figure 1-1 Molonglo Valley Development



## 1.2 Scope of Works

The scope of works for the traffic noise impact assessment is set out below:

- ▶ Desktop review to identify key environmental noise catchment areas and noise sensitive receivers using aerial photography;
- ▶ Determination of project specific noise goals for the operation of the Molonglo Infrastructure Stage 1 project with consideration to the publication; ACTPLA's *Draft Noise Management Guidelines* 1996 (NMG);
- ▶ Generation of one noise model using Computer Aided Noise Abatement (Cadena-A) software to predict sound pressure levels emanating from the Molonglo Infrastructure Stage 1 project for the 2021 traffic conditions. Only the North-South Arterial Road corridor was considered in the noise model; and
- ▶ Reporting of results and provision of in-principle mitigation measures (setbacks, noise barriers and/or architectural treatment) to reduce noise impact at potential receivers where required.

## 1.3 Limitations

This report has been prepared for ACT Procurement Solutions. The purpose of the report is to provide an independent review of impact of traffic noise from the North-South Arterial Road within the proposed Molonglo Valley development.

It is not the intention of the assessment to cover every element of the acoustical environment, but rather to conduct the assessment with consideration to the prescribed work scope.

In conducting this assessment and preparing the report, current guidelines for noise were referred to. This work has been conducted in good faith with GHD's understanding of the client's brief and the generally accepted consulting practice.

No other warranty, expressed or implied, is made as to the information and professional advice included in this report. It is not intended for other parties or other uses.



## 2. Road Traffic Noise Criteria

Road traffic noise criteria are sourced from the ACTPLA's NMG and shown in Table 2-1. The objective of the criteria is to protect future occupants of development areas from excessive levels of traffic noise.

**Table 2-1 Maximum External Traffic Noise Level  $L_{A10}$  (18 hour) dB(A) (Source ACTPLA)**

Land Uses	Maximum Noise Level at a Point 1m in Front of the Building Façade
Residential and community facilities.	63
Private open space <sup>(2)</sup> .	58
Commercial facilities.	75

- 1 The acceptable traffic noise levels incorporate an allowance for reflection from the facade of the building under investigation. In cases where the building is not yet built, measurements should be taken at a distance of one metre in front of the proposed building facade, and 2.5 dB(A) added to the measurement to allow for future facade reflection.
2. This criterion is also applied to useable private outdoor space of attached houses or apartments. Where the outdoor space is divided into two or more separate areas, at least one of these areas should meet this criterion. Measurements should be taken at a point one metre from the nearest boundary of the area of identified private open space at a height of 1.2 - 1.5 metres above ground level.

The criterion for maximum noise levels from traffic on roads at the nearest new residential buildings is 63 dB(A)  $L_{10}$  (18 hour) at one metre in front of the facade or the proposed facade closest to the road which is the main source of traffic noise.

The ACTPLA's NMG states that if the external noise goals are not achievable through appropriate set-back distances and barriers from the nearest major road, then the internal noise levels recommended in *Australian Standard 2107: Acoustics - Recommended design sound levels and reverberation times for building interiors* should be aimed for. In doing so, there may be requirements for the use of external noise attenuation measures or by appropriate noise attenuation treatments incorporated to the proposed buildings.

To protect the amenity of residential areas and to allow residents relatively quiet enjoyment of their private open space (i.e. backyards, courtyards, and similar areas), an additional criterion has been set. This provides for a maximum of 58 dB(A)  $L_{10}$  (18 hour) measured one metre in front of the nearest boundary of the private open space on residential blocks where the front of the residence does not address (face) the road which is the source of the traffic noise.

To predict this private open space noise level would require the proposed residential buildings to be input to the model, which would account for shielding and reflection of sound from the structures. As information regarding the proposed residential buildings was not available at the time of this assessment, only the 63 dB(A)  $L_{A10}$  (18 hour) noise goal has been assessed.



### 3. Noise Modelling

Acoustic Modelling was undertaken using the Computer Aided Noise Abatement (Cadna-A) software to predict the effects of road traffic noise generated by the North-South Arterial Road on the proposed residential areas. Cadna-A is a program for the calculation of noise levels. CadnaA calculates environmental noise propagation according to ISO 9613-2, "Acoustics – Attenuation of sound during propagation outdoors".

Noise modelling was conducted with consideration to The United Kingdom Department of Environment's *Calculation of Road Traffic Noise (CoRTN)*.

Noise modelling was undertaken with the information that was available at the time of this assessment.

Using the physical properties of traffic volume and mix, ground topography, road gradient, air and ground absorption and source and receiver height, scenarios were modelled using CoRTN to predict the  $L_{10(18\text{ hour})}$  noise indices.

The Austroads Research Report, "An Approach to the Validation of Road Traffic Noise Models" (2002) provides guidance on applying conversion factors to noise levels generated by CoRTN for Australian roads. The results of the ARRB Transport Research study are shown below in Table 3-1.

**Table 3-1 Australian Road Conversions – ARRB Study – Austroads 2002**

	With Façade	No Façade
Mean	1.7 dB	0.7 dB
Standard Deviation	2.5 dB	1.8 dB
Number of Sites	41	63

Source: Saunders et al 1983

Correction factors were applied to the predicted results to incorporate the ARRB façade corrections for Australian roads, as well as the 2.5 dB(A) façade correction for reflection, as per ACTPLA guidelines.

#### 3.1 Model Configuration

##### 3.1.1 Traffic Input Data

At this stage, the proposed building layouts and road designs for surrounding roads are not known, therefore only the North-South Arterial Road has been considered.

The CoRTN calculation method calculates traffic noise emissions levels based on traffic flows, heavy vehicle percentages, vehicle speeds, road gradients and road pavement types. The CoRTN calculation method requires 18-hour traffic counts (6 am to 12 am midnight). As there were no 18-hour counts available it was assumed that the 18-hour traffic flows were 94% of the Average Annual Daily Traffic (AADT) flows provided.



The traffic data for the North-South Arterial Road used as input to the model (18-hour predicted traffic flows) as supplied by GHD Canberra is shown in Table 3-2. Traffic volumes were provided for 10-year after project completion (2021). The traffic volumes along the North-South Arterial Road has been divided into 5 portions, A to E, to account for changes in traffic flows at intersections.

**Table 3-2 10-year Projected (2021) North-South Arterial Road Traffic Flows**

North-South Arterial Road	2021 AADT Traffic Flows (Veh/Day)	2021 Predicted 18-Hr Traffic Flows (Veh/18Hr)
Portion A	15,170	14,260
Portion B	9,820	9,231
Portion C	26,730	25,126
Portion D	31,000	29,140
Portion E	44,670	41,990

The traffic speed along the North-South Arterial Road was modelled at 70 km/hr. Traffic was modelled as including 5% heavy vehicles.

A road surface texture depth of 5 mm was assumed for all road surfaces.

### 3.1.2 Noise Modelling Set-up

The following data has been supplied and used in the noise model:

- ▶ Three dimensional terrain model of the North-South Arterial Road and surrounding areas;
- ▶ The noise grid has been modelled at 1.5m;
- ▶ Road designs and routes have been supplied electronically and modelled in Cadna-A;
- ▶ A ground absorption coefficient of 0.5 has been used in this assessment; and
- ▶ All traffic information, including respective road speed limits, traffic counts and heavy vehicle percentage was based on information provided at the time of this assessment.

## 3.2 Results

Figure 3-1 below shows the predicted results of the traffic noise modelling. Results indicate that the 63 dB(A)  $L_{A10(18\text{ hour})}$  traffic noise goal should be met at most of the future residential properties along the North-South Arterial Road alignment.

For the majority of the North-South Arterial Road, the 63 dB(A)  $L_{A10(18\text{ hour})}$  noise contour is contained within approximately 40 – 60 m of the alignment. However, towards the southern end of the proposed roadway, near the existing Cotter Road and Weston suburb, the 63 dB(A)  $L_{A10(18\text{ hour})}$  reaches up to 150 m from the roadway edge. Therefore, where residential buildings are proposed to be located within close proximity (less than 150 m) of the North-South Arterial Road, the ACTPLA's noise goal may be exceeded and appropriate measures may be required to mitigate traffic noise levels to meet the ACTPLA criterion. As a result, in-principal recommendations for noise mitigation have been provided in Section 4 of this assessment.



Predicted results also indicate that 2021 noise levels at the existing community facilities such as ADF College, Bahai Church and Orana School are below the ACTPLA's traffic noise criterion.

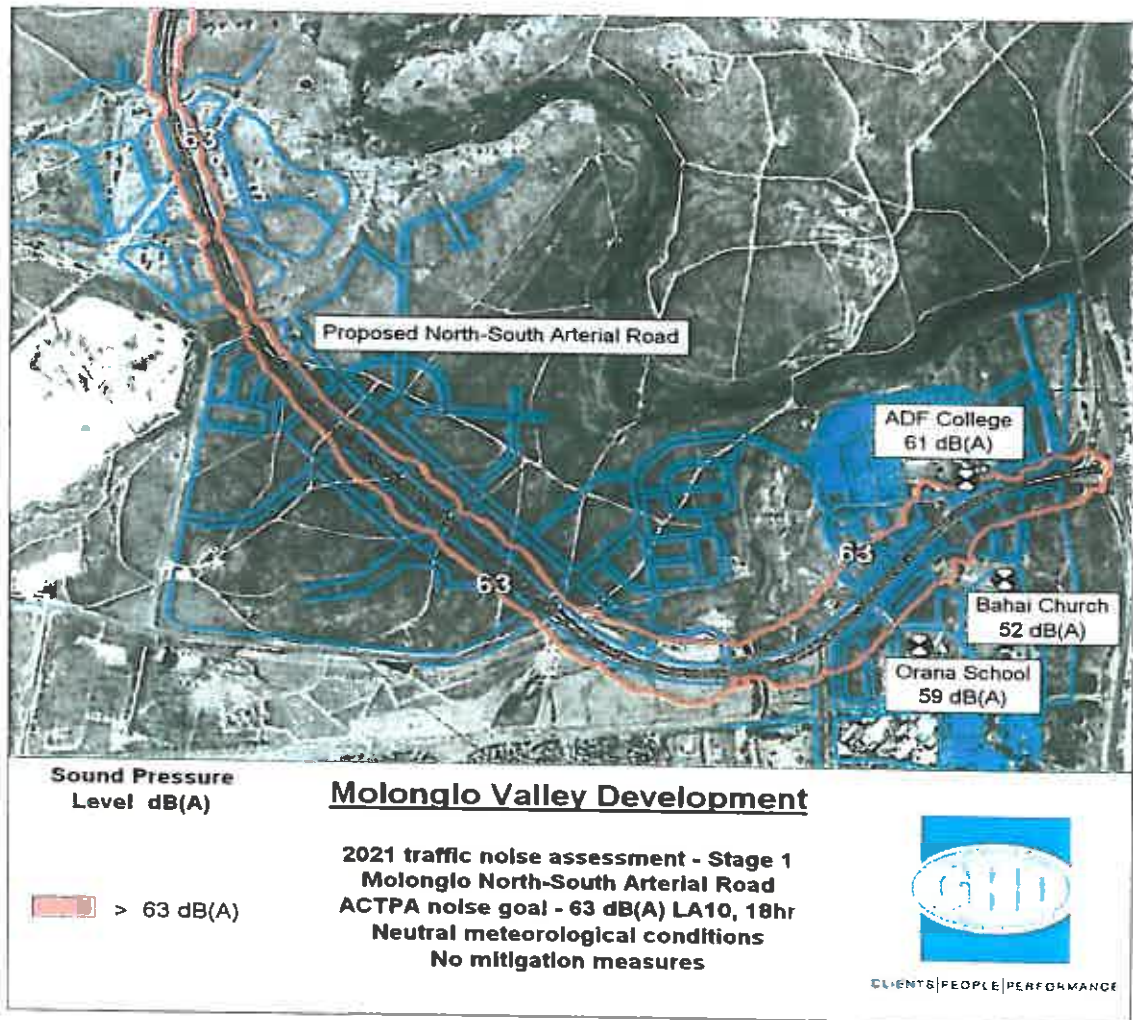


Figure 3-1 Predicted Traffic Noise Contours – North-South Arterial Road – dB(A) LA10, (18 hour)



## 4. Recommendations

The ACTPLA outlines three practical methods for reducing traffic noise to acceptable levels. These are:

- ▶ Adequately separating sensitive receivers from roads (using set-back requirements or buffer strips);
- ▶ The construction of noise mounds or other noise attenuation structures between roads and adjacent buildings; and
- ▶ Including acoustic features in the building structure.

General mitigation measures for reducing road traffic noise are also referenced from the Roads and Traffic Authority's (RTA) *"Environmental Noise Management Manual"* (ENMM) (2001) and from Austroads *"Modelling, Measuring and Mitigating Road Traffic Noise"* (2005). These include the following:

- ▶ Controlling noise at the source;
- ▶ Controlling the noise path between the source and the receivers; and
- ▶ Controlling noise at the receiver by improving building components to reduce the noise transmission to the interior.

A means of controlling noise at the source is using Open Grade Asphalt which has high absorption properties, however Open Grade Asphalt is mostly effective when vehicle speed are in excess of 80 km/hour. It also has a shorter life expectancy than Dense Grade Asphalt and is therefore not considered to be the most appropriate option in mitigating traffic noise for the North-South Arterial Road.

Improving building structures to reduce sound transmissions may be practical in some situations however can be expensive and should be used in conjunction with other mitigation measures.

Barriers can be very effective in reducing noise levels at the receivers at the ground level, however are not as effective for multi story buildings as high barriers need to be installed to remove the line of sight between the road and the multi story receiver. Barriers are only effective when they intersect the path between the predominant noise source and receiver.

It is GHD's understanding that ACTPLA's intention is that the property developers within the proposed residential areas will address noise attenuation requirements and that no attenuation measures will be built within the road reserve.



## 5. Conclusions

GHD was commissioned by ACT Procurement Solutions to prepare a desktop traffic noise impact assessment for the potential impacts of the proposed North-South Arterial Road on proposed adjacent residential areas.

At concept design stage, the predicted noise results should be used as a guide to provide an indication as to what areas of the proposed development may need more attention to noise mitigation measures at the detailed design stage.

A 63 dB(A)  $L_{10(18-hr)}$  contour plot has been produced for the projected (2021) traffic flows along the North-South Arterial Road. Predicted results indicate that the ACTPLA's traffic noise goal may be exceeded at some parts of the proposed residential areas adjacent to the North-South Arterial Road.

Predicted 2021 traffic noise levels at the existing community facilities adjacent to Cotter Road show compliance with the ACTPLA's criteria.

With potential for possible traffic noise goal exceedences, recommendations for road traffic noise mitigation measures have been outlined in Section 4 of this report.



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This report should not be altered, amended or abbreviated, issued in part or issued incomplete in any way without prior checking and approval by GHD.

**Document Status**

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Draft	T Gribble	C Evenden	<i>C Evenden</i>	G Collins	<i>G Collins</i>	11/11/08
0	T Gribble	G Collins	<i>G Collins</i>	G Collins	<i>G Collins</i>	17/11/08

Appendix H  
EPBC Referral Decision



**Notification of  
REFERRAL DECISION – not controlled action if undertaken in a particular  
manner**

**URBAN DEVELOPMENT IN PARTS OF THE SUBURB OF COOMBS – MOLONGLO  
VALLEY, ACT (EPBC 2009/5050)**

This decision is made under Sections 75 and 77A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

**Proposed action**

<b>person named in the referral</b>	Director Planning Policy, ACT Planning and Land Authority.
<b>proposed action</b>	To develop part of the suburb of Coombs, Molonglo Valley, ACT, as described in the referral received by the Department on 25 August 2009 (EPBC 2009/5050) and request for reconsideration dated 2 March 2010.

**Referral decision: Not a controlled action if undertaken in a particular manner**

<b>status of proposed action</b>	The proposed action is not a controlled action provided it is undertaken in the manner set out in this decision.
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**Person authorised to make decision**

<b>Name and position</b>	Ms Vicki Middleton Assistant Secretary Approvals and Wildlife Division
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**signature** 

**date of decision** 16 April 2010

<b>manner in which proposed action must be taken</b>	<p>The following measures must be taken to avoid significant impacts on:</p> <ul style="list-style-type: none"><li>Listed threatened species and communities (sections 18 &amp; 18A).</li></ul> <ol style="list-style-type: none"><li>Maintain a buffer zone of at least 20 metres from moderate and high quality <i>Aprasia parapulchella</i> habitat as identified at Annexure 1, except when inconsistent with other measures in this notice.</li><li>Ensure vehicles do not drive over and keep all forms of disturbance, such as heavy earth moving equipment and other construction activity away from moderate and high quality <i>Aprasia parapulchella</i> habitat at Annexure 1, except when</li></ol>
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inconsistent with other measures in this notice.

3. Prevent construction spoil and any material used in soil stabilisation and revegetation from running down slope over mapped *Aprasia parapulchella* habitat areas at Annexure 1.
4. Prevent the spread or planting of trees, shrubs or weeds (e.g. Blackberry *Rubus fruticosus*) within 20 m of high and moderate quality *Aprasia parapulchella* habitat at Annexure 1. Trees and shrubs will not be planted in areas that could potentially shade moderate and high quality habitat or buffers;
  - 4.1. All construction machinery will be washed to prevent the spread of weeds prior to entering the site. All machinery operating below the proposed edge road will be washed; if machines have been (a) offsite or (b) entered or operated in the area of former pine plantation identified at Annexure 1.
5. Prevent stormwater, occurring as a result of this action, from flowing over moderate and high quality *Aprasia parapulchella* habitat patches below the sewer line at Annexure 1.
6. Erect permanent fencing to enclose all moderate and high quality *Aprasia parapulchella* habitat at Annexure 1. Fencing will be designed to minimise unregulated public access, rock collection, access by domestic animals and unregulated stock grazing.
7. An edge road as indicated on page 27 of the Coombs and Wright Concept Plan will separate residential development from the river corridor.
8. A management strategy will be implemented, and ensure that;
  - 8.1. Habitat values for high and moderate quality *Aprasia parapulchella* patches below the edge road are maintained and improved, including removal and on-going management of weeds;
  - 8.2. Any fire, biomass management, or fuel reduction required as a result of the action within 20 m of moderate and high quality habitat at Annexure 1 will be conducted in an ecologically sympathetic manner with the conservation of *Aprasia parapulchella*. Grazing will only be used as a management technique when it is undertaken in accordance with expert advice;
  - 8.3. Signs containing educational/public information concerning the conservation of *Aprasia parapulchella* in the Molonglo Valley will be erected in consultation with expert advice.
9. Measures 1 and 2 will not apply with respect to the construction of public access ways to the river corridor through moderate quality *Aprasia parapulchella* habitat or buffer areas at Annexure 1. Access ways will be planned and designed in accordance with expert advice to minimise impact and conserve habitat values for *Aprasia parapulchella*;
  - 9.1. Access ways will not pass through high quality *Aprasia parapulchella* habitat at Annexure 1.

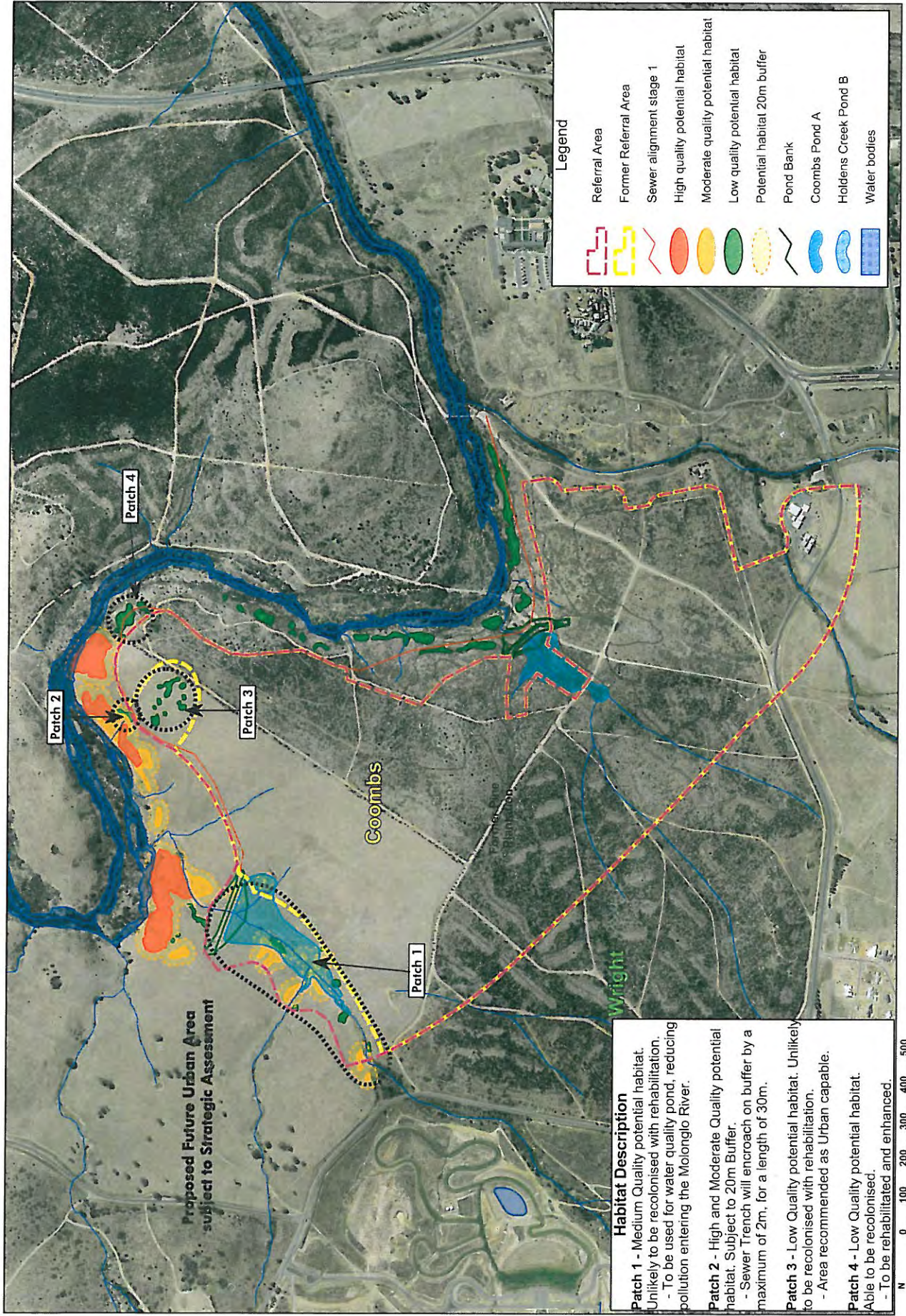
- 
10. Surface rocks suitable for *Aprasia parapulchella* from within the Coombs pond inundation area and access way alignments will be used to rehabilitate areas of potential habitat below the sewer line in accordance with expert advice. Rehabilitation will not take place within mapped high quality habitat at Annexure 1. Rocks and any machinery will be washed of all soil and organic matter prior to use for rehabilitation.
    - 10.1. A monitoring program developed in accordance with expert advice will survey rehabilitated habitat areas annually for 5 years, following final completion of the trunk sewer. As part of the monitoring program, a baseline survey will be conducted prior to the construction of houses and annual results will be published on an appropriate ACT Government website.
  11. For Patch 2 (Annexure 1) all measures, except measure 1 apply. In addition;
    - 11.1. Within 20 m of patch 2, machinery will only operate from within or above the sewer alignment; excavated material will not be stockpiled below the alignment.
    - 11.2. All land disturbed within 20 m of Patch 2 will be rehabilitated to improve current *Aprasia parapulchella* habitat value in accordance with expert advice. Specifically surface rocks will be retained and replaced and disturbed areas will be revegetated with local native grasses, sterile Rye and specifically Kangaroo grass (*Themeda australis*).
  12. Patch 4 (Annexure 1) will be rehabilitated to improve *Aprasia parapulchella* habitat value below the sewer alignment as per the measure outlined in 11.2.
    - 12.1. All development other than the trunk sewer will avoid the rehabilitated portion of Patch 4 (Annexure 1) by a minimum buffer of 20m.
  13. A wildlife expert experienced with *Aprasia parapulchella* will check all potential habitat that is disturbed prior to construction. Any *Aprasia parapulchella* specimens found will be relocated to the nearest suitable habitat.
  14. The above measures do not apply to the area identified as Patch 1 (Annexure 1), except for measures 10 and 13.

*\*The 20 m buffer referred to in this notice is to be measured from the edge of relevant mapped Aprasia parapulchella habitat.*

*\*\*Expert advice means: someone with demonstrated expertise in Aprasia parapulchella.*

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# Annexure 1 Aprasia parapulchella habitat near the Coombs development area



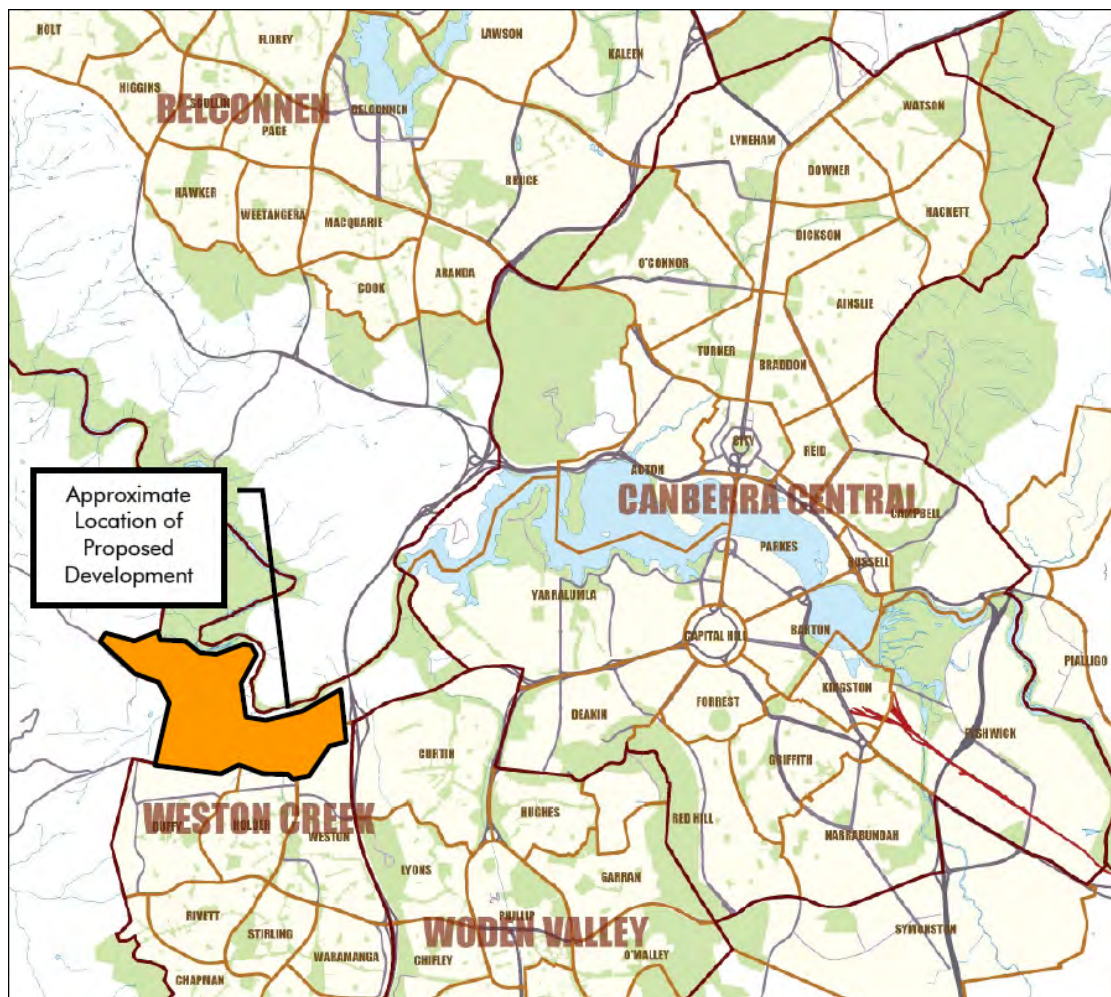
Appendix I  
EIS Exemption

**Report to the Minister for Planning**

**EIS scoping & Section 211 consideration**

**Molonglo urban land development and associated works  
(North Weston-Wright-Coombs)**

**Prepared by  
ACT Planning and Land Authority  
July 2009**



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## Introduction

This document is a report to the ACT Minister for Planning on the assessment of the Molonglo Urban Land Development and associated works project proposed by the Land Development Agency (LDA). The project encompasses the future suburbs of North Weston, Wright and Coombs.

The LDA identified the development of North Weston, Wright and Coombs suburbs as key components in their land release program to ensure long term residential land availability in the National Capital. The LDA has prepared an EIS scoping/s211 exemption application which identifies the potential impacts of the proposed development that provides information to support their request for Ministerial exemption under s211 of the *Planning and Development Act 2007* (the P&D Act).

### 1.1 ACT EIA Requirements

#### 1.1.1 The Environmental Impact Statement Process

Impact track assessment applies to proposals under Section 123 of the P&D Act. The Molonglo Urban Land Development is a proposal that meets Section 123 of the P&D Act as it involves a process or activity mentioned in Schedule 4 of the P&D Act, and therefore requires an EIS. An EIS must be completed in accordance with the requirements of the P&D Act before a development application can be lodged in the impact track. Table 1 below lists the applicable EIS triggers for the project.

**Table 1 – EIS triggers per Schedule 4 of the P&D Act 2007**

<b>Part 4.2</b>	<b>Activities</b>	<b>Project component</b>
1	proposal for a linear transport system corridor (for example, construction of new corridor or realignment outside existing corridor) intended to result in a major road, bus way, railway, light rail or tramway, and that is likely to have a significant impact on air quality or ambient noise or cause a significant level of vibration, significant visual intrusion or significant impact on a residential area	Triggered by proposed arterial road.
3	proposal for construction of a dam that will— (a) be at least 10m high, with a storage capacity of at least 20 000m <sup>3</sup> ; or (b) be at least 5m high, with a storage capacity of at least 50 000m <sup>3</sup>	Triggered by proposed Weston Pond.  Triggered by proposed Weston Pond
5	proposal for construction of a sewage treatment plant (other than a septic tank that services residential premises), or sewer reticulation system, designed to service a residential subdivision that—  (d) is to be within 100m of a body of water, whether natural or artificial, waterway or wetland; or (g) is to be within 2km of a residential zone and, taking into consideration the topography and local weather conditions, is likely to significantly affect the amenity of the neighbourhood because of noise, odour, dust, vermin attracted, lights, traffic or waste.	Triggered by proposed trunk sewer.  Triggered by proposed trunk sewer.
<b>Part 4.3</b>	<b>Areas &amp; processes</b>	<b>Project component</b>

1	proposal that is likely to adversely impact on the conservation status of— (a) a species or ecological community that is endangered; or (b) a species that is vulnerable; or (c) a species that is protected; or (d) a species with special protection status; or (e) a species or ecological community if the flora and fauna committee has specified criteria for assessing whether the committee should recommend the making of a declaration under the <i>Nature Conservation Act 1980</i> , section 38 (Declaration of species, community or process) in relation to the species or ecological community; or (f) an endangered species, an endangered population, an endangered ecological community, a critically endangered species, a critically endangered ecological community or presumed extinct under the <i>Threatened Species Conservation Act 1995</i> (NSW), if the potential impact of the proposal will be on the species or community in New South Wales.	Triggered by clearing of land to be a known Pink Tailed Worm Lizard habitat.
3	proposal involving— (a) the clearing of more than 0.5ha of native vegetation;	Triggered by clearing in excess of 75% of vegetative cover.
7	proposal with the potential to have a significant impact on the heritage significance of a place or object registered, or nominated for provisional registration, under the <i>Heritage Act 2004</i>	Triggered by the disturbance of potential heritage sites.
8	proposal involving— a) land registered in the register of contaminated sites kept under the <i>Environment Protection Act 1997</i> ; or b) land potentially contaminated in a way that is causing, or is likely to cause, a significant risk of harm to people's health or the environment.	Triggered by disturbance of land known to be contaminated.

The EIS scoping/s211 exemption request application was submitted by the LDA to ACTPLA on 28 May 2009. In accordance with ACTPLA requirements, the application contained information to inform the consideration of the s211 component of the application.

Information on the comments received from prescribed entities as part of the referral process can be found in Section 4 of this report. Further information on the key findings of the LDA's assessment with regards to the potential impacts can be found in Section 4 – Evaluation.

### **1.2 Commonwealth EIA Requirements**

The proposal has discussed with the Department of Environment, Water, Heritage and the Arts (DEWHA) and is currently being assessed under the strategic assessment process of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC) being undertaken for the entire Molonglo Valley urban development area (East, Central and West Molonglo). It is anticipated that the strategic assessment process will be finalised by mid August 2009. The completed strategic assessment will preclude subsequent development areas of the Molonglo Valley requiring referral under the EPBC Act.

## **2 Project Details**

### **2.1 The Project**

#### **2.1.1 Project Description**

The site comprises the south east corner of a larger area known as East Molonglo. The developable area is intended for various urban uses including residential, commercial, institutional, recreational and reserve. Infrastructure components of the project include, three large storm water management ponds, arterial road and trunk sewer line.

#### **2.1.2 Project Proponent**

The Land Development Agency (LDA) is the proponent.

## **3 EIS Process**

The Environmental Impact Assessment (EIA) process is a systematic process to identify, predict and evaluate the environmental effects of the proposed project. This process is applied before major decisions and development commitments are made. The main objective is to prevent, reduce and off-set significant negative impacts on the environment.

The purpose of the EIA process is to ensure that the decision maker (i.e. ACTPLA) is fully informed of the environmental aspects and consequences prior to making a final decision on the DA.

### **3.1 Impact Track**

As the project is captured by the Impact assessment track the EIS process must be completed before a DA can be lodged.

Section 211 of the P&D Act allows an applicant to seek exemption from the requirement to complete an EIS. The Minister responsible for the P&D Act has discretion under this section to grant exemption based on the information in previous studies. If exemption is granted then the EIS process is regarded as complete and allows an applicant to lodge a DA for assessment in the impact track.

### **3.2 Controlled Action**

Under the *Environment Protection and Biodiversity Act 1999* (EPBC Act), a person must not take an action that has, will have, or is likely to have a significant impact on any of the matters of National Environmental Significance (NES) without approval from the Commonwealth Environment Minister. It is the responsibility of the proponent to refer the project to the Commonwealth Government.

An SEA is currently being undertaken by the Commonwealth Government (DEWHA) and the ACT Government with a view to identifying matters of National Environmental Significance (NES) in the Molonglo Valley.

### 3.3 Referral

As required by the P&D Act and the *Planning and Development Regulation 2008* the LDA's application for an EIS scoping document was referred by ACTPLA to the following prescribed entities. While there is not statutory requirement to refer a section 211 exemption request, that request was included within the referral for entity consideration:

- ActewAGL Distribution, referred 5 Jun 2009, no comments received at time of drafting this report
- ACTEW Corp, referred 5 Jun 2009, no comments received at time of drafting this report
- the Chief Executive municipal services, referred 5 Jun 2009, no comments received at time of drafting this report. However comments have been received from individual branches within the Department of Territory and Municipal Services.
- the Conservator of Flora and Fauna, referred 5 Jun 2009, comment received 29 June 2009
- the Environment Protection Authority, referred 5 Jun 2009, comment received 29 June 2009
- the Emergency Services Commissioner, referred 5 Jun 2009, comment received 26 June 2009
- the Chief Executive, health policy, referred 5 Jun 2009, comment received 26 June 2009
- the Heritage Council, referred 5 Jun 2009, comment received 3 July 2009

and the following non-prescribed entities:

- Belconnen Community Council, referred 5 June 2009, no comment received at time of drafting this report;
- Weston Creek Community Council, referred 5 June 2009, no comment received at time of drafting this report;
- Woden Community Council, referred 5 June 2009, no comment received at time of drafting this report;
- Conservation Council South East Region and Canberra, referred 5 June 2009, no comment received at time of drafting this report;
- National Capital Authority - referred 5 Jun 2009, comment received 3 July 2009

Comments received from the above referral entities were generally supportive of the project being exempted from the need to complete an EIS provided that any subsequent DA was conditional upon those matters listed in Section 5 – Development Application Considerations, of this report.

## **4 Evaluation**

This section provides a summary of the issues identified as triggering the need for an Impact assessment of the project. For each issue, the results are summarised under the following three headings:

- **Impacts**

Details the potential impacts of the project as identified by Schedule 4 of the P&D Act.

- **Previous studies**

Information supplied by the applicant in support of their s211 exemption, including the PA evaluation report dated 18 February 2008 prepared in response to Territory Plan Variation 281.

- **Conclusion**

Result of ACTPLA evaluation of previous studies.

### ***4.1 Item 1 Part 4.2 Schedule 4 - Arterial Road***

#### **Impacts**

A component of the project is the construction of the first portion of a major arterial road. This arterial road, identified as John Gorton Drive, will service the suburbs of Wright and Coombs, with eventual extension to the north bank of the Molonglo River as the development front moves outwards.

This proposed arterial road has triggered application of Item 1, Part 4.2, Schedule 4 as it has the potential to have a significant impact on air quality, ambient noise, vibration, visual intrusion and impact on residential areas (Duffy, Holder and Weston).

#### **Previous studies**

The applicant has supplied two reports in support of the s211 exemption:

- Molonglo Roads Feasibility Study, SMEC, 2008; and
- Report on Molonglo Infrastructure Stage 1, Preliminary Sketch Plans, GHD, 2008 (incorporating Traffic Report and Road Traffic Noise Assessment).

#### **Conclusion**

The two supporting reports have adequately identified the issues associated with the EIS trigger. The reports demonstrate that there will be impacts on air quality due to increased traffic. However, other issues of ambient noise, vibration and visual intrusion can be mitigated to acceptable levels through sympathetic design.

It is concluded that further environmental assessment of this issue is not required for this project. However, air quality modelling as recommended by the Preliminary Assessment evaluation should be carried out for subsequent stages of development in the Molonglo Valley prior to lodgement of any EDP DA.

## **4.2 Item 3 Part 4.2 Schedule 4 – Weston Pond**

### **Impacts**

A component of the project is the construction of three in-stream storm water management ponds. The largest of these, known as Weston Pond has a surface area of 11 ha and involves the ponding of an unnamed watercourse. The other two ponds do not trigger the need for EIS in their own right.

### **Previous studies**

The original concept plan for East Molonglo includes in stream damming and detention of the Molonglo River to create a lake. However due to the high ecological impact of this design it was abandoned in favour of smaller ponds located in stream of water courses that feed into the Molonglo River. The benefit of this approach is twofold: 1) it avoids the inundation of a reach of the Molonglo River that has pockets of high quality Pink Tailed Worm Lizard (PTWL) habitat; and 2) ponding and detaining water prior to entering the Molonglo River will improve the quality of the water entering the Molonglo River system. Supporting information submitted by the applicant reinforces this approach.

Creating a large lake in the Molonglo river also had implications for the 1:100 ARI and the Scrivener Dam Hazard Failure Area.

Siting of the ponds has been carried out in conjunction with Parks Conservation and Lands (PCL) who have made recommendations on design and siting of the required dam walls.

### **Conclusion**

Issues surrounding Weston Pond and to a lesser extent, the two smaller ponds, have been satisfactorily addressed by locating the ponds in areas of low ecological value and by redesigning the concept plan to abandon the idea of a large central lake created by damming the Molonglo River.

It is concluded that further environmental assessment of this issue is not required for this project. Detailed design issues can be addressed at individual the DA stage.

## **4.3 Item 5 Part 4.2 Schedule 4 – Trunk Sewer**

### **Impacts**

A component of the project is the construction of a trunk sewer. The trunk sewer will be approximately 2.7km in length. The initial proposal incorporated a pump station. However, the sewer has since been redesigned and a pump station is no longer required. This has reduced the impact of this component significantly. The alignment of the trunk sewer is adjacent to the Molonglo River and passes thorough minor areas of low quality PTWL habitat.

### **Previous studies**

- Habitat mapping and conservation considerations for the Pink-tailed Worm Lizard with respect to the alignment of the proposed Molonglo Trunk Sewer, W Osborne 2007.

The original sewer concept for East Molonglo had identified the need for this trunk sewer. However, because of the need to avoid the PTWL habitat the sewer line was place high on the bank of the river.

Therefore a full gravity sewer could not be constructed and the need for a pump station was identified. Since this original servicing concept was developed continued ecological sampling in the area of Wright and Coombs that was previously identified as high to medium quality PTWL habitat has now been reassessed as low quality PTWL habitat. This has allowed the sewer line to be moved to an alignment lower on the river bank and negates the need for a pump station.

Removal of the pump station reduces the need for land disturbance significantly.

### **Conclusion**

Supporting information on the location of the trunk sewer line has adequately identified the impacts associated with its construction and operation. On going investigations and design refinement of the alignment has allowed a less significant impact to be achieved while not compromising the required level of service.

By locating the sewer line in what will be public lands, will also reduce the impact of odour from vents and encroachment by private structures that could impeded effective operation and maintenance.

It is concluded that further environmental assessment of this issue is not required for this project. Detailed design issues can be addressed at individual the DA stage.

#### **4.4 Item 1 Part 4.3 Schedule 4 – PTWL Habitat**

##### **Impacts**

This area of East Molonglo is known PTWL habitat. The potential for the disturbance and loss of PTWL habitat as a result of this project was identified early in the Territory Plan Variation and design process.

##### **Previous studies**

Two studies are key to understanding the PTWL habitat of this area of the Molonglo Valley.

- Habitat mapping and conservation considerations for the Pink-tailed Worm Lizard with respect to the alignment of the proposed Molonglo Trunk Sewer, W Osborne 2007; and
- Environmental planning principles for the protection of the Pink-tailed Worm Lizard in the Lower Molonglo Valley, ACT, W Osborne 2008.

These documents were supplied in support of the s211 exemption consideration. These studies achieved two things:

- identifying the quality/extent of PTWL habitat; and
- provide recommendations for land use planning in the vicinity of the PTWL habitat to mitigate or avoid impacts from urban development.

##### **Conclusion**

The concept plans for Wright and Coombs have been developed with reference to the above mentioned studies. The concept plans have identified a land use pattern

that is sympathetic to the PTWL habitat areas. These will be carried forward to the individual EDP DAs.

PCL has agreed that the recommendation of the reports have been addressed through the design and subsequent adoption of the concept plans for Wright and Coombs. PCL have provided wording of a possible condition that should be attached to any subsequent EDP DA approval. It is concluded that further environmental assessment of this issue is not required for this project.

#### **4.5 Item 3 Part 4.3 Schedule 4 – Clearing greater than .5ha**

##### **Impacts**

The project requires the clearing of more than .5ha of native vegetation. Ecological studies, and peer review of those studies confirm that whilst indeed the area proposed for urban development will be clear felled and terra forming carried out, the impacts on vegetation are minimal.

##### **Previous studies**

A review of environmental studies undertaken to inform DA63 and Dv281 was carried by *NGHenvironmental* on behalf of the NCA to inform the NCA's deliberations on amending the NCP to identify the Molonglo Valley as future urban. This independent review was comprehensive and resulted in recommendations being put forward for the mapping of urban boundaries, preservation of raptor habitat, preservation of PTWL habitat, and effects upon vegetation communities present in the Molonglo Valley.

A key recommendation and action that was implemented as a result of this review was the removal of the area known as Central Molonglo from the identified future urban area.

##### **Conclusion**

Environmental studies supplied in support of this s211 application, including the review by *NGHenvironmental*, have identified the impacts of urban development of the areas of North Weston, Wright and Coombs. Recommendations given in those reports have been reinforced in the adopted concept plans and the indicative land use pattern of the Territory Plan.

It is concluded that further environmental assessment of this issue is not required for this project. Detailed design issues can be addressed at the individual EDP DA stage.

#### **4.6 Item 7 Part 4.3 Schedule 4 – Heritage**

##### **Impacts**

Potential heritage impact relate to the possibility of disturbance to both known and unknown sites of Aboriginal and European heritage.

##### **Previous studies**

This was identified early on the planning process for the project area. As such a comprehensive study of the project area was undertaken. The ACT Heritage Council has ratified that all components of the Aboriginal cultural assessment have taken place and that no further investigation is required.

The Heritage Council has also confirmed that given the extensive survey of the area already carried out, the quality of the reports submitted to date, including the draft survey of the historic heritage, Council is confident that no additional useful heritage information would be obtained were an EIS to be required.

### **Conclusion**

It is concluded that further assessment of this issue is not required for this project. However, the requirement for an unanticipated discovery plan must still be attached to any EDP DA or other DA approval, as a standard condition.

## **4.7 Item 8 Part 4.3 Schedule 4 – Contaminated land**

### **Impacts**

This trigger is activated as the area for development contains known contaminated sites. These sites include the former Weston Sewage Treatment Facility, night soil depot, builders land fill and former pine plantation.

### **Previous studies**

This issue has been identified early and addressed accordingly. Phase 1 ESA's studies have been completed for all contaminated sites, with Phase 2 and remediation action plans already lodged with an independent land contamination auditor for endorsement and subsequent submission to the Environment Protection Authority's Environment Protection Unit for sign off, which is expected by 31 July 2009.

### **Conclusion**

The EPA has confirmed that contamination issues have been adequately identified and the process for remediation is well in hand. It is recommended that should an EDP DA be lodged prior to EPU signing off on the remediation action plans that approval be conditional upon obtaining the required EPU clearance of the final remediation plans.

It is concluded that further assessment of this issue is not required for this project.

## **4.8 Entity comments**

### **EPA**

Conditional support of s211 exemption.

The comments submitted by the EPA are concerned with the possible contamination associated with past land uses and how this impacts upon future use of the land for residential, commercial, recreational and reserve purposes.

The proponent is aware that site contamination is an issue in need of address. As such they have provided statements and supporting documentation that identified that contamination issues have been thoroughly investigated. Further clarification was sought and provided (23 June 2009) by the proponent as follows:

- i) The EPU has endorsed the Phase 1 ESA report for the areas of Wright and Coombs. A copy of the EPU endorsement dated 12 February 2009 was provided as requested confirming the proponents original statement.

Advice from an independent contamination auditor is not required for this area as a Phase 1 ESA does not require sign off by an independent auditor only the EPU.

- ii) A final Phase 2 ESA was submitted to an independent contamination auditor for review and endorsement on 27 March 2009. This Phase 2 ESA relates to the area of the former pine plantation on Blocks 1204 and 1180 Weston Creek. The auditor's response is expected by 31 July 2009. The auditor's response will then be submitted to the EPU for sign off. However, in an email dated 7 July 2009 the EPA have stated that they would be acceptable to receiving interim advice from the auditor thereby allowing development to proceed on a conditional basis that the EPU sign off must be obtained prior to approval of any subsequent EDP.
- iii) A final Phase 2 ESA was submitted to an independent contamination auditor for review and endorsement on 12 May 2009. This Phase 2 ESA relates to the area of the former sewage treatment plant, landfill, night soil depot on parts Blocks 1196, 1179 and 1203 Weston Creek. The auditor's response is expected by 31 July 2009. The auditor's response will then be submitted to the EPU for sign off. However, in an e-mail dated 7 July 2009 the EPA have stated that they would be acceptable to receiving interim advice from the auditor thereby allowing development to proceed on a conditional basis that the EPU sign off must be obtained prior to approval of any subsequent EDP.
- iv) In addition to the final ESA reports, the proponent has prepared and submitted to the independent land contamination auditor short term environmental management plans and remedial action plans for all investigated sites. These are also expected to obtain sign off by the auditor in concurrence with the respective ESA reports by 31 July 2009.

### **Conclusion**

Interim advice from the independent auditor is not required to allow the s211 request to be granted. ACTPLA is satisfied that the level of investigation and documentation provided by the proponent in relation to contamination has demonstrated that the issue is acknowledged and efforts to address the matter are and have been carried out in accordance with legislated requirements, and that the land is suitable for the intended land uses.

### **Recommendation**

That any subsequent DA for an EDP in the area of land that is the subject of this EIS scope/s211 request must provide documentary evidence of EPU sign off on all documents associated with the land contamination investigations and remediation, including;

- Final ESA Phase 2 Report – Pine Plantation, Blocks 1204 and 1180 Weston Creek;

- Short Term Contamination Environmental Management Plan – Pine Plantation, Blocks 1204 and 1180 Weston Creek;
- Final Phase 2 Report – Former Weston Creek Sewerage Treatment Plant, Builders Landfill and Night Soil Depot, Blocks 1196, 1179 and 1203 Weston Creek;
- Short Term Contamination Environmental Management Plan – Builders Landfill and Night Soil Depot, Blocks 1196, 1179 and 1203 Weston Creek;
- Short Term Contamination Environmental Management Plan – Grease Trench and Sludge Bed, Part Block 1210 Weston Creek;
- Remedial Action Plan - Builders Landfill and Night Soil Depot, Blocks 1196, 1179 and 1203 Weston Creek; and
- Remedial Action Plan – Block 1210 Weston Creek.

### **Conservator**

Conditional support of s211 exemption.

The comments submitted by the Conservator are concerned with:

- i) Increased recreational use of the Molonglo River Corridor; and
- ii) Indirect impacts to PTWL habitat.

The proponent is aware that impacts on the Molonglo River Corridor and the PTWL habitat are potential significant issues that must be addressed before development of the area can proceed. As such numerous studies have been commissioned and completed over many years to obtain an understanding of the areas ecology and potential impacts of the proposed urbanisation of the Molonglo Valley.

Statements and documents provided by the proponent in support of the EIS scope/s211 request demonstrate that the issues have been thoroughly investigated with the results informing the Territory Plan Variation, concept plans/strategic land use pattern indicated by the Territory Plan.

Clarification was sought and provided (3 July 2009) by the proponent as follows:

- i) It is conceded by the proponent that increased recreational use of the Molonglo River corridor will occur as a result of urban development within the Molonglo Valley. However, studies commissioned to investigate the valley as the next major development front for the ACT have mapped areas of significant conservation value and proposed strategies for minimising impacts. This is reflected in the Territory Plan by identification of the river corridor as NUZ4- River Corridor and restricting the limits (size and shape) of the FUA to be sympathetic to the receiving environment.

The limits of the development area will be further refined at the EDP DA evaluation assessment stage by referencing the recommendations of the previous studies and by ensuring that the indicative land use pattern of the Territory Plan is adhered to.

- ii) Indirect impacts on PTWL habitat will occur as a result of the development of the valley. As with the issues associated with the river corridor, the studies commissioned to investigate this issue were used to inform the strategic land use pattern in the Territory Plan which avoids those areas of high PTWL habitat value.

It has also been confirmed by the proponent that a sewer pump station is no longer required for the trunk sewer line. This further reduces the impact upon PTWL habitat.

In relation to the location of the dam wall for the proposed Coombs Pond, it was chosen to ensure minimal impact by locating in an area of former pine plantation of very low ecological value. However, the Conservator will have an opportunity to comment on the DA for the pond during the referral process which will include TaMS.

### **Conclusion**

The comments submitted by the Conservator contain a level of detail that the EIS process is not intended to address. Whilst the comments have proven valuable in identifying issues early in the development process there are more appropriate tools to ensure they are implemented.

By way of the comments being noted in this report they will be carried forth into the EDP DA assessment for the various other DA's associated with the development of this area of the Molonglo Valley. The comments may also be given effect through any relevant Deed of Agreement.

The issues raised by the Conservator have been thoroughly investigated by the proponent as is evidenced by the numerous studies referenced in the s211 request. ACTPLA is satisfied that the level of investigation and documentation has demonstrated that further environmental assessment is not required.

At a 6 July 2009 meeting with the Conservator and key staff, it was agreed that the issues raised by the Conservator could be addressed by this report making a recommendation to the Minister that that the Conservators comments be addressed at the EDP DA assessment stage.

### **Recommendation**

That any subsequent DA for an EDP must include:

- A Molonglo River Corridor Master Plan. The plan is to be prepared in consultation with Parks Conservation and Lands, and include the implementation of the principles for the protection of Pink-tailed Worm Lizard habitat as contained in the report *Environmental planning principles for the*

*protection of the Pink-tailed Worm Lizard (Aprasia paraulchella) in the Lower Molonglo Valley, ACT – William S Osborne February 2008.* The plan will include the requirement for a 20m buffer zone and an additional Inner Asset Fire Protection Zone that is to be within the development area, not within the river corridor or urban open space. Locations of cycle paths, walking tracks, roads and other infrastructure are to be located in the inner asset protection zone n, not within the 20m buffer zone. The plan must contain provision for the appropriate fencing of PTWL habitat adjacent to the urban development area;

- A statement addressing how the EDP has considered and addressed findings and recommendations of the Molonglo Valley Strategic Environmental Assessment;
- A statement addressing how the design of the ponds has considered and addressed PCL advice regarding the locations of the dam walls.

#### **TAMS – Asset Services Group**

Unconditional support of s211 exemption.

#### **National Capital Authority**

Unconditional support of s211 exemption.

#### **ACT Heritage Council**

Conditional support of s211 exemption.

The ACT Heritage Council have confirmed that a cultural heritage assessment and subsurface investigations have already been undertaken in both North Weston and environs and Coombs, Wright and environs. The outcome of these investigations is the production of three reports which have been approved by the ACT Heritage Council as satisfying all components of the required Aboriginal cultural assessment.

The Heritage Council is currently awaiting submission of a final report in relation to this matter for ratification. Final clearance of the historic heritage assessments therefore remains outstanding. However, the Heritage Council has confirmed that given the extensive survey of the area already carried out, the quality of the reports submitted to date, including the draft survey of the historic heritage, the Council is confident that no additional useful heritage information would be obtained were an EIS to be required

#### **Recommendation**

That no further assessment is required in relation to these matters.

That any subsequent DA for an EDP must include:

- Documentary evidence of the ACT Heritage Councils ratification and clearance of the final report re: historic heritage places in the areas of Coombs and Wright; and

- A statement addressing how the EDP has considered and addressed findings and recommendations of the final report re: historic heritage places in the areas of Coombs and Wright.
- An unanticipated discovery plan be developed for each area that is subject to an EDP DA or other DA approval.

### **ACT Health**

Conditional support of s211 exemption.

Whilst ACT Health supports the s211 exemption they have identified several matters that will need to be addressed prior to or in conjunction with development of the site:

- i) Identification and remediation of any site contamination;
- ii) Assessment and mitigation of the decommissioned sewage treatment facility adjacent to the site;
- iii) Provision of appropriate recreational space to encourage healthy living activities; and
- iv) Management of odours from nearby sewage vents.

All of the above issues raised by ACT Health have been addressed or are currently being addressed.

Site contamination issues are in hand as evidenced by the response to the EPA comments above. Similarly the assessment and mitigation of the decommissioned sewage treatment facility is well advanced with a Remedial Action Plan currently being evaluated by an independent land contamination auditor with final approval by the EPU expected by 31 July 2009.

The concept master plans and the Territory Plan zoning of the site address the issue of appropriate recreational open space to encourage healthy living.

Management of sewage systems must comply with all relevant Australian Standards and work practices. Amongst these standards is the requirement for odour control. This matter is more appropriately addressed at the design approval stage of the sewer trunk and reticulation system.

### **Recommendation**

That conditions requiring documentary evidence of EPU approval for all site contamination reports be provided at the EDP DA submission stage.

### **ACT Emergency Services Agency – ACT Fire Brigade, ACT State Emergency Services**

Conditional support of s211 exemption.

Whilst ACT ESA supports the s211 exemption they have identified several matters that they believe will need to be addressed prior to or in conjunction with development of the site:

- i) Fire station response area; ACT FB
- ii) Water supplies; ACT FB
- iii) Infrastructure – roadways standards; ACT FB
- iv) Street furniture; ACT FB
- v) Construction requirements; ACT FB
- vi) Bush fire risk; ACT FB
- vii) Drowning risk; ACT SES

ACTPLA considers that the matters listed above are concerned with a level of detail that is beyond the scope of the EIS process. They are more appropriately addressed during the DA assessment stage of the EDP and or the individual infrastructure project DA's.

### **Recommendation**

That no further assessment is required in relation to these matters.

### **5 DA Considerations**

Any development application related to the MVUD will include the consideration of appropriate conditions of approval such as those outlined below. Issues which are identified during the assessment of the subsequent impact track development application may be addressed through further conditions not included in this section or as a variation of these conditions. Many of the conditions of approval involve the implementation or management of mitigation measures.

The following possible conditions of approval have been identified during the consideration of the s211 request for the proposal:

#### **Construction Environmental Management Plan**

That a *Construction Environmental Management Plan* (CEMP) be submitted to ACTPLA for approval prior to the commencement of works on site. The CEMP shall include as a minimum, the following sub-plans and mitigation measures:

- (a) **Vegetation Management Plan and Mitigation Strategy**  
A plan that details management and/or removal of native and exotic vegetation before, during and after construction and endorsed by PCL, TAMS.
- (b) **Map of areas of Environmental Significance**  
A map that identifies areas of environmental significance, including areas identified for rehabilitation, offsets and for special consideration.
- (c) **Work Method Statements**  
Work method statements endorsed by PCL, TAMS.
- (d) **Conservation Management Plan and Unanticipated Discovery Plan – Heritage**  
*A Conservation Management Plan and an Unanticipated Discovery Plan*, that include the discovery of human remains, developed and endorsed by the ACT Heritage Council.
- (e) **Noise Management Plan**  
*A Noise Management Plan* including mitigation measures to be endorsed by EPA.

- (f) Molonglo River Corridor Master Plan  
A Molonglo River Corridor Master Plan endorsed by PCL
- (g) Sediment and Erosion Control Plan  
A *Sediment and Erosion Control Plan* to be endorsed by the EPA.

**NOTE:** *the CEMP may contain plans and management strategies listed elsewhere within the conditions of approval. Where these plans can be integrated into the CEMP, it must be clearly identified to which condition of approval the plan or management strategy applies.*

### **Environmental Authorisation/Agreement**

That prior to the commencement of works, the following requirements be sought, submitted to and approved by the EPA:

- (h) Environment Authorisation under the provisions of the *Environment Protection Act 1997* for any activity on the site which is listed under Schedule 1 as a Class A activity;
- (i) A Waterways Works licence under the provision of the *Water Resources Act 2007* for any diversion of or any works within a natural waterway; and
- (j) Environment Protection Agreement with the EPA for any activity on the site which is listed under Schedule 1 as a Class B activity of the *Environment Protection Act 1997*.

### **Works on Territory Land**

That in accordance with the *Roads and Public Places Act 1937* no work should be undertaken on road verges and other unleased Territory Land without the approval of the Manager, Asset Acceptance, Community & Infrastructure Services (AA, C&I), TAMS. The approval is to be obtained prior to the commencement of any work on site.

### **Traffic Management Plan**

That a *Traffic Management Plan* be submitted to and approved by the Manager, AA, C&I, TAMS, and evidence of this approval be submitted to ACTPLA prior to the commencement of works.

### **Construction (Temporary) Parking Management Plan**

That a detailed construction parking plan for the construction phase be submitted to and approved by the Manager, AA, C&I, TAMS, prior to the commencement of any works on site. This plan shall take into account all construction/demolition vehicles and equipment, and construction workers vehicles, and how and where they will be accommodated within the site to the satisfaction of the Manager, AA, C&I, TAMS.

### **Traffic Control Device Drawings**

That Traffic Control Device drawings for all new and amended works be submitted to the Manager, AA, C&I, TAMS for approval prior to the installation of such devices.

### **Landscape Management Protection Plan (LMP)**

That during construction, all existing vegetation (trees, shrubs and grass) located on the verge and unleased Territory land immediately adjacent to the development be managed, protected and maintained in accordance with the LMP submitted to and approved by the Manager, AA, C&I, TAMS prior to the commencement of works. This plan is to be implemented before the commencement of works, including the demolition/earthworks on the site and is to be in accordance with *City Management Guidelines for the Protection of Public Landscape Assets Adjacent to Development Works-REF-04*.

### **Notice of Commencement of Construction**

That a Notice of Commencement of Construction be submitted to the Manager, AA, C&I, TAMS, one week prior to the commencement of works. The Notice shall also include the confirmation of any protective measures installed in accordance with the approved *Landscape Management Protection Plan* and programmed implementation of the *Temporary Traffic Management Plan*.

### **Waste Management Plan**

That a *Waste Management Plan* be prepared in accordance with the Development Control Code for Best Practice Waste Management in the ACT which includes demolition, construction and ongoing operational phases.

### **Bushfire Risk Management and Mitigation Plan**

That a bushfire risk assessment and recommendations be endorsed by the Commissioner, Emergency Services Authority and be submitted to ACTPLA prior to commencement of works on site, in accordance with the Planning for Bushfire Risk Mitigation General Code, the Territory Plan.

### **Table of Associated works and details of associated works**

Details of associated works including off site works be submitted to ACTPLA including the location of alternative recreation areas, parking areas and public viewing areas. Details shall include requirements for approval (DA/BA) and proposed intended timeframes for implementation.

### **Audit of requirements of conditions of approval**

That prior to the commencement of works, the applicant/Lessee shall nominate an independent person, who will be approved by ACTPLA, to audit and ensure that all conditions of approval set out in the decision by ACTPLA, or under the EPBC Act are fully completed in accordance with the next condition of this decision. That prior to the completion of work, the applicant/Lessee shall submit a report prepared and endorsed by the person identified under the previous condition of this decision to provide demonstrated evidence that the mitigation measures set out in the approval have been fully completed to the satisfaction of ACTPLA.

## **Compliance Monitoring and Tracking**

That a Compliance Tracking Program be developed and implemented to track and audit the requirements and compliance of conditions of the approval. The Program shall be submitted to and approved by ACTPLA prior to the commencement of construction or operation as appropriate. The program shall relate to both the construction and operational stages of the project and shall include, but not necessarily be limited to:

- (k) Provisions for periodic review of the compliance status of the development against the requirements and conditions of approval;
- (l) Provisions for periodic reporting of compliance status to ACTPLA; and
- (m) Mechanisms for rectifying any non-compliance identified during auditing or review of compliance.

## **Implementation of revisions for approval**

That prior to the commencement of works, revised drawings, based on the relevant drawings submitted as part of the application, showing any changes required as a result of the implementation of the conditions of approval set out in this decision, shall be submitted to ACTPLA for assessment and decision;

## **Hazardous Materials**

That a *Hazardous Materials Management Plan* be submitted to the Manager, EPA, DECCEW, in accordance with the *Hazardous Materials Environment Protection Policy*.

## **Emergency and Incident Response Management Plan**

That an *Emergency and Incident Response Management Plan* endorsed by the ESA shall be submitted to ACTPLA for approval prior to the commencement of works on site.

## **Community Information, Consultation and Involvement**

That prior to the commencement of construction, the proponent shall ensure that the following are available for community enquiries and/or complaint for the life of the project (construction stage)

- (n) A telephone number on which complaints about construction and operational activities at the site can be registered
- (o) A postal address to which written complaints may be sent; and
- (p) An email address to which electronic complaints can be transmitted

The telephone number, the postal address and the email address shall be displayed on the signs, placed in appropriate locations as defined in Condition 11 “Temporary Disruption Signage Plan” and Condition 18 “Table of Associated works and details of associated works”. A register of complaints shall be made available for inspection by ACTPLA upon request.

## **6 Conclusion**

Previous studies have demonstrated that those issues which triggered the requirement for an EIS have been satisfactorily identified and addressed. This has been confirmed by referral entities who have given unconditional and conditional support for the granting of an s211 exemption.

## **7 Recommendation**

ACTPLA has assessed the EIS scope/s211 exemption request as meeting the requirements of Chapter 8 of the P&D Act.

The supporting documentation has provided sufficient information to the ACT Government to allow an informed evaluation of potential environmental impacts which could be attributed to the proposal. The LDA has proposed a range of mitigation and management measures to reduce or avoid potential environmental impacts arising from construction and operational activities associated with the project. It is considered that any potential adverse impacts can be adequately addressed through implementation of these measures and the development application conditions specified in this report.

ACTPLA's recommendation is that the previous studies submitted with the application have adequately identified and considered those matters of potentially significant impact and that further environmental assessment is not required.

ACTPLA's recommendation is that the Minister grant exemption from the requirement to complete an EIS in accordance s211 of the *Planning and Development Act 2007*.

## Appendix J

### Waterways Code WSUD Checklist

## Water sensitive urban design estate development checklist

Note: This checklist may be completed for each stage of development as well as for the total development area.

DA No. .... Estate Name COOMBS  
 Stage EDP Suburb/District MOLONGLO Nearest Streets COTTER ROAD  
 Applicant Name STUART CHALKER Company LDA  
 Developer Name LDA

**WSUD Concept Plan required as 1:1000 scale. Plan No** 202347-C-WSUD 01 x0 03  
1:2500

### Mains water use

Mandatory provisions for rating plumbing fittings and appliances for individual dwellings, such as in Lease and Development Conditions?  Y  N

Estimated mains water use reduction using the Design Response Report, BASIX, Green Star or other assessment tool/spreadsheet: 40 %

Mains water savings proposed in the design of the public realm?  Y  N

Description: IRRIGATION OF STREET TREES & RAWCARDENS

### Stormwater management

Development area <u>TOTAL</u> / <u>TOTAL EXCL. MU</u>	<u>108.75</u> m <sup>2</sup> HA / <u>83.4</u> HA
Impervious areas – Roof areas	
Roof connected to rainwater storage	<u>9.63</u> HA m <sup>2</sup>
Roof area not connected to storage <input checked="" type="radio"/> ①	<u>NA</u> m <sup>2</sup>
Total	<u>9.63</u> HA m <sup>2</sup>
Impervious areas - Paved areas <input checked="" type="radio"/> ②	<input checked="" type="radio"/> ① + <input checked="" type="radio"/> ②
Hard paved areas	<u>44.48</u> m <sup>2</sup> HA
Permeable / porous paving	<u>0</u> m <sup>2</sup>
Total	<u>44.48</u> m <sup>2</sup> HA
Total impervious areas (with a 50% reduction applied to permeable/porous paving areas)	<u>54.11</u> m <sup>2</sup> HA

**Analysis / modelling results for sediment, nutrient and runoff volumes**

	Existing conditions	Development with no WSUD measures	Development with WSUD measures	% Reduction with WSUD measures
Suspended solids export (kg/yr)	7550	84,900	20,579	76 +
Phosphorus export (kg/yr)	25.8	122.9	59	52 +
Nitrogen export (kg/yr)	308	1464	925	37 + Δ
Peak flow for 3 months ARI storm (m³/s)	NA ↓	6.5	NA ↓	NA ↓
Peak flow for 5 years ARI storm (m³/s)	NA ↓	20.01	NA ↓	NA ↓
Peak flow for 100 years ARI storm (m³/s)	NA ↓	44.5	NA ↓	NA ↓

REFER OVER

**Pond / Wetland proposals**

↓ REQUIRED DETENTION IN COOMBS IS PROVIDED BY COOMBS PONDS TO MITIGATE POST DEVELOPMENT INCREASE IN FLOWS

The following details are to be completed for all proposed pond / wetland designs to allow for the basic elements to be checked for sizing and adequacy.

	RL	Surface area	Volume
Pond invert		0	0
NWL <sup>(1)</sup>			
TWL <sup>(2)</sup> – 3 months ARI storm			
TWL <sup>(2)</sup> – 100 years ARI storm			

- (1) NWL = Normal water level prior to storms
- (2) TWL = Top water level

	Inflow	Outflow
1 year ARI flow		
5 years ARI flow		N/A
100 years ARI flow		

Catchment area to pond for small storms up to 3 months ARI = .....Ha

Catchment area to pond for large storms up to 100 years ARI = .....Ha

Percentage urbanised = .....%      Percentage impervious = ..... %

Extended detention = Volume at TWL (target 3 months ARI flow) – Volume at NWL

= ..... m³

Retardation storage = Volume at TWL (100 years ARI flow) – Volume at TWL (3 months ARI flow)

= ..... m³

Macrophyte zone area (less than 600 mm depth at NWL) = .....%

Plant species proposed (list and include % of total planting area):

**Wastewater reuse (optional)**

Wastewater reuse proposed?	<del>Y/N</del> <del>N/A</del>
Type of reuse	
Untreated greywater (direct use on garden only)	<del>Y/N</del> <del>N/A</del>
Treated greywater	<del>Y/N</del> <del>N/A</del>
Community reuse facility (if available)	<del>Y/N</del> <del>N/A</del>
Uses for wastewater	
Garden use	<del>Y/N</del> <del>N/A</del>
Toilet flushing	<del>Y/N</del> <del>N/A</del>
Laundry use	<del>Y/N</del> <del>N/A</del>
Other	<del>Y/N</del> <del>N/A</del>
Estimated annual reuse	..... <del>N/A</del> ..... m <sup>3</sup> (KL)

**Summary of WSUD targets and achievements**

	Target	Achieved
Mains water use reduction	40%	<del>40</del> .....%
Reduction in suspended solids	60%	
Reduction in total phosphorus	45%	
Reduction in total nitrogen	40%	
Effluent reuse	Optional	..... kL/yr

**NOTE**

- + - POLLUTANT REDUCTION TARGETS IN COOMBS ARE DETERMINED BY DOWNSTREAM DISCHARGE CONDITIONS IN ACCORDANCE WITH ACTPLA'S 'STORMWATER QUALITY MODELLING OF WRIGHT & COOMBS'
- Δ - REFER SECTION 3.6 OF EDP REPORT. CONFIRMING DEVELOPER TARGETS AS REQUIRED BY ACTPLA'S 'STORMWATER QUALITY MODELLING OF WRIGHT & COOMBS' ARE EXCEEDED BY INFRASTRUCTURE PROPOSED UNDER THE COOMBS EDP.

ACTPLA'S 'STORMWATER QUALITY MODELLING OF WRIGHT & COOMBS' IS CONTAINED AT APPENDIX D OF THIS REPORT.

Appendix K  
Molonglo Riparian Strategy



# MOLONGLO RIPARIAN STRATEGY

## Coombs and North Weston

Prepared for  
Land Development Agency

28 January 2011



## DOCUMENT TRACKING

ITEM	DETAIL
Project Name	Molonglo Riparian Strategy
Project Number	09SUTNRM-0016
File location	G:\Synergy\Projects\09SUTNRM\09SUTNRM-0016 Molonglo Riparian Strategy\Report
Prepared by	Beth Medway, Peter Hemphill, Luke Geelan, Vivian Tan, Jo Daly, Tammy Haslehurst, Dr Will Osborne
Approved by	Dr Ailsa Kerswell
Status	Final
Version Number	8
Last saved on	28 January 2011

## ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from the Land Development Agency, ACT Planning and Land Authority, and Territory and Municipal Services.

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# Abbreviations

ABBREVIATION	DESCRIPTION
ACT	Australian Capital Territory
ACTPLA	ACT Planning and Land Authority
DECCEW	Department of the Environment, Climate Change, Energy and Water
EDP	Estate Development Plan
EPBC	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
LDA	Land Development Agency
NCA	National Capital Authority
TAMS (LMP)	Territory and Municipal Services (Land, Management and Planning)

# Executive Summary

The ACT Land Development Agency commissioned Eco Logical Australia Pty Ltd to prepare a strategy for rehabilitation of a section of the Molonglo River corridor. The study area is adjacent to Coombs and North Weston, which are some of the first suburbs to be developed in the Molonglo Valley, a greenfield urban development planned for 55,000+ people. The Strategy will be used by a range of ACT Government agencies to address urban interface issues, conservation objectives, recreation uses and land management requirements. This Strategy represents part of an ongoing process for the rehabilitation and management of the whole river corridor.

The environmental, recreational and amenity values of the riparian corridor and adjacent areas have been degraded by past land uses. Land use within the area prior to the bushfires in January 2003 included forestry (pine plantation) and rural grazing leases. The study area is heavily infested with pest plant species including Blackberries and Willows, a condition that has been exacerbated by the fires.

The study area is currently zoned Non-Urban 'NUZ4 River Corridor' and classified as 'Special Purpose Reserve' in the Molonglo and North Weston Structure Plan in the Territory Plan. Objectives of NUZ4 River Corridor are to:

- Conserve the ecological and cultural values of the ACT's major river corridors
- Protect stream flow, water quality and flood plains from adverse impacts
- Ensure that the type and intensity of development is sustainable
- Provide opportunities for a range of ecologically sensitive water and land based recreational activities
- Ensure compatibility between land uses, water uses and the general character of the rivers
- Provide opportunities for appropriate environmental education and scientific research activities
- Prevent development that would significantly increase fire hazard

The Territory Plan requires that a plan of management is prepared for public land reserves to describe how the objectives for the area are to be implemented and promoted. This Strategy provides the framework for subsequent development of a River Park Concept Plan and detailed plan of management.

It is recommended that proposed rezoning of the river corridor to 'nature reserve' be further investigated during subsequent planning phases. The rezoning would more accurately reflect the objectives of conserving and rehabilitating biodiversity, amenity and recreational opportunities described in this Strategy. Management objectives for this zone are listed in Schedule 3 of the Act as follows:

- To conserve and restore the natural environment
- To provide for public use of the area for recreation, education and research

The Strategy describes management principles, objectives and strategic actions to achieve the vision for the corridor, which is to:

*Enhance recreational opportunities and improve amenity, while conserving and rehabilitating aquatic and riparian ecosystems within the study area.*

Key strategic actions include:

- Staged programs of weed control, and native vegetation and fauna habitat rehabilitation, which will start in areas of best condition and highest conservation significance
- Protecting and enhancing Pink-tailed Worm Lizard (*Aprasia parapulchella*) habitat. The Pink-tailed Worm Lizard is a threatened species listed under the Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. Actions identified in this Strategy relevant to *A. parapulchella* are consistent with the EPBC Referral Decision regarding the development of the suburb of Coombs dated 16 April 2010
- Maintain and improve recreational opportunities and amenity, including linkages with surrounding urban areas and regional recreational facilities such as Stromlo Forest Park
- Minimise ongoing threats to the values of the corridor, such as inappropriate fire regimes and water pollution

LDA is expected to implement some early actions as part of estate development (e.g. design and establishment of urban edge features such as the perimeter road). In the long term, responsibility for implementation of the Strategy lies with TAMS (LMP).

# 1 Introduction

## 1.1 BACKGROUND AND CONTEXT

In 2004, the Australian Capital Territory Planning and Land Authority (ACTPLA) prepared the Canberra Spatial Plan which identified the Molonglo Valley as a potential 'greenfield' area to accommodate future urban development. Subsequent investigations by ACTPLA in collaboration with the National Capital Authority determined that the area would be suitable for urban development, taking account of matters of National Capital Significance and environmental considerations. ACTPLA then prepared a Structure Plan (**Figure 1**) and a draft variation to the ACT Territory Plan for the new district of Molonglo - a new town of approximately 55,000 people.

In August 2008, Variation 281 to the Territory Plan was approved. The final variation includes Concept Plans for North Weston, Coombs and Wright, as well as the intended land use zones for the entire East Molonglo. Amendment 63 to the National Capital Plan passed through Commonwealth Parliament on the 12 December 2008. Land release commenced in 2010.

The National Capital Plan sets the general framework for the river corridor which seeks to ensure that the corridor is an integrated part of the national capital open space system. Its key objective is:

*To conserve the essential landscape and environmental character of the river and its natural and cultural values and to provide a balanced range of river and off-river recreation and other uses in a manner that reinforces and protects the river corridor as a unified system.*

The Molonglo River corridor is zoned in the Territory Plan as 'Public Land Reserve – special purpose reserve (Pd)'. Therefore the reserve must be managed in accordance with the management objectives stated in Schedule 3 of the Territory Plan for a 'special purpose reserve' which are:

*To provide for public and community use of the area for recreation and education.*

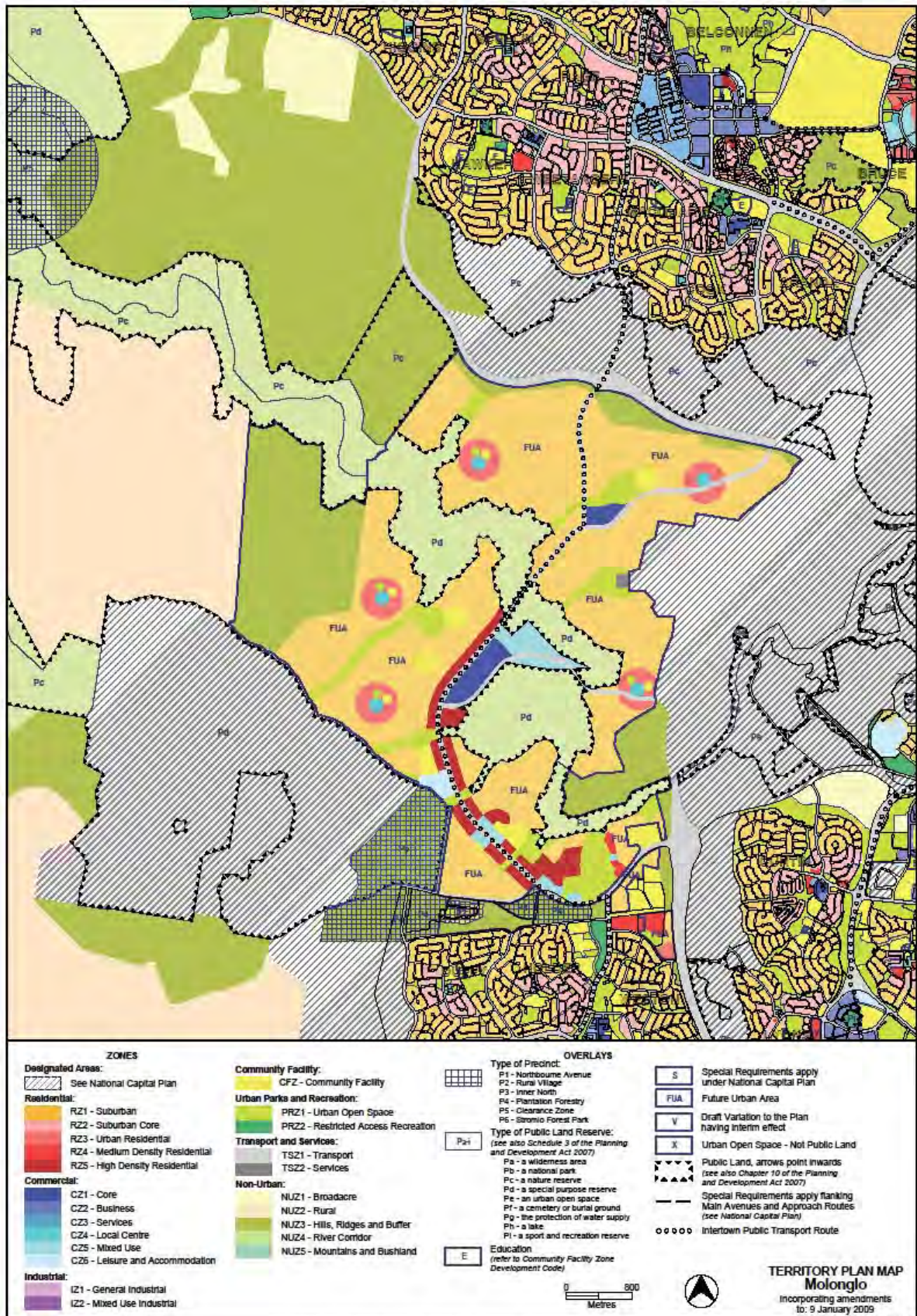
The Territory Plan requires that a *plan of management* is prepared for public land reserves to describe *how the objectives for the area are to be implemented and promoted*.

This Riparian Strategy provides a first step leading to the preparation of a plan of management. It also meets certain statutory requirements, including conditions of a referral decision made under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* regarding the development of the suburb of Coombs.

A diagrammatic summary of the planning context for the Riparian Strategy is given in **Figure 2**. This Strategy represents a first stage in an ongoing strategy for the river corridor which ultimately will extend from Scrivener Dam (Lake Burley Griffin) to the lower end of the future urban area downstream of Coppins Crossing.

The Land Development Agency (LDA) with ACTPLA and TAMS engaged Eco Logical Australia to prepare this Riparian Management Strategy for part of the Molonglo River corridor adjacent to Coombs and North Weston. The project is needed to provide a comprehensive strategy that can be used by a range of ACT Government agencies to address urban interface issues, conservation objectives,

recreation uses and land management requirements. The methodology used to prepare this report is outlined in **Appendix A**. A summary of the legislative, planning and policy framework is given in **Appendix B**.



Authorised by the ACT Parliamentary Counsel—also accessible at [www.legislation.act.gov.au](http://www.legislation.act.gov.au)

Figure 1: Molonglo Structure Plan

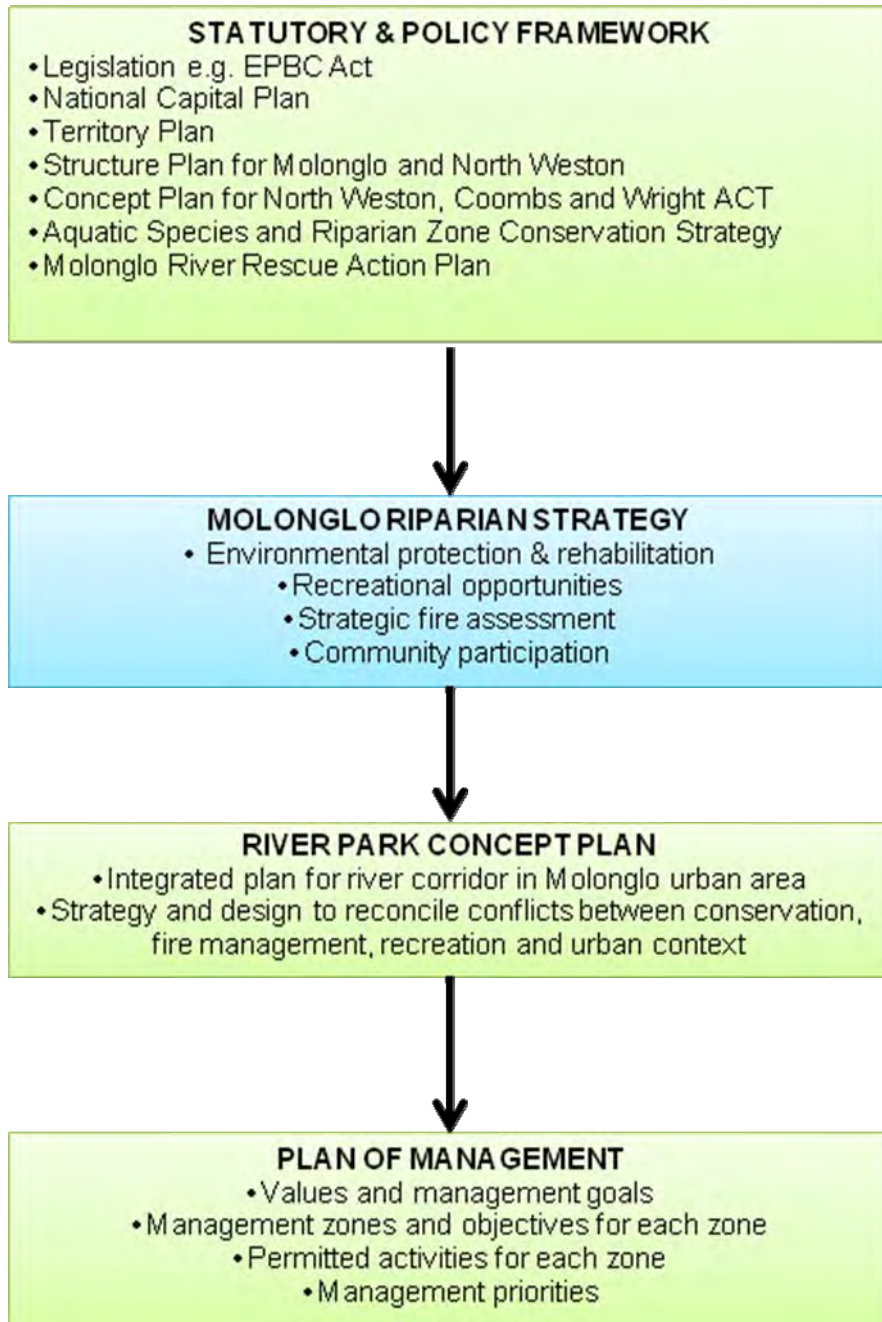


Figure 2: Planning context

## 1.2 STUDY AREA

The study area is approximately 110 ha and encompasses the Molonglo River corridor adjacent to the future suburbs of Coombs and North Weston. The study area is shown in **Figure 3**. Consideration is also given to the regional context, including:

- The river corridor immediately upstream of the study area, between Scrivener Dam and the Tuggeranong Parkway
- The downstream river corridor towards Coppins Crossing
- Adjacent future suburbs
- Misery Hill and Bald Hill
- Connectivity with Stromlo Forest Park to the west and the Arboretum to the north-east

## 1.3 VISION FOR THE STUDY AREA

The vision for the study area needs to be consistent with legislative requirements and current policies, and needs to align with the vision for the broader river corridor. These matters are outlined in **Appendix B**.

The vision for the study area recognises the history of modification of the landscape since European settlement from rural, to pine-plantation forestry, to weed infestation following the 2003 wildfires. The vision anticipates urban development of adjacent areas, and aims for rehabilitation and improvement beyond the current condition.

The vision for the study area is to:

***Enhance recreational opportunities and improve amenity, while conserving and rehabilitating aquatic and riparian ecosystems within the study area.***

The character of the future landscape will ultimately become a mix of good quality urban bushland, with appropriate vegetation communities and fauna habitats, and pockets of 'park-like' recreation areas and a well-maintained track network which will be the focus of recreational activity. There will be a staged, transition period as parts of the river corridor are enhanced prior to other areas.

Long-term active management by professionals and the community will be needed to improve and maintain conditions within the study area as adjacent areas become increasingly urbanised.

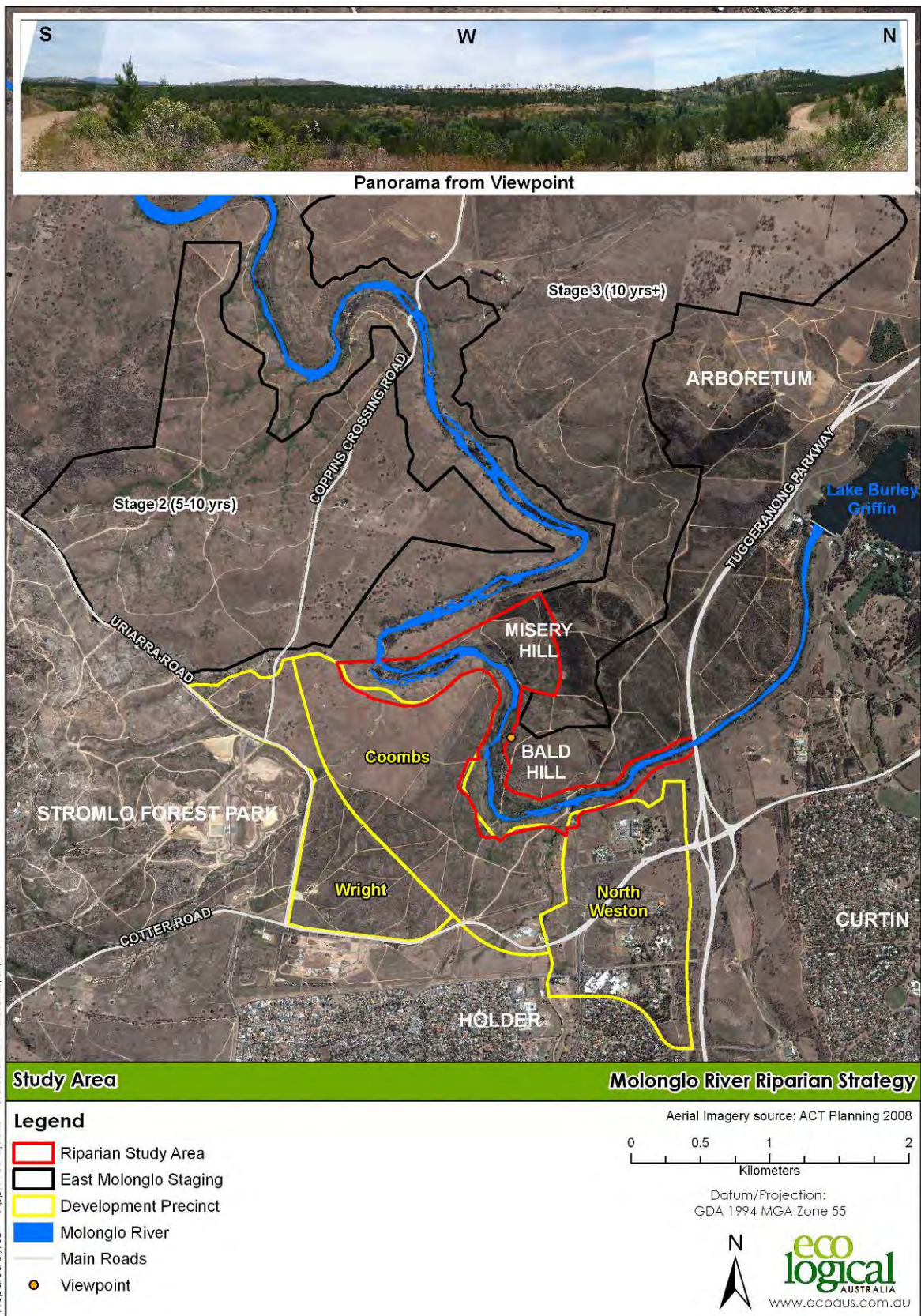


Figure 3: Molonglo riparian corridor study area

## 2 Current values

This section describes the strengths and weakness of the study area in terms of its recreational facilities, amenity, topography, drainage, terrestrial ecology, aquatic ecology and water quality. Opportunities to improve conditions are identified and possible future threats to these values are assessed. The strengths, weaknesses, opportunities and threats (SWOT) analysis is summarised in **Appendix C**.

### 2.1 RECENT USE

In recent decades the study area has been subject to pine forestry and stock grazing. In the Molonglo Valley, pine plantations have had a more widespread and significant adverse impact than stock and farmland.

#### 2.1.1 Pine forestry

The majority of the study area and surrounds were cleared, planted and managed for pine forestry until the 2003 bushfires. This included construction and maintenance of unsealed roads suitable for logging operations. The forest was burnt in 2003, and since that time there has been no management of these areas. This has resulted in tracks becoming eroded and overgrown, and pine wildlings and weeds dominating regrowth of vegetation across the landscape.



**Pine regrowth and weedy understorey**

### 2.1.2 Stock grazing

The western or downstream part of the study area has been, and continues to be grazed by stock. Adverse impacts associated with stock grazing (which are generally not associated with grazing by native animals) typically include:

- Lowered water quality (including increases in turbidity and nutrients)
- Trampling and lack of regeneration of fringing aquatic vegetation that is important for bank stability and habitat e.g. *Phragmites* spp.
- Erosion and sedimentation due to the creation of tracks and bare areas, and soil compaction
- Deterioration in stream bank stability, through trampling, track creation and loss of streambank vegetation
- Spread of weeds (into and out of riparian areas)
- Disturbance to habitat, such as rocks and logs, and loss of ground surface detrital material (litter and woody debris)
- Loss of habitat connectivity and impacts on the value of riparian areas as drought refuges for native species
- Lack of regeneration of native species, including dominant native tree cover
- Loss of invertebrate and other species due to trampling and soil compaction, with associated effects on energy and nutrient cycling processes

It is important that removal of stock be carefully managed to promote better environmental conditions and avoid uncontrolled growth of weeds, loss of amenity and increased bushfire risk. There are a variety of strategies that can be employed to manage the potential environmental impacts of stock removal, including bush regeneration practices, grazing by native animals, slashing and control burns.



**Holdens Creek draining to Molonglo River - grazed area in foreground, pine regrowth and plantations on hills in distance**

### 2.1.3 Water management

The study area is part of the Lower Molonglo River corridor, which is defined as the river downstream of Lake Burley Griffin. The Lake was created following construction of Scrivener Dam across the Molonglo River in 1963. Water flow in the river is regulated by the dam.

In recent years water has been extracted from Weston Creek near its junction with the Molonglo River at Clos Crossing and conveyed by water tanker for use at the arboretum.



Scrivener Dam upstream of the study area (January 2010)



Scrivener Dam – three floodgates open following heavy rain in December 2010

#### 2.1.4 Recreation and amenity

Unsealed tracks throughout the area (shown in **Figure 4**) are used for recreational activities such as horse and mountain bike riding, walking, cross-country running, orienteering and recreational off-road vehicle use. The tracks provide linkages with Stromlo Forest Park, the Arboretum and Equestrian Park. The main tracks through this area are part of the Bicentennial National Trail, which is a 5,330 km marked route along the Great Dividing Range of eastern Australia.

There are two locations where the tracks cross the river – Clos Crossing and Southwell's Crossing. Both are concrete structures, although only Clos Crossing is wide enough to allow a car across.



**Clos Crossing**



**Southwells Crossing**

The Territory Plan codes do not allow for swimming in the Molonglo River because of poor water quality (refer to **Section 2.4**) and the variable water level following rainfall or release from the dam. Water is not typically released from the dam unless there is heavy rainfall upstream. Rapid increase in water level in the river can also be associated with rainfall in the catchment.



**Dry rocky crossing immediately upstream of large pool (see photo on following page)**



**Rocky crossing under water later the same day following rain upstream**



**Large pool downstream of rocky section**

Views are available from either side of the river valley, particularly from high hills. The ACT Equestrian Association states that Misery Hill is a favourite destination for local equestrians but they would not be able to go there if the access road is sealed because of the expected use by vehicles.



**View across the valley towards future suburb of Coombs**



Figure 4: Existing track network and river crossings

## 2.2 TOPOGRAPHY, DRAINAGE AND SOILS

Topography is a key parameter for defining the landscape and has implications for track alignments, recreational areas, erosion management, flood zone constraints and ecosystems. Topography and drainage features within the study area (e.g. ponds and probable maximum flood extent) are illustrated in **Figure 5**, based on studies and designs conducted for the urban development. An analysis of slope is given in **Figure 6**.

The main river channel is deeply incised for much of its length to Coppins Crossing. The ephemeral drainage channels, such as Holdens Creek are indicated in **Figure 5**. Water flow in the Lower Molonglo River has been significantly altered by upstream impacts including the urban development of Canberra and construction of Scrivener Dam. Further changes will occur as a result of development of adjoining suburbs.

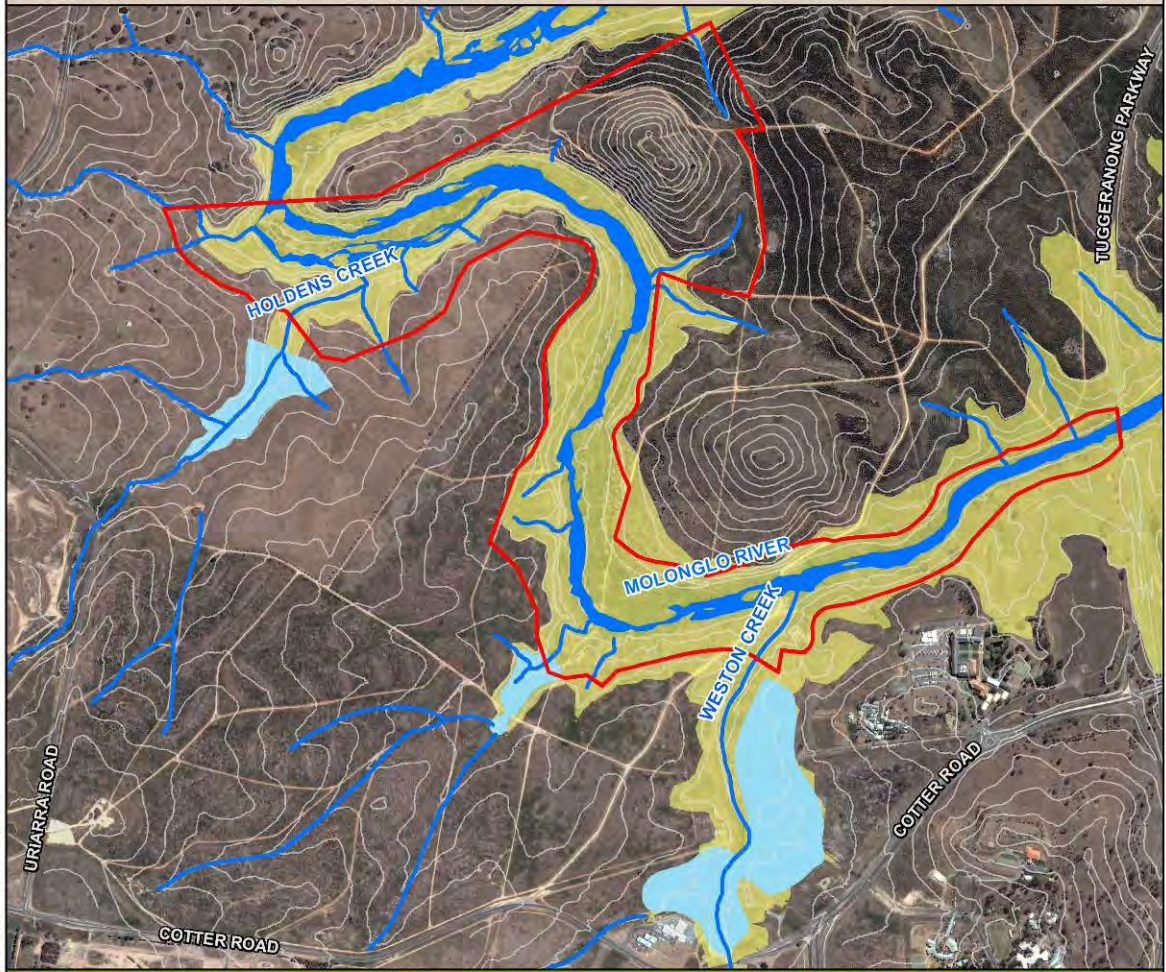
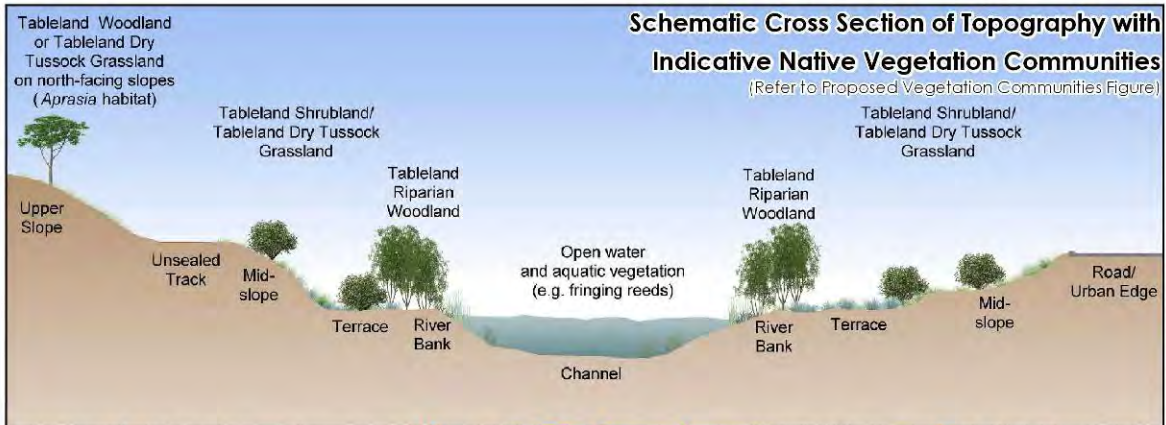


**Undulating terrain draining to river**

Volcanic rocks dominate the geology of the area and outcrop in the riverbed and banks. Terraces and alluvial flats border the river channel from 2-5 m above the normal (low) flow level. Rock and boulder terraces are positioned in some sections of the river. Terraces were formed during previous high discharge floods, but following the construction of Scrivener Dam have become relict features upon which vegetation has become established (ACT Government 2007).

The slope analysis in **Figure 6** indicates that the river flats and terraces generally have a slope of less than 10%. Most of the riparian corridor is bounded by steeper slopes of between 10 - 20%, including the hills on the north-eastern side of the river. Excellent views are available from some of the upper slopes and hill-tops.

Soils are typically shallow or skeletal and mostly infertile. Soils across the study area have been extensively disturbed by past grazing and forestry activities. Erosion is evident at a few locations where the river bank is exposed. Some unsealed tracks have been eroded, particularly after recent heavy rainfall.



**Topography and Drainage** **Molonglo River Riparian Strategy**

**Legend**

- Riparian Study Area
- Drainage
- Contours (5m)
- Ponds
- Probable Maximum Flood Extent

Aerial Imagery source: ACT Planning 2008

0 150 300 600  
Meters

Datum/Projection:  
GDA 1994 MGA Zone 55

[www.ecoaus.com.au](http://www.ecoaus.com.au)

Prepared by: JD Approved by: BM Status: DRAFT Date: 24/01/2011

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Figure 5: Topography and drainage

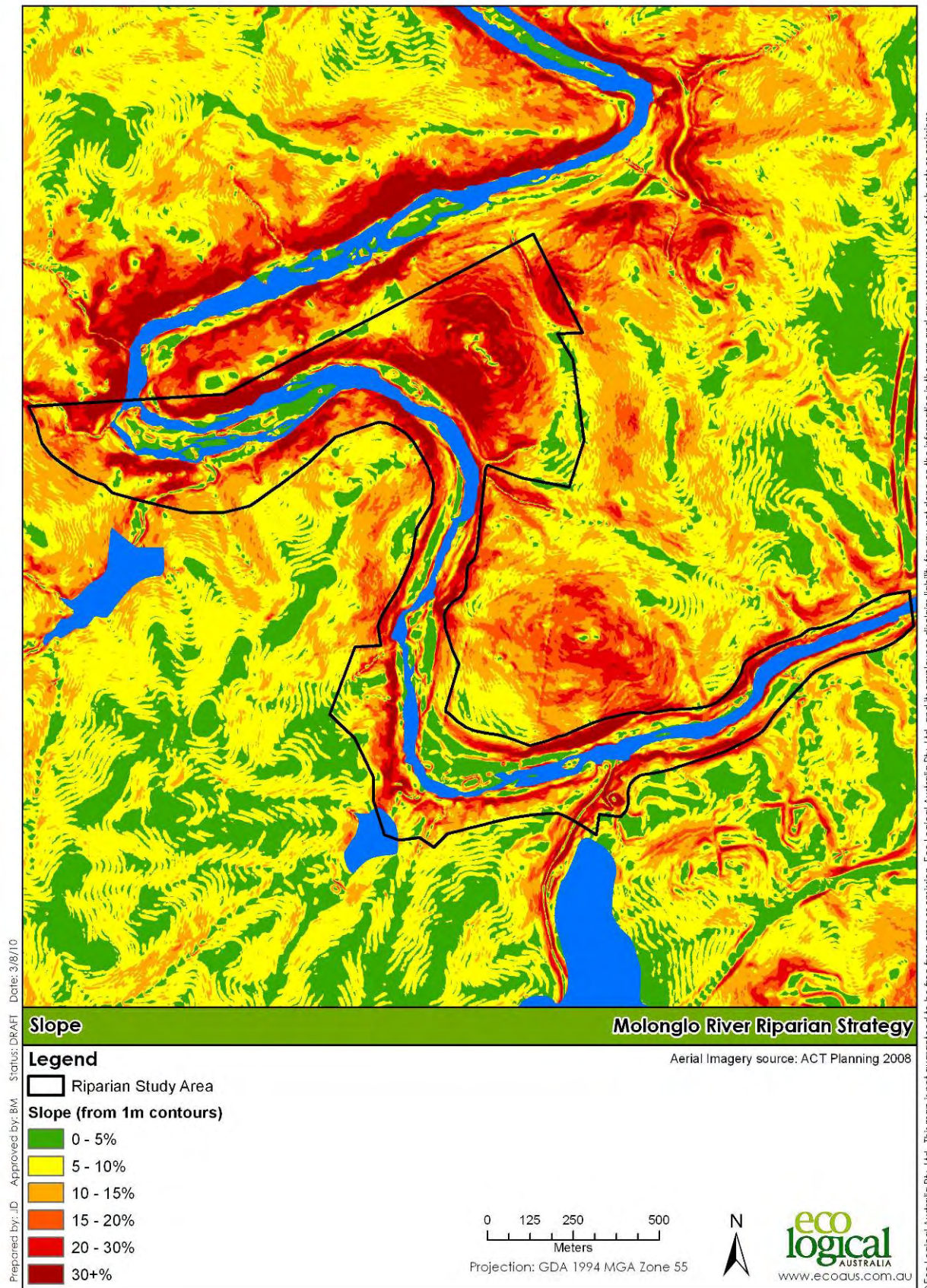


Figure 6: Slope analysis

## 2.3 TERRESTRIAL ECOLOGY

ELA (2008, 2009b) undertook ecological survey and mapping for the Molonglo River corridor between Scrivener Dam and the confluence of the Molonglo River with the Murrumbidgee River. Further investigation was undertaken in early 2010 during preparation of this Strategy. Results of field investigations and a literature/data review inform this section of the report.

The vegetation, river corridor and water quality within the study area have been severely modified by pine forestry, agriculture (primarily grazing), the construction of Scrivener Dam and the fires in 2003. Extensive weed infestation throughout most of the study area means that native vegetation communities cannot be easily defined. There are some small pockets where remnant vegetation exists, such as the stand of mature Casuarinas on the mid-stream bank in the downstream section of the study area.

Overall the condition of ecosystems within the corridor can be grouped into:

- Tuggeranong Parkway to Misery Hill – severely modified environment that was a pine plantation. Dense weed infestation prevents access to the river along most of its length. There is some gully erosion along tributaries but most of the main river channel is stable. Water quality is poor as a result of urban runoff upstream especially from Yarralumla and Weston Creeks but also from Lake Burley Griffin which has suffered algal blooms in recent years (as a result of high nutrient loads from the urban area, Queanbeyan and farm land within the Molonglo River Catchment).
- Misery Hill to the downstream study boundary – moderately modified environment that continues to be grazed by stock. This area has moderate to low levels of weed infestation, but retains significant ecological values. Some parts of this area provide habitat for the threatened Pink-tailed Worm Lizard (*Aprasia parapulchella*).

### 2.3.1 Flora and fauna

Despite the highly modified state of the study area, there is some valuable habitat available for native fauna. Examples include:

- Dead trees, particularly where located in the river, offer sites for roosting and nesting. Australasian Darters (*Anhinga novaehollandiae*) were observed nesting in a dead tree in the upper section of the study area
- Dense thickets of weeds (e.g. Blackberry *Rubus fruticosus* agg.) provides habitat for small birds such as wrens
- Rocky, derived grasslands provide habitat for the Pink-tailed Worm Lizard (*Aprasia parapulchella*)
- Derived grasslands and open woodlands provide habitat for Eastern Grey Kangaroos (*Macropus giganteus*)
- Aquatic habitat (fringing reeds, open water, exposed rocks at the edge of the river) provide habitat for frogs, fish and reptiles (e.g. Eastern Water Dragon *Physignathus lesueurii*)

The Molonglo riparian area will act as a local refuge for small birds and other fauna during times of stress, such as drought. The corridor is also of local importance to movement of many species of birds across the landscape such as silvereyes, thornbills, honeyeaters and native finches.

Threatened\* and migratory species that may be found in the area, and their conservation status, are listed according to habitat type in **Appendix D**. Species that have suitable habitat in the study area, but have not been recorded, include:

- Striped Legless Lizard (*Delma impar*)\*
- Rainbow Bee Eater (*Merops ornatus*)
- Cattle Egret (*Ardea ibis*)
- Great Egret (*Ardea alba*)

*A. parapulchella* is the only threatened species<sup>1</sup> that has been recorded in the study area. Habitat for *A. parapulchella* is mapped in **Figure 7**. Refer to the following section for further details.

### 2.3.2 Pink-tailed Worm Lizard

#### *Habitat*

The following information regarding the Pink-tailed Worm Lizard (*Aprasia parapulchella*) was prepared by Dr William S. Osborne, Institute for Applied Ecology, University of Canberra (3 February 2010). The information is based in part on an earlier unpublished report to ACTPLA<sup>2</sup>.

Detailed information is available on the habitat of the Pink-tailed Worm Lizard (Osborne et al. 1991; Jones 1992, 1999). The species lives beneath stones in burrows formed initially by ant colonies. The species feeds exclusively on ants, particularly on their eggs and larvae. In the ACT region, suitable habitat for the lizards occurs in association with open rocky areas on hillsides, particularly on slopes of the main river valleys. In this region, the species has only been found in areas underlain by acid volcanic rock types – Late Silurian acid volcanoclastic deposits (e.g. rhyodacite, rhyolite, dacite). The specific rock types are listed in Osborne et al. (1991) but a common feature of the sites is that they contain numerous scattered surface rocks which are well-weathered and partially embedded in the soil and grass. The lizards are commonly found beneath rocks that range from about 10 to 30 cm in diameter (Jones 1992).

Potential habitat in the ACT is characterised by an absence of trees (e.g. a lack of forest cover) and by a cover of predominantly native grasses, particularly kangaroo grass *Themeda australis*, red-leg grass *Bothriochloa macra* and *Lomandra filiformis* (Osborne et al. 1991; Jones 1992, 1999). The likelihood of the occurrence of *A. parapulchella* is increased with an increasing cover of kangaroo grass (*T. australis*). By contrast, increases in the occurrence of the grasses *Stipa falcata*, *Stipa bigeniculata* and *Poa labillardieri* decrease the likelihood of finding the species. Jones (1992) also found that a moderate number of disturbed sites dominated by exotic pasture species such as *Avena barbata*, *Vulpia bromoides*, *Hypocheirus radicata*, *Bromus hordaceus*, *Aira elegans* and *Trifolium arvense*, and the native species *Bothriochloa macra* (red-leg grass) supported at least some individuals. It is possible, however, that these disturbed sites will not support viable populations.

<sup>1</sup> Note that it is classified as threatened under the Commonwealth EPBC Act

<sup>2</sup> Osborne, W.S. (2007) *Environmental planning principles for the protection of the Pink-tailed Worm-lizard Aprasia parapulchella in the Lower Molonglo Valley, ACT*

**Figure 7** shows areas of low, moderate and high quality habitat. Moderate and high quality areas are of particular interest and are defined as follows:

- High Quality Potential Habitat: Suitable rocky areas generally dominated by, or with a large component of Kangaroo Grass (*Themeda triandra*) and also often containing *Poa sieberiana* and, in some cases, a range of native forb species. Exotic annual species such as Haresfoot Clover (*Trifolium arevense*) and *Vulpia* spp. may also be present.
- Moderate Quality Potential Habitat: Suitable rocky areas usually dominated by Spear Grasses (*Austrostipa* spp.) and Wallaby Grasses (*Austrodanthonia* spp.). Native forb species and exotic annual grasses such as Haresfoot Clover (*Trifolium arevense*), Wild Oats (*Avena* sp.) and Saffron Thistle may also be present

*What can we learn from populations previously protected in urban reserves?*

In the ACT some areas supporting the lizards have been fully isolated in the urban matrix (e.g. Mt Taylor) and the longer-term survival prospects for these isolated populations are not known. The Mt Taylor population is of particular interest because it is a large population that has been surrounded by urban matrix for over twenty years. The reserve has been subject to a greatly increased frequency of unnatural fires (mainly from children lighting fires) and some areas of habitat have been disturbed by people collecting or moving rocks. Despite these activities the lizards were found by Osborne and McKergow (1992) to be very common. More recently David Wong (University of Canberra, unpublished data) found that a reasonably large population of Pink-tailed Worm Lizards still occurs in Coleman Ridge Nature Reserve in an area fronted on one side by suburbs and agriculture on the other side. This area has been urbanized for some thirty years.

*Commonwealth EPBC Referral Decision requirements*

The proposed development of the suburb of Coombs was referred to the (then) Department of the Environment, Water, Heritage and the Arts (now Sustainability, Environment, Water, Population and Communities) in 2009. As part of the assessment of the referral, the Department considered the potential for significant impacts on *A. parapulchella* from the proposed urban development. The referral decision (EPBC 2009/5050 dated 16/4/10) is replicated in **Appendix E** and states that ‘the proposal is not a controlled action if undertaken in a particular manner’. Required management measures are discussed in **Section 5.1.6** and include a 20 m buffer surrounding high-moderate Pink-tailed Worm Lizard habitat.



**Pink-tailed Worm Lizard**

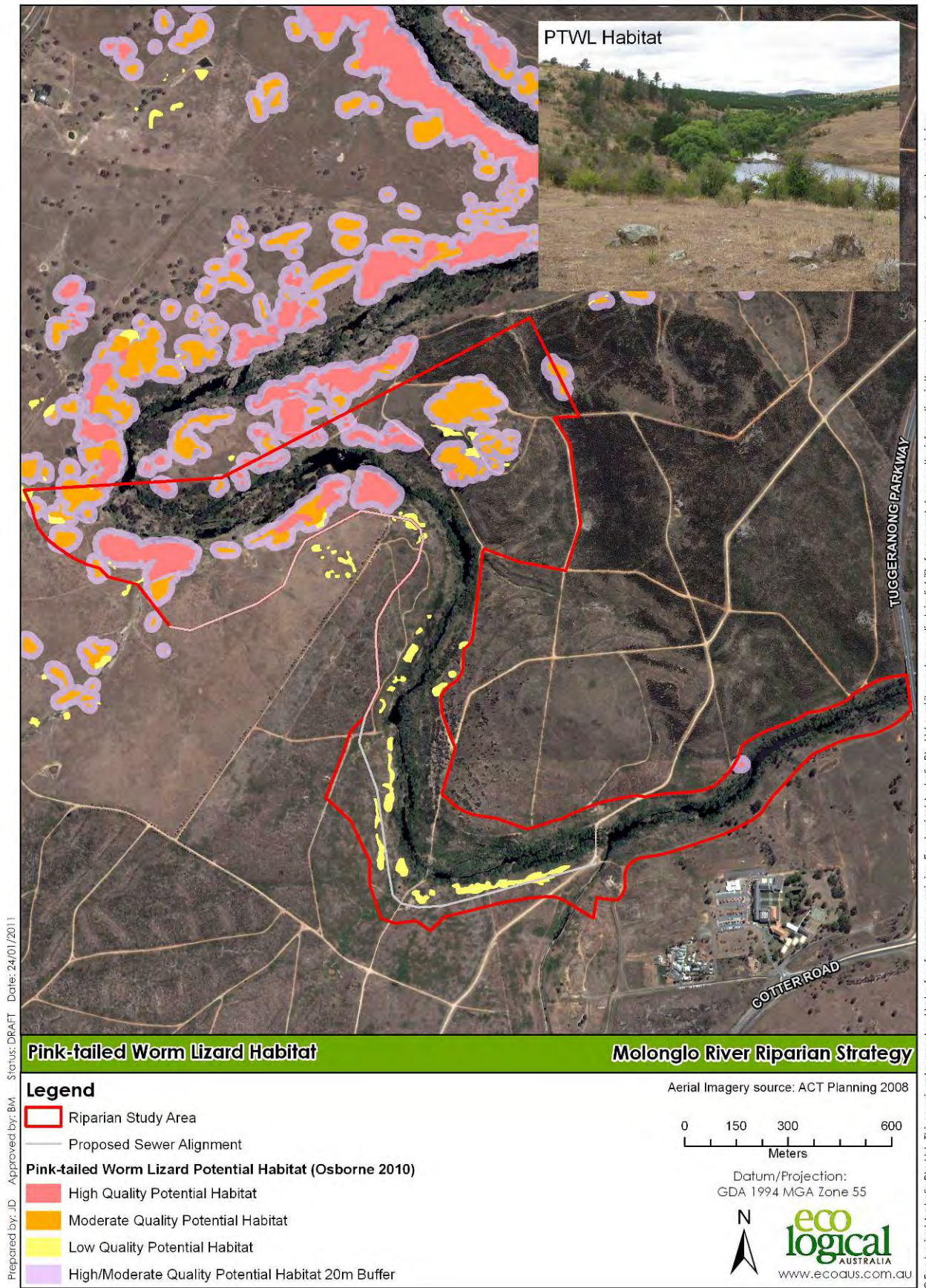


Figure 7: Pink-tailed Worm Lizard habitat

### 2.3.3 Pest plants and animals

The study area is heavily weed infested because:

- Past land uses have included clearing native vegetation cover for farmland and pine forestry which has resulted in the introduction of pest plants and their establishment in the river corridor
- The 2003 fire destroyed much of the pine forest canopy and encouraged the proliferation of weeds and pine wildlings. Formal forestry practices ceased in the area after the 2003 fires
- Pest plants have become established in reworked streambeds and the main river channel
- River regulation associated with Scrivener Dam has resulted in few high level flows to limit weed establishment
- Riparian areas are usually wetter and more fertile, often allowing exotic species to out-compete native species, especially where there is disturbance. Cultivation and fertiliser application further encourage establishment of weed species
- The watercourse itself is a route by which seeds and other plant material are transported to new locations by the water itself and by animals, particularly birds

There are many weed species growing in the study area. The ACT Pest Plants and Animals (Pest Plants) Declaration 2005 under the *Pest Plants and Animals Act* identifies plants that are major problems in riparian areas and found in this study area. These include:

- African Love Grass (*Eragrostis curvula*)
- Serrated Tussock (*Nassella trichotoma*) – Weed of National Significance
- St John's Wort (*Hypericum perforatum*)
- Blackberry (*Rubus fruticosus* agg.) – Weed of National Significance
- Willows (*Salix* spp.) – Weed of National Significance

Weeds of National Significance (WoNS) have infested large portions of Australia's natural and productive landscape and require action at a national level to reduce their impacts. A national strategy for each WoNS has been endorsed by the Natural Resource Management Ministerial Council and specifies actions to better manage the weed. WoNS recorded in the Molonglo study area are indicated above.

Most of the area adjacent the river corridor (with the exception of the lower reach) is ex-pine plantation land that is covered with Radiata Pine, and further degraded by Blackberry, St John's Wort, and exotic and native grasses. Pine wildlings will be cleared for urban development on the southern side of the river, but ex-plantation areas to the north present a major problem for rehabilitation of ecosystems within the corridor because of the ongoing threat of weed infestation.

Pest animal species that occur in the area include carp, foxes, rabbits and feral cats. Feral animals predate or compete with native species and degrade habitat. Urban development usually increases the impacts associated with domestic pets e.g. dog excrement, kittens being dumped in bushland, and domestic cats preying on birds, reptiles and invertebrates.

## 2.4 AQUATIC ECOSYSTEMS AND WATER QUALITY

The ACT Water Report 2007-08 summarises results of water quality, stream flow and aquatic ecosystem monitoring in the ACT. The water quality in ACT streams and lakes was assessed against the water quality standards set out in Volume 2 of the Territory Plan, General Code 1.8 'Water Use and Catchment General Codes'. The study found that environmental conditions in urban waterways were more degraded than non-urban waterways. However, it is not possible to know the applicability of

monitoring results to the study area because there were no monitoring sites in the Lower Molonglo River.

The closest water quality monitoring site is at Coppins Crossing, downstream of the study area. Water at this site is monitored by the Wirinjani Waterwatch Group using kits supplied by the Molonglo Catchment Group (refer to **Section 5.3.4** for more details about Waterwatch). Water quality in the Lower Molonglo was rated as good for the period January to June 2009 according to the M-CHIP rating system, which considers pH, turbidity and electrical conductivity (Skinner 2009).

Aquatic habitat in the study area comprises deep and shallow pools with slow moving water, and rocky and muddy bottoms separated by shallow, fast flowing rapids over exposed bedrock. Bridges at Clos and Southwell's Crossings allow fish passage.

The most recent aquatic fauna survey of the Molonglo River was conducted in 2003. The *ACT Aquatic Species and Riparian Zone Conservation Strategy* identifies the need for a fish and platypus survey as a priority action. A Platypus Watch Group has recently established with support from the Molonglo Catchment Group.

There are small pockets of native and exotic reeds along the river, providing in-stream habitat for frogs and fish. There were numerous small fish (species unknown) observed in the river during near Clos and Southwell's Crossings, even though water quality was affected by oily slicks (possibly runoff associated with the nearby water pumping station and tanker) and ferrous material.

Weston Creek enters the river just upstream of Clos Crossing. During dry periods, a pumping station extracts water from a pool at the confluence and the water is taken off site by tanker-truck to water plants at the Arboretum.

## 2.5 FIRE

The *Strategic Bushfire Management Plan for the ACT* (v2) states that 'the ACT has a history of severe damaging bushfires with large areas burnt in the bushfire seasons of 1919/20, 1925/26, 1938/39, 1951/52, 1978/79, 1982/83, 1984/85, 2000/01 and 2002/03'. A *Bushfire Risk Assessment for the Coombs Estate Development Plan* (ABPP 2010) found that the Molonglo Valley was impacted in the 1951/52 bushfire season, and the 2003 bushfires extended across the entire valley, destroying the forests, infrastructure and dwellings in the adjacent suburbs of Duffy and Holder.

As outlined later in this Strategy, future urban development and rehabilitation of the riparian corridor will require different management approaches, particularly fire regimes, to achieve desired objectives. Issues to consider include:

- The need to protect assets (e.g. homes) through identification and maintenance of asset protection zones (**Section 3**)
- The need to rehabilitate and maintain healthy ecosystems in the riparian corridor through application of ecologically-appropriate fire regimes (**Section 5.1.5**)

Some dead timber and exotic vegetation will need to be removed to reduce bushfire risk prior to urban development. Weed removal is also needed to improve biodiversity. A staged approach to bush regeneration is recommended in this Strategy and should commence prior to construction of dwellings in Coombs to minimise the risk of bushfire associated with excessive dead timber and exotic vegetation in the river corridor and surrounds. Consideration needs to be given to the habitat value of the timber (e.g. used for roosting and nesting) and vegetation to be removed, as well as the risk of soil erosion.



**Aerial photo taken in 2011**

**Note timber stockpiled on the upstream side of Clos Crossing bridge after recent heavy rain**

## 3 The urban edge

This section describes urban edge features, including bushfire asset protection zones and infrastructure.

### 3.1 DEFINING THE URBAN EDGE

Urban edge features need to satisfy the *TAMS Design Standards for Urban Infrastructure No.20 - Urban Edge Management Zones*. The planning objective for the urban edge zone is to ensure an appropriate interface between the urban area and surrounding public and unleased land. This requires the establishment of an adequate buffer strip inside the riparian corridor containing:

- Management fencing
- An adequate fire break
- Access tracks for land management and other maintenance authorities
- Public access
- Catch and cut-off drains
- Electricity and other services

Features relevant to the urban edge are described below and illustrated in **Figure 9**. The estate development plan (EDP) for Coombs is being developed by LDA. The buffer strip between the riparian corridor and Coombs will typically be a minimum of 17-18 m wide, depending on topography and other site-specific factors. Detailed planning and design of the urban edge will be done during preparation of EDPs, the River Park Concept Plan and Plan of Management.

### 3.2 ASSET PROTECTION ZONES

Australian Bushfire Protection Planners (ABPP 2005 and 2006) assessed bushfire risk for the Molonglo Valley in accordance with the requirements of *Planning for Bushfire Risk Mitigation* (ACTPLA), the *Strategic Bushfire Management Plan for the ACT* and the *Australian Standard for Risk Management (AS/NZS 4360: 2004)*. A further assessment was done (ABPP 2010) to determine the bushfire risk from the Pink-tailed Worm Lizard habitat at Coombs. The options presented in the recent assessment are being considered by the LDA in consultation with other agencies.

ABPP (2010) recommended that:

- The outer asset protection zone (APZ) along the river corridor should be 100 m wide (APZs are schematically defined in **Figure 8**)
- A 50 m wide inner APZ should be provided to the north-west of the Coombs development precinct, which faces Misery Hill (inner APZ to be measured from the house property boundary)
- A 40 m wide inner APZ should be provided to the remainder of the riparian corridor
- The ember zone (HAPZ) for the residential precinct should be BAL 29 for 100 m plus BAL 19.0 for the next 150 m, in accordance with *Australian Standard 3959-2009 Construction of Buildings in Bushfire Prone Areas*
- The stormwater detention ponds on Holdens Creek, Weston Creek and the internal creek lines should be maintained as an inner APZ

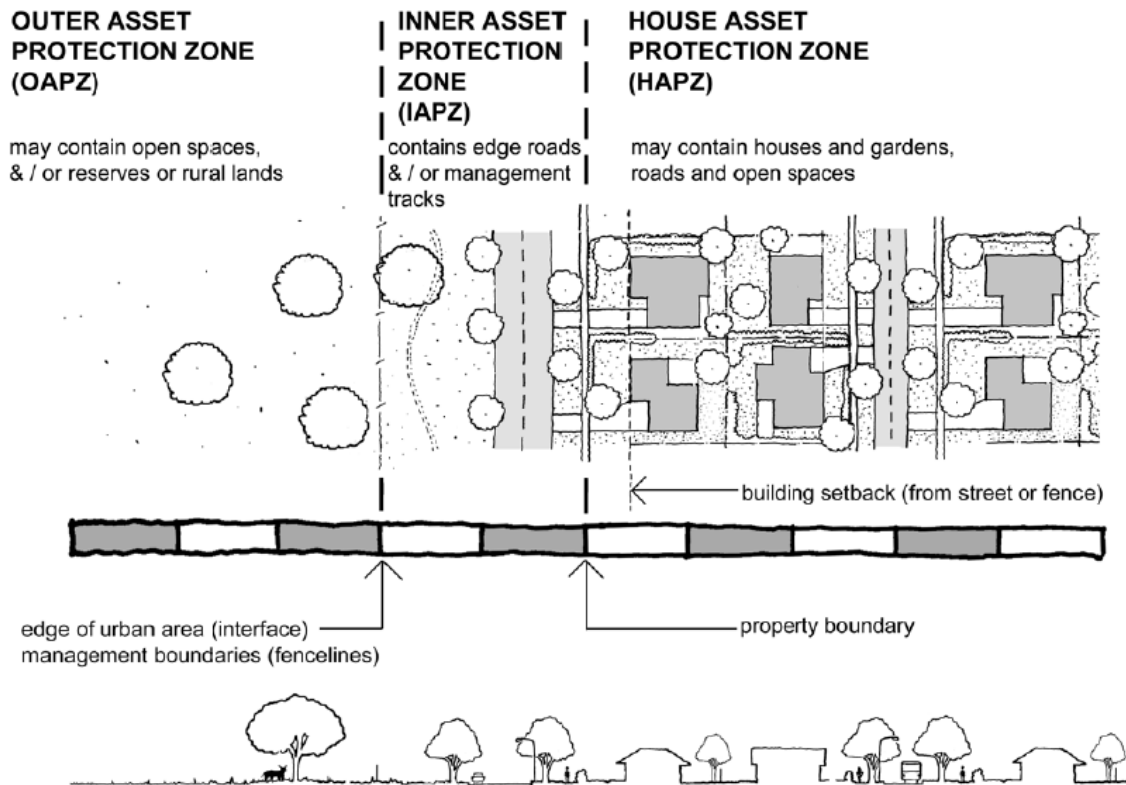


Figure 8: Bushfire asset protection zones (ACTPLA 2008)

### 3.3 INFRASTRUCTURE

Locations that may be suitable for accessing the riparian corridor via local roads in the Coombs subdivision will be shown on the EDP. Detail design of the perimeter road and connecting tracks will be undertaken subsequent to this Strategy. Signage will be designed and installed in accordance with TAMS standards<sup>3</sup>.

The urban development will feature stormwater detention ponds designed to protect the river from urban pollutants runoff (proposed locations shown in **Figure 5**) and an associated stormwater pipe network. Water sensitive urban design features will be incorporated in the urban development in accordance with *Waterways – Water Sensitive Urban Design General Code* (ACT Planning and Land Authority 2009).

Construction of water, sewer and other services within the corridor will need to avoid impacts to sensitive areas (such as Pink-tailed Worm Lizard habitat and buffers) and be rehabilitated to a condition consistent with the principles and objectives of this Strategy. Urban edge design should also consider how infrastructure can be maintained with minimal environmental impact (e.g. position pipework beneath unsealed roads).

<sup>3</sup> [http://www.tams.act.gov.au/\\_data/assets/pdf\\_file/0003/34671/DS25\\_Standard\\_Drawings.pdf](http://www.tams.act.gov.au/_data/assets/pdf_file/0003/34671/DS25_Standard_Drawings.pdf)

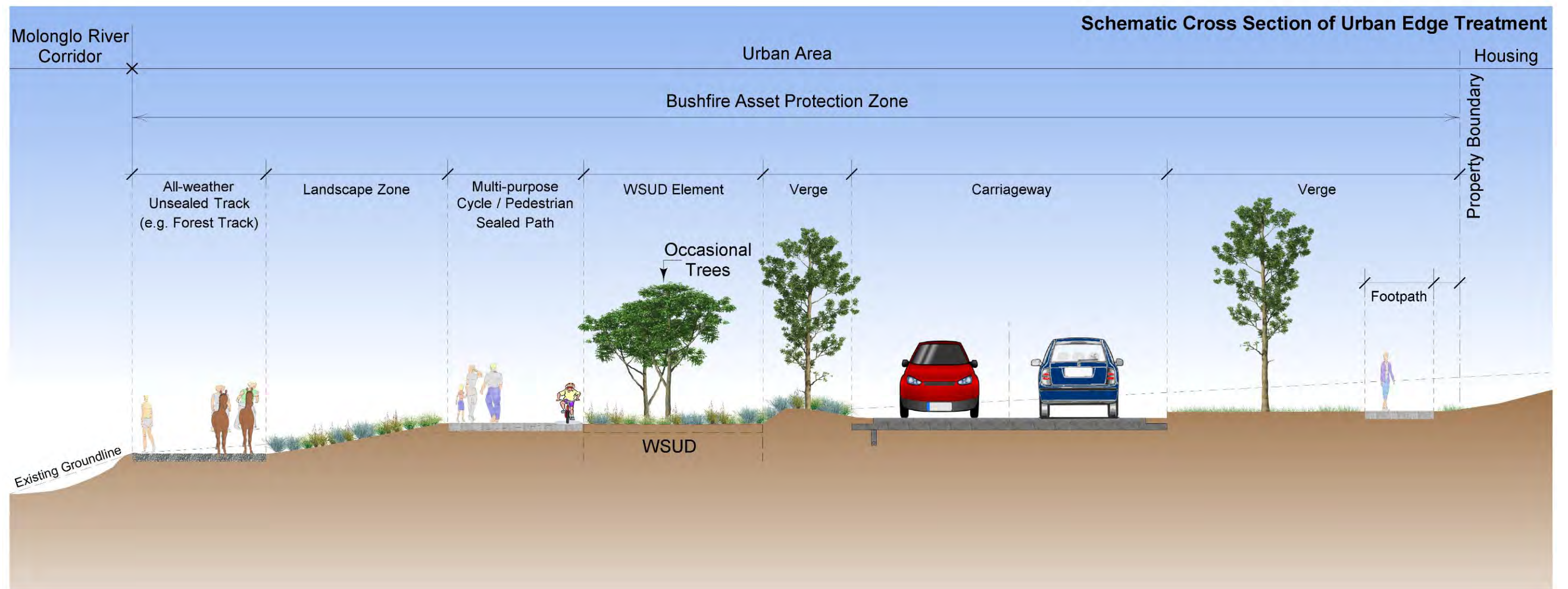


Figure 9: General concept plan for the urban edge

## 4 Management framework for corridor

### 4.1 PRINCIPLES

The following management principles and objectives have been developed following consideration of the corridor's values and issues:

- The corridor is to be managed so that it provides for public and community use of the area for recreation and education while ensuring that natural values and biodiversity are maintained and improved
- Rehabilitation/improvement of the corridor is achievable and will require substantial, coordinated, ongoing management and resources, particularly in the short to medium term
- Consistent with best practice bush regeneration principles, high priority should be given to conserving and enhancing better quality areas of habitat within the river corridor. Biodiversity can disperse from these core areas as bush regeneration is implemented. Bush regeneration includes natural regeneration and recolonisation where this is possible e.g. by removing weeds and reducing disturbance to the river corridor caused by stock and other factors
- The ecosystems of the Molonglo River corridor and adjacent areas are important for habitat and landscape connectivity at both local and regional scales and any new facilities and management should seek to maintain and improve connectivity
- Existing river crossings and recreational tracks need to be reviewed for their suitability, and where appropriate, maintained and improved. Additional tracks and formal crossings should take into account the natural and biodiversity values of the river corridor
- Rehabilitation/improvement of the riparian corridor requires activities and impacts within the adjoining and upstream sub-catchments to be addressed in addition to localised impacts within the study area
- An adaptive management approach is needed because of the rapidly changing landscape associated with adjacent urban development and removal of past management regimes e.g. pine plantation and grazing

Environmental managers often deal with considerable uncertainty and complexity about how ecosystems and the physical environment interact. Adaptive management is a widely accepted approach to natural resource management that involves learning from implementation. By following the adaptive management cycle, practitioners ensure that learning is focussed on management needs and that new knowledge feeds back to inform future management choices.

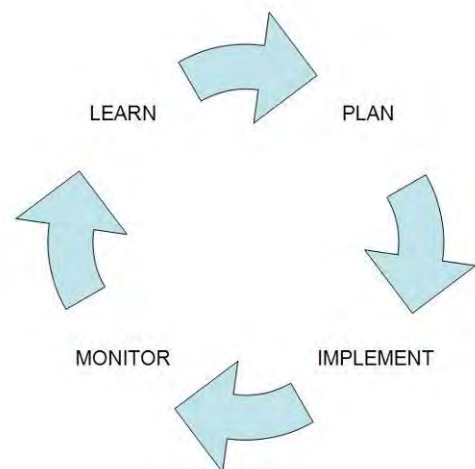


Figure 10: Adaptive management cycle

## 4.2 OBJECTIVES

The main objectives for the study area are tabulated below.

**Table 1: Objectives for the study area**

ISSUE	OBJECTIVES
Biodiversity	Protect Pink-tailed Worm Lizard habitat and increase the population Enhance biodiversity Rehabilitate native vegetation communities and associated fauna habitat Improve ecological connectivity with surrounding non-urban areas Reduce populations of pest plant and animal species Maintain or improve small bird habitat in riparian vegetation Allow water flow and fish passage within the river Improve water quality and aquatic ecosystem health Ensure bushfire regimes satisfy ecological requirements
Recreation	Facilitate safe crossing over the river for pedestrians, horse riders, and emergency vehicles Provide connectivity with the surrounding track/road network, including the urban area and Bicentennial National Trail Provide recreational facilities such as open space areas, seating, signage, viewing areas and access routes in areas of low ecological value
Other	Involve the community in ongoing protection and management of the riparian corridor Minimise risk of bushfire to assets in surrounding areas Apply an integrated and cost effective management regime

## 4.3 PRIORITIES

Suggested timeframes are as follows:

- Short term – Within two years
- Medium term – Three to ten years
- Long term – Beyond ten years, with gradual improvement over time

As a general rule, highest priority should be given to actions that will maintain and improve better quality areas or that abate serious threats (e.g. weeds of national significance). This approach is consistent with best practice principles for bush regeneration and riparian management as outlined in Buchanan (2009) *Restoring Natural Areas in Australia* and Lovett and Price (2007) *Principles for Riparian Lands Management*. Priority should also be given to maintaining and improving selected tracks and river crossings.

#### 4.4 RESPONSIBILITIES

The following table outlines the roles and responsibilities for implementation of the Strategy.

**Table 2: ACT Government agencies responsible for implementation**

ORGANISATION	SECTION	RESPONSIBILITY
LDA		Estate Development Plan, construction management in urban areas
ACTPLA		Strategic Assessment, EPBC referrals, structure and concept planning, infrastructure planning and development approvals Engage consultant to prepare the River Park Concept Plan
TAMS (LMP)	Conservation Planning and Research	Wildlife research, ecological surveying, biodiversity monitoring
	Asset Integration, Design and Development	Capital works design and implementation
	Parks and Conservation	Management of national parks, reserves and rural land Coordination of community and volunteer groups Strategic recreation planning Natural resource protection Forestry and Fire Management
	City Services	Planning and management of urban parks and reserves and the public domain, including, lakes, street trees, public open space and city places Management of pest and weed control programs Licensing and Compliance
Department of the Environment, Climate Change, Energy and Water	Natural Environment and Resource Management	Conservator of Flora & Fauna Administer <i>Nature Conservation Act</i> and <i>Environment Protection Act</i> Secretariat to the NRM Council ACT environment grants Delivery of Caring for our Country initiatives in the ACT Funding to assist agencies, and catchment and Landcare groups coordinate and undertake works on ground
Territory Venues and Events	Stromlo Forest Park	Major events
NCA	Risk and Planning	Upstream management & Lake Burley Griffin Emergency risk planning
ESA	Risk and Planning	Emergency risk planning Monitoring of performance against Strategic Assessment commitments
Commissioner for Sustainability and the Environment		Monitoring of performance against Strategic Assessment commitments

Other stakeholders that could be involved in funding (grants) and/or practical implementation include:

- ACT Natural Resource Management Council
- Local catchment groups (Molonglo Catchment Group)
- ANU and University of Canberra
- ACT and South East Region Conservation Council
- ACT Flora and Fauna Committee

- National Water Commission
- Murray Darling Basin Authority
- Australian Government Department of Sustainability, Environment, Water, Population and Communities (responsible for administering the EPBC Act and Caring for our Country programs)
- Greening Australia
- RiverSmart
- Indigenous employment and training programs

It is proposed that TAMS (LMP) establish a team to develop the detailed Plan of Management (following preparation of the River Park Concept Plan) and conduct the on-ground works in parallel with development of the Coombs subdivision. The team could be internally resourced or engaged as a contractor. This approach has several advantages because the team could:

- Prepare more detailed habitat/vegetation maps and site plans consistent with the Strategy and River Park Concept Plan (e.g. mapping pockets of good habitat, scheduling weed spraying)
- Retain detailed knowledge about the site management e.g. effective practices/techniques
- Provide a clear point of authority and responsibility, which would facilitate communication with agencies, developers and the community
- Assist with relevant work for the urban subdivision e.g. removal of Blackberries, plant or seed supply for landscaping, bushfire control burns, removal of excess dead timber
- Respond quickly to environmental cues e.g. weed growth following rain
- Have an ongoing commitment to care of the area
- Prevent problems that may arise during development in relation to threatened species and communities and help to deter vandalism
- Manage fire threats and fuel loads

Even if an on-ground work team is established to implement the Strategy, there would need to be input from a range of agencies and other organisations.

#### 4.5 FUNDING

Initial stages of implementation of the Riparian Strategy will be closely aligned to development of the Coombs subdivision and funded by LDA. Additional grant funds and in-kind contributions should be sought from a range of sources, for example:

- Territory and Commonwealth government environmental grants (e.g. through the ACT Natural Resource Management Council)
- Community volunteers (e.g. Molonglo Catchment Group, Bush on the Boundary, schools, scouts) can assist with bush regeneration and revegetation

The Chief Minister and TAMS (LMP) are currently considering proposals to develop a 100 km multi-use trail around the ACT. Funds associated with this may help to cover the costs of improving the track network in the riparian study area.

The Australian Government's *Caring for our Country Business Plan 2010-11* identifies the following priority issues of relevance to the Molonglo Riparian Management Strategy and should be investigated as a possible source of grant funds:

- Biodiversity and Natural Icons – increasing native habitat and reducing the impact of invasive species
- Community Skills, Knowledge and Engagement – including Community Action Grants to support community groups to undertake projects in other Caring for our Country national priority areas

## 5 Strategic action plans

This section describes strategic actions recommended to maintain or improve the values of the Molonglo riparian corridor. These strategic actions provide the basis for the subsequent development of the River Park Concept Plan and a detailed Plan of Management. Key actions have been prioritised according to the following themes:

- Biodiversity enhancement and conservation including protection and rehabilitation of terrestrial and aquatic habitat, pest plant and animal control, and maintenance of conservation buffers
- Provision of recreational access and facilities including tracks, river crossings and open space areas, erosion control, water quality improvements
- Fire management including buffers, fuel management, emergency access (this discussion is additional to that described in **Section 3**)
- Community participation
- Monitoring

### 5.1 BIODIVERSITY

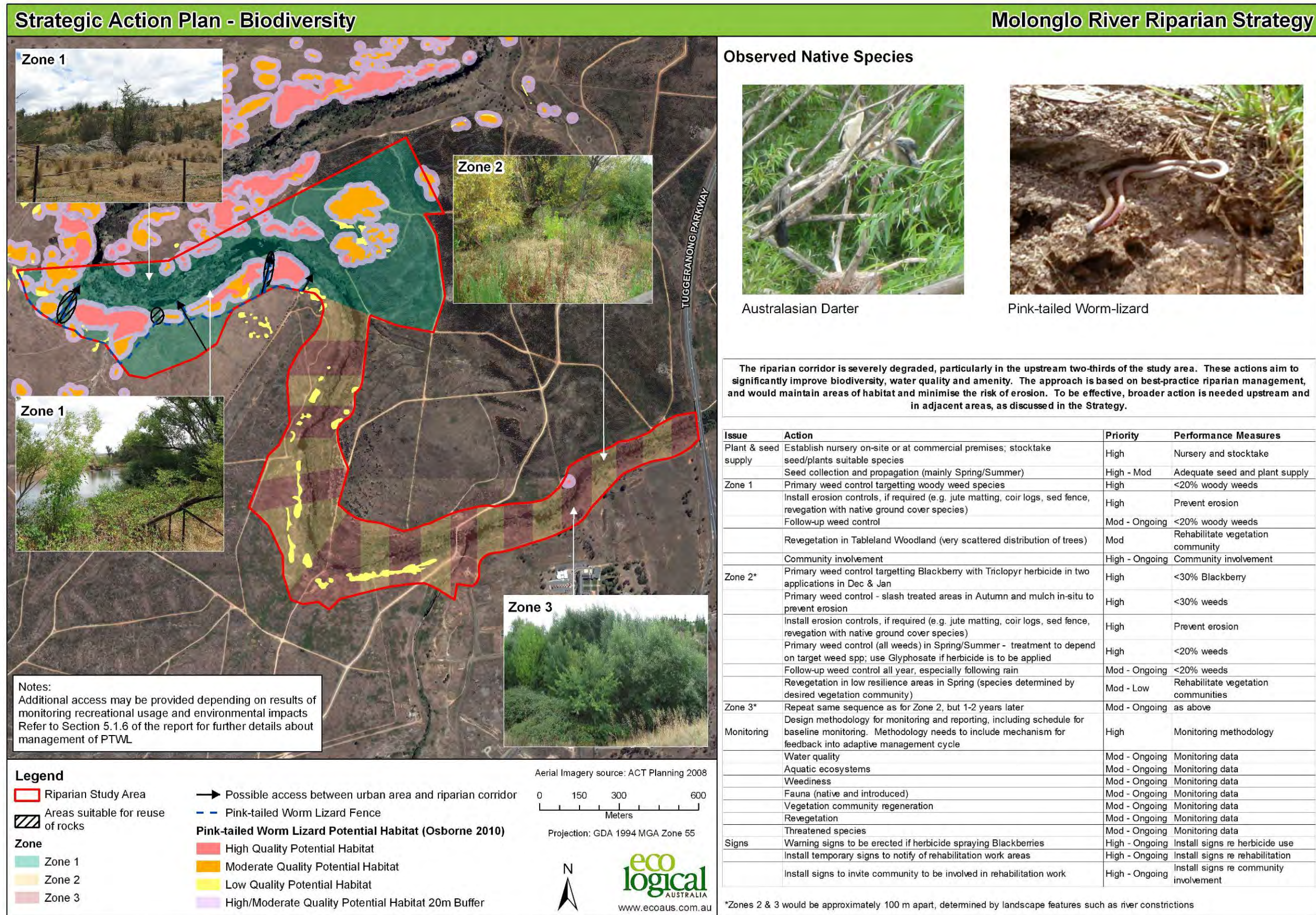
Despite the substantial modification, the corridor still offers important ecological values including habitat for threatened fauna (Pink-tailed Worm Lizard). There is significant scope to maintain and improve the ecological values of the study area. This approach would have benefits for the biodiversity and amenity of the immediate area and surrounds.

#### 5.1.1 Bush regeneration management zones

A staged approach undertaken by a team of professional bush regenerators is recommended in the strategic action plan for biodiversity. **Figure 11** identifies three management zones within the study area that relate to the stages of implementation. Further definition of these according to their suitability for recreation, fire management, habitat protection etc should be undertaken during preparation of the Concept Plan and Plan of Management. Detailed investigation will also be used to refine the extent of each zone, the tasks to be undertaken and the priorities/work schedule.

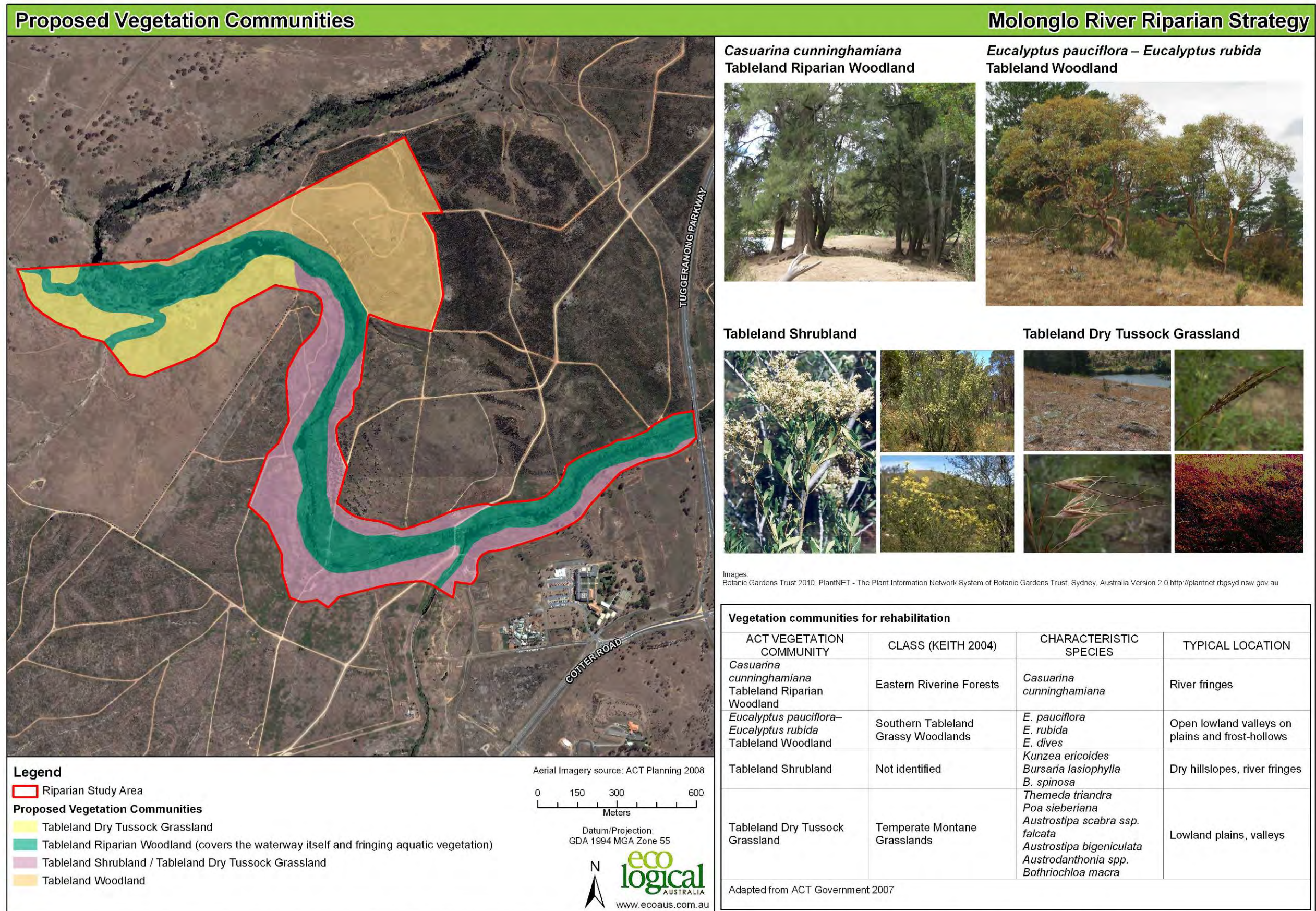
**Zone 1** – is the area in ‘best’ ecological condition and incorporates Pink-tailed Worm Lizard habitat. This zone should be managed first by removing stock, woody weeds and highly invasive weeds (e.g. African Love-grass, St John’s Wort and Chilean Needle Grass), and stabilising erosion. Fences, signage and access paths should be constructed to protect habitat areas from inappropriate use. Longer term management in this area should focus on increasing the proportion of native species consistent with the vegetation communities mapped in **Figure 12** and described in **Section 5.1.6**. Priority should be given to involving the community in management of this area because it offers relatively easy access, the work would not be too arduous and results would be quick to occur.

**Zone 2** and **Zone 3** – these zones are heavily weed infested, particularly along the river banks. Indicative areas for these zones are shown in **Figure 11**. The alternate management pattern is intended to allow fauna species to move to adjacent habitat as primary weed control is undertaken and then revegetation/regeneration of native species occurs. The risk of soil erosion would also be reduced by this staged approach. Community involvement in the management of these zones should be encouraged once the maintenance stage is reached.



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Figure 11: Biodiversity strategic action plan



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Figure 12: Proposed vegetation communities

Prepared by: JD    Approved by: BM    Status: Draft    Date: 24/01/2011

### 5.1.2 Weed management

Weed infestation is the main environmental problem in the corridor because much of the riparian corridor is densely weed-affected and has low resilience. This section and the actions tabulated in **Figure 11** provide more detail about how to control weeds and gradually rehabilitate native vegetation within the corridor.

The recommended approach is to maintain and enhance the better quality areas first, and involve the community where possible. Weed control must be achieved without detriment to other environmental qualities such as soil stability and fauna habitat. Effective rehabilitation will require a sustained effort over the long term, in conjunction with control of potential further degrading influences such as urban stormwater or garden dumping.

Where relevant, the site should be prepared by removing burnt timber, pine wildlings and stock grazing. The first weeding of a site is called primary weeding. Follow-up or secondary weeding needs to be timed to prevent:

- Any weeds seeding
- Vigorous growth of weeds from weed fragments
- Native plants being out-competed or smothered by weeds

A site is considered to have reached the maintenance stage when a follow-up is only needed once or twice per year. The amount of time and resources required should decrease each time a site is treated.

Selection of a suitable weed control technique will depend on:

- The weed species to be controlled
- The size of the weeds (e.g. mature or seedling)
- The ratio of weeds to native species
- The density of weeds (i.e. high or low resilience)
- The size of the area affected
- Topography
- Soil type
- Weather
- Presence of threatened species

Variability of conditions across the study area means that a variety of weed control techniques will be needed. The main techniques are expected to include management of seed movement, seed set and seed germination; weed control mats; mulch; cut and paint; scrape and paint/stem scrape; herbicide spraying; and slashing and mowing. Further information about weed control, bush regeneration and revegetation is provided by Buchanan (2009).

Monitoring will be needed to determine if native plants are regenerating following weed control.

### 5.1.3 Revegetation and regeneration

Revegetation and soil erosion control will be needed where resilience is low and there has been extensive weed cover removed. A preliminary list of flora species suited to the proposed vegetation communities is given in **Section 5.1.4**. Additional species suitable for revegetation will be determined by available nursery stock and revegetation objectives.

Local provenance species should be used where possible for public landscaping in the urban area and revegetation in the riparian corridor. It is recommended that a plant nursery be established to provide a

reliable, cost-effective supply of suitable plant stock (no weed species). In the longer term the nursery could sell native plants to residents as well as continue to supply replacement plants for public landscaping.

Consideration should be given to an annual native plant give-away to interested local residents. This is an effective way to revegetate gardens in the area with suitable species. This offer could be supported by other community engagement activities such as education about weed species and native fauna habitat.

Regeneration within the Pink-tailed Worm Lizard habitat areas will need to be carefully monitored and controlled to ensure that Grassland is not lost at the expense of invading Tableland Shrubland vegetation (see below).

#### 5.1.4 Vegetation communities

It is proposed that vegetation communities be rehabilitated in accordance with location within the landscape, as shown in **Figure 12**. The following table summarises the types of vegetation communities that would occur within the study area, including their characteristic species and typical location.

**Table 3: Vegetation communities for rehabilitation**

ACT VEGETATION COMMUNITY	CLASS (KEITH 2004)	CHARACTERISTIC SPECIES	TYPICAL LOCATION
<i>Casuarina cunninghamiana</i> Tableland Riparian Woodland	Eastern Riverine Forests	<i>Casuarina cunninghamiana</i> <i>Acacia mearnsii</i> <i>Acacia dealbata</i> <i>Acacia rubida</i> <i>Callistemon sieberi</i> <i>Kunzea ericoides</i> <i>Microlaena stipoides</i>	River fringes
<i>Eucalyptus pauciflora</i> – <i>Eucalyptus rubida</i> Tableland Woodland	Southern Tableland Grassy Woodlands	<i>E. pauciflora</i> <i>E. rubida</i> <i>E. dives</i> <i>Poa sieberiana</i> <i>Austrodanthonia caespitosa</i> <i>Themeda triandra</i>	Open lowland valleys on plains and frost-hollows
Tableland Shrubland	Not identified	<i>Kunzea ericoides</i> <i>Bursaria lasiophylla</i> <i>B. spinosa</i> <i>Callitris endlicheri</i> <i>Leptospermum obovatum</i> <i>C. endlicheri</i> <i>Callistemon sieberi</i> <i>Acacia dealbata</i>	Dry hillslopes, river fringes

ACT VEGETATION COMMUNITY	CLASS (KEITH 2004)	CHARACTERISTIC SPECIES	TYPICAL LOCATION
Tableland Dry Tussock Grassland	Temperate Montane Grasslands	<i>Themeda triandra</i> <i>Poa sieberiana</i> <i>Austrostipa scabra</i> ssp. <i>falcata</i> <i>Austrostipa bigeniculata</i> <i>Austrodanthonia</i> spp. <i>Bothriochloa macra</i> <i>Chrysocephalum apiculatum</i> <i>Convolvulus erubescens</i> <i>Vittadinia muelleri</i> <i>Desmodium varians</i> <i>Carex inversa</i>	Lowland plains, valleys

Adapted from ACT Government 2007

#### *Casuarina cunninghamiana* Tableland Riparian Woodland

*Casuarina cunninghamiana* Tableland Riparian Woodland grows on streambanks between normal water levels and maximum flood levels, in particular, on sandy and shingle terraces. Characteristically, it forms almost pure stands (unless subject to weed infestation) in narrow belts along the watercourses. Riparian She-oak Woodlands and associated mistletoe species are important faunal habitat.

*Casuarina cunninghamiana* is a fire sensitive species and the majority of mature trees will die if burnt by high intensity fire. (Following the 2003 fires, monitoring has shown that *C. cunninghamiana* will regenerate by sprouting if burnt by lower intensity fires.) The understorey of this community typically contains limited biomass to carry fires. Monitoring after the bushfires of January 2003 showed seedling regrowth faces significant competition from weeds, especially Blackberry (*Rubus fruticosus* spp.).

The characteristic species of the community are *Casuarina cunninghamiana*, *Acacia mearnsii* (Black Wattle), *Acacia dealbata* (Silver Wattle), *Acacia rubida*, *Callistemon sieberi*, *Kunzea ericoides* and *Microlaena stipoides* (Weeping Grass). *Casuarina cunninghamiana* have a relatively short life, probably less than 100 years, appearing to give way to either *E. viminalis* or *E. bridgesiana* in the absence of disturbance. This vegetation cycle recommences following floods or changes in river course, as *Casuarina cunninghamiana* colonises the new banks.

#### Tableland Shrubland

The Tableland Shrubland community is dominated by *Kunzea ericoides* (formerly *Leptospermum phyllicoides*) and is associated particularly with river fringes, rocky riverbanks and gravel beds adjoining rapidly flowing water. It is frequently an early colonizer and stabilizer of riverbanks and on previously cleared hillslopes. It may form extensive thickets up to 3 m high and provides important habitat and movement corridors for birds.

Eucalypts are either sparse or absent but *Callitris endlicheri* commonly occurs within the shrub community and extends into adjacent open forest. *Kunzea ericoides* occurs with a range of other species, including *Leptospermum obovatum*, *C. endlicheri*, *Callistemon sieberi* (River Bottlebrush) and *Acacia dealbata*.

Other shrubland associations along the Molonglo River that do not contain *K. ericoides* include:

- *Bursaria lasiophylla* shrublands
- *Pomaderris angustifolia* shrublands
- *Cryptandra propinqua* (Silky Cryptandra) shrublands

- *Dodonea viscosa* and *Acacia rubida* shrublands
- *Acacia rubida*, *A. mearnsii*, *Bursaria spinosa* shrublands

The density and extent of regrowth and revegetation of this community need to be monitored and managed carefully to ensure that bushfire risk is not significantly increased. Examples of benchmark conditions of this vegetation community from less disturbed areas along the Molonglo River suggest that more open areas can intersperse with denser patches of vegetation. This distribution pattern would be consistent with objectives to integrate 'pocket park' recreation areas in the riparian corridor.

#### *Eucalyptus pauciflora*–*Eucalyptus rubida* Tableland Woodland (Snow Gum–Candlebark)

Woodland containing *E. pauciflora* (Snow Gum) occurs in low-lying frost-prone areas and is only localised in extent. *E. rubida* (Candlebark) is found to a limited extent with this community or as pure stands. The characteristic tree species are *E. pauciflora* and *E. rubida*, with a grassy ground cover of *Poa sieberiana*, *Austrodanthonia caespitosa* and *Themeda triandra*. Trees in this community are sparsely distributed.

#### Tableland Dry Tussock Grassland

The community is naturally treeless or contains up to 10% projective foliage cover of trees, shrubs or sedges. The community is characterised by a diverse flora dominated by tussock grasses and containing many native forb species. The community is found in valleys influenced by cold air drainage and on open plains. This community merges into *Eucalyptus pauciflora*–*Eucalyptus rubida* Tableland Woodland.

The community has been greatly fragmented and disturbed since European settlement. Where it occurs within the riparian zone, it is frequently difficult to distinguish between naturally treeless grassland and cleared *Eucalyptus melliodora*–*Eucalyptus blakelyi* Tableland Grassy Woodland.

Characteristic species are *Themeda triandra*, *Poa sieberiana*, *Austrostipa scabra* spp. *falcata*, *Austrodanthonia* spp., *Bothriochloa macra* (Redleg Grass), *Chrysocephalum apiculatum* (Common Everlasting), *Convolvulus erubescens* (Pink Bindweed), *Vittadinia muelleri* (Narrow-leaved New Holland), *Desmodium varians* (Slender Tick-trefoil) and *Carex inversa* (Knob Sedge).

Three dry tussock associations have been identified in the ACT (Sharp 1997):

- *Austrostipa* grassland
- *Austrodanthonia* grassland
- Dry *Themeda* grassland

This vegetation community provides habitat for the Pink-tailed Worm Lizard. The rocky ground surface and lack of canopy cover means that it has a low bushfire fuel regime. Effective management of grassland areas (i.e. ensuring weeds, trees and shrubs are removed and rocks are in place) therefore has the dual benefit of protecting biodiversity while minimizing bushfire risk.

### 5.1.5 Ecologically-appropriate fire regimes

Fires in the ACT landscape have been caused by a combination of inherently inflammable vegetation, dry summers, periodic drought and lightning ignitions. Unlike the modified landscapes such as pine forests and pasture, the native vegetation communities proposed for the study area are fire-adapted ecosystems. This means that:

- They require a certain burning regime to stay healthy

- Significant ecological change is likely to occur over long time periods if burning regimes change (e.g. become too frequent, infrequent, intense or widespread)

The threat posed by inappropriate fire regimes is recognised in Victoria with the listing of 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' and 'Inappropriate fire regimes causing disruption to sustainable ecosystem processes and resultant loss of biodiversity', as Potentially Threatening Processes under the Victorian *Flora and Fauna Guarantee Act 1988*. Similarly in NSW, 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' is listed as a Key Threatening Process under the NSW *Threatened Species Conservation Act 1995*.

The Commonwealth Government has nominated<sup>4</sup> 'fire regimes that cause biodiversity decline' as a key threatening process under the *Environment Protection and Biodiversity Conservation Act 1999*. The listing of a key threatening process has no regulatory implications other than requiring the Minister to decide whether or not to have a threat abatement plan. If a threat abatement plan is considered appropriate, the plan would provide national guidelines to governments about possible ways to improve fire management to reduce potential negative impacts on biodiversity. The Threatened Species Scientific Committee is due to complete its assessment and provide the Minister with a recommendation by 31 March 2011.

In addition, there is still considerable uncertainty about the use of fire as a management tool, including the extent to which the results of burning in one area can be extrapolated and applied to other areas<sup>5</sup>.

An adaptive management approach should be applied to create and maintain healthy ecosystems in the riparian corridor using fire. This will require monitoring on-ground conditions, responsive management and implementation of a mosaic burn pattern. The burning regime will need to reflect floristics, fauna habitat value, season, fuel hazards, bushfire history, and other management activities such as weed removal and bush regeneration. Some weed species or undesirable native species may increase with burning so would need follow-up treatment.

TAMS (PCL) provides fuel and fire suppression guidelines for Pink-tailed Worm Lizard habitat (further details about this species are given in the following section). The guidelines including the following comment:

*In managing for good conservation outcomes, it is important to consider the ecosystem as a whole, including animals, plants, soil and soil biota, rather than thinking in terms of individual*

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4 Department of Sustainability, Environment, Water, Population and Communities (2010). EPBC Nomination to list Fire regimes that cause biodiversity decline as a key threatening process. Viewed 24 November 2010. <http://www.environment.gov.au/biodiversity/threatened/ktp/pubs/fire-regimes-nomination.pdf>

5 Department of Sustainability, Environment, Water, Population and Communities (2010). Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory in Community and Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: <http://www.environment.gov.au/sprat>. Accessed 2010-11-24T12:15:56.

*species. Disturbance to the composition or structure of the community can have impacts on the functioning of the system as a whole.*

### 5.1.6 Pink-tailed Worm Lizard

This section outlines potential threats and recommended management measures to protect the threatened Pink-tailed Worm Lizard. Management recommendations are consistent with requirements of the EPBC Act referral decision (see **Appendix E**).

Direct and indirect threats from urban development in the Molonglo Valley could impact on some habitat areas for this species (refer to **Figure 7** for habitat distribution). Direct impacts could occur from construction of roads, buildings and other infrastructure. Indirect impacts could be associated with the nearby urban development (e.g. sediment and nutrient run-off, and spread of weeds).

The following activities would result in direct harm to local populations of Pink-tailed Worm Lizards.

#### *Direct threats*

Construction directly on occupied habitat, direct loss of occupied habitat through excavation, leveling of ground, and the construction of roads, buildings and service facilities have the potential to degrade or destroy Pink-tailed Worm Lizard habitat. Depending on the scale of these activities, all or part of the habitat could be removed. Typically such activities are not compatible with the protection of the species.

Of particular concern in the Molonglo area are linear construction activities (such as roads and bridges) that cross through the areas on interconnected habitat along the slopes of the Molonglo River.

Direct loss of occupied habitat through construction of ponds in and near the Molonglo River corridor has the potential to flood some habitat areas. The degree of impact would depend on the depth of the ponds and the extent of any mechanical damage to the river banks and slopes associated with construction. The immediate impact may be minimal if the pond surface lies below the lower edges of any nearby habitat.

Habitat for Pink-tailed Worm Lizard typically does not occur in the immediate riparian zone of the river. The position of the lower edge of the habitat has not been measured but typically occurs above the level of regular floods which would otherwise influence the habitat by silt deposition etc.

#### *Indirect threats*

There is a considerable area of planned urban edge that will directly abut potential habitat along the upper slopes of the corridor in this area. Whilst this may not directly impact lizard habitat, indirect impacts from urban runoff and human activities (e.g. dumping rubbish, removing rocks etc) could be expected from this development because the edge will often be located immediately upslope of the corridor habitat.

It is possible after residential development and other construction activities have been completed there will be an increased likelihood of the spread of weeds into the rocky native grassland patches preferred by the species. Weed spread is already an extensive problem in the ACT with highly invasive species like Paterson's Curse, St John's Wort and Blackberry smothering rocky outcrops at many sites, along the lower Molonglo River corridor. There is the potential for other highly invasive plants to escape from gardens, or be dumped by people or moved by animals to the nearby patches of habitat.

Planting trees should not occur on sites that support Pink-tailed Worm Lizards. The species is very rarely found in tree-covered sites in the ACT, and it is thought that the shade from foliage might influence the ground temperature suitable for activity by this species.

#### *Recommended management*

Measures that need to be taken to avoid significant impacts are outlined in the EPBC Act referral decision<sup>6</sup> and summarised in the following table. Additional detail regarding recommended management is tabulated below.

**Table 4: Pink-tailed Worm Lizard management**

REFERRAL DECISION REQUIREMENTS	ADDITIONAL DETAIL
Maintain a buffer zone of at least 20 m from moderate and high quality <i>A. parapulchella</i> habitat	20 m buffers are shown around moderate and high quality habitat patches in <b>Figure 7</b> . Areas within the buffers should be treated in the same manner as habitat itself i.e. no direct or indirect impact, similar fire regime
Ensure vehicles do not drive over and keep all forms of disturbance, such as heavy earth moving equipment and other construction activity away from moderate and high quality <i>A. parapulchella</i> habitat	Until permanent fencing is constructed, temporary fencing should be used to define exclusion zones i.e. habitat and buffers. All construction staff should be trained/inducted so that they understand their responsibilities regarding environmental protection
Prevent construction spoil and any material used in soil stabilization and revegetation from running down slope over habitat areas	Install sedimentation and erosion controls to protect habitat and buffers
Prevent the spread or planting of trees, shrubs or weeds within 20 m of high and moderate quality habitat. Trees and shrubs should not be planted in areas that could potentially shade moderate and high quality habitat and buffers	Monitor vegetation growth and manage (e.g. weed control, remove unwanted plants) in accordance with desired vegetation community objectives. Urban edge landscaping treatment to consider potential impacts of shade from mature trees and shrubs
Wash all construction machinery to prevent the spread of weeds prior to entering the site. Wash all machinery operating below the proposed edge road if machines have been offsite, or entered or operated in the area of former pine plantation	Provide wash-down areas for construction vehicles and machinery to avoid impacts to habitat areas and buffers. Educate construction personnel and site visitors through signage and induction training
Prevent stormwater occurring as a result of the development from flowing over moderate and high quality habitat patches below the sewer line	Water sensitive urban design for development to ensure that the stormwater regime does not change in habitat areas and buffers
Erect permanent fencing to enclose all moderate and high quality habitat. Design fencing to minimize	<b>Figure 11</b> indicates the proposed position of permanent fencing to protect habitat areas. Refer to <b>Section 5.1.7</b>

<sup>6</sup> Please refer to **Appendix E** for full text

REFERRAL DECISION REQUIREMENTS	ADDITIONAL DETAIL
unregulated public access, rock collection, access by domestic animals and unregulated stock grazing	for more detail
Construct an edge road to separate residential development from the river corridor	Urban edge features are described and illustrated in <b>Section 3</b>
Habitat values for high and moderate quality habitat patches below the edge road are maintained and improved, including removal and ongoing management of weeds	Long-term commitment of resources to be provided for integrated, adaptive management of the corridor
Conduct any fire, biomass management, or fuel reduction required as a result of the action within 20 m of moderate and high quality habitat in an ecologically sympathetic manner with the conservation of <i>A. parapulchella</i> . Grazing should only be used as a management technique when it is undertaken in accordance with expert advice	<p>To protect the PTWL, fire management should:</p> <ul style="list-style-type: none"> <li>• Not disturb the scattered rocks</li> <li>• Favour growth of native grasses</li> <li>• Not be too frequent/infrequent or intense</li> <li>• Be done in patches to allow recolonisation of burnt areas</li> </ul> <p>See <b>Section 5.1.5</b> for more information about ecologically appropriate fire regimes</p> <p>Grazing by native fauna should be encouraged by providing connectivity with other natural areas along the Molonglo River corridor and adjoining reserves, and reducing threats from domestic animals such as uncontrolled cats and dogs</p>
Erect signs containing educational/public information concerning the conservation of <i>A. parapulchella</i> in the Molonglo Valley in consultation with expert advice	Dr Will Osborne (or similar expert) to be consulted regarding the content and suitable locations for signage
Plan and design access ways in accordance with expert advice to minimize impact and conserve habitat values. Access ways should not pass through high quality habitat	Suggested access routes are indicated in <b>Figure 13</b> . Associated features are described in <b>Section 5.1.7</b>
Surface rocks suitable for <i>A. parapulchella</i> from within the Coombs pond inundation area and access way alignments should be used to rehabilitate areas of potential habitat below the sewer line in accordance with expert advice. Rehabilitation should not take place within high quality habitat. Rocks and any machinery should be washed of all soil and organic matter prior to use for rehabilitation	Areas that may be suitable for reuse of rocks taken from the construction area are indicated in <b>Figure 11</b> . These areas are adjacent to existing moderate habitat. Dr Will Osborne (or similar expert) should undertake detailed site inspection of the proposed receiving sites to determine the suitability of these areas prior to rocks being moved
A monitoring program developed in accordance with expert advice should be implemented to survey rehabilitated habitat areas annually for five years, following final completion of the trunk sewer. As part of	<p>Monitoring should be undertaken in existing and rehabilitated habitat areas to:</p> <ul style="list-style-type: none"> <li>• map the extent and quality of habitat</li> </ul>

REFERRAL DECISION REQUIREMENTS	ADDITIONAL DETAIL
<p>the monitoring program, a baseline survey should be conducted prior to the construction of houses and annual results should be published on an appropriate ACT Government website</p>	<ul style="list-style-type: none"> <li>• record numbers of lizards</li> <li>• identify plant species (including weeds) and vegetation structure</li> </ul> <p>Monitoring reports should also describe management treatments that have been applied during the past year, any threats that have arisen and recommendations for future management</p>
<p>A wildlife expert experienced with <i>A. parapulchella</i> should check all potential habitat that is disturbed prior to construction. Any <i>A. parapulchella</i> specimens found should be relocated to the nearest suitable habitat</p>	<p>Dr Will Osborne (or similar expert) to undertake pre-clearance survey and relocation, if required</p>

### 5.1.7 Fencing

The EPBC Act referral decision (**Appendix E**) requires that areas of moderate and high quality Pink-tailed Worm Lizard habitat be fenced to minimise unregulated public access, rock collection, access by domestic animals and unregulated stock grazing. Rather than fence each patch of habitat it is recommended that fences be constructed in areas shown in **Figure 11**. This approach is intended to:

- Provide an opportunity to increase connectivity and fauna movement between existing patches
- Concentrate public access in certain, clearly defined areas
- Provide fences or walls that are aesthetically pleasing and consistent with the broader landscape i.e. using natural materials such as rock and/or wood
- Create rocky habitat in the wall itself

Steep areas between patches of habitat that are designed for public access may need steps or paths to be constructed. Consideration should be given to incorporating rocks in the steps and paths.

Rocks to be used to build the wall, path or steps should be of a similar type to rocks within the habitat area. However, rocks **MUST NOT** be sourced from the habitat areas to be conserved. Civil contractors working in the urban areas should stockpile rocks so that they can be reused to improve habitat and possibly create fencing/walls/paths in the river corridor.

Fence design should consider requirements of other fauna species and management access.

### 5.1.8 Aquatic ecosystems and water quality

Removal of stock should result in an improvement in water quality and fringing aquatic ecosystems.

Riparian corridors adjacent to areas of urban development typically experience a range of adverse impacts that include weed encroachment, rubbish dumping, vandalism, and stormwater pollution.

The ACT Water Report 2007-08 found that water quality and aquatic ecosystems in urban areas appear to be more degraded than non-urban sites. Urban sites are commonly impacted by human impacts such as altered flow regimes, nutrient enrichment, weed infestation, increased pollutants, predation and disturbance of wildlife by domestic cats and dogs, and soil disturbance as a result of recreational use. Urban water quality is thought to remain poor during drought conditions because stream flows are generally low and any pollutants entering waterways are not diluted and frequently do so as part of

storm events. Long dry periods combined with sudden storm events can allow the development of heavy silt loads in runoff water from urban areas under development.

Good design and community environmental education can help to minimise the risk of these potential impacts. The Coombs and North Weston urban developments will incorporate water sensitive urban design features such as the stormwater ponds shown in **Figure 5**.

Monitoring will be needed to determine how water quality and aquatic ecosystems change as surrounding land practices change.

## 5.2 RECREATION AND AMENITY

As Coombs, Wright and North Weston are developed over the next few years, the riparian corridor will help define the character of the landscape and suburbs. Amenity will be highly valued by residents and visitors to the area. Views, safety, opportunities for recreation, access and the natural environment are some of the factors that contribute to amenity.

Residents and visitors to the area are more likely to value the natural environment and become involved in its protection and management if appropriate access is provided.

There will be a need to maintain and improve recreation opportunities and amenity as population density increases with adjacent urban development. The existing track network, river crossings and urban edge facilities will provide the foundation for ongoing recreational activities such as walking, mountain bike riding and equestrian. Connectivity will need to be established with tracks, paths and open space areas in adjoining areas.

Detailed assessment and design of tracks, crossings, signage and other recreational facilities (e.g. picnic areas) should be undertaken as part of the Concept Plan and Plan of Management. There may be some rationalization of existing tracks and/or new tracks identified. Design and maintenance of tracks and crossings will need to address issues raised in **Section 2**, including erosion and safety.

**Table 5** identifies the types of recreational activities expected to occur in the study area and their requirements. Issues that were raised by various recreational user groups during preparation of this Strategy have been incorporated in the table. Recommended strategic actions for recreational areas and river crossings are provided in **Figure 13**.

### 5.2.1 Domestic animals

Dogs in the riparian corridor should be leashed at all times to help protect native fauna. Any dog off-leash area would need to be fenced to prevent uncontrolled access to adjacent areas. The grassed area between the proposed Pink-tailed Worm Lizard fence and the riparian corridor boundary should be investigated for suitability as an off-leash area.

The ACT Government has a cat containment policy which requires domestic cats to be kept indoors or caged outside. This policy aims to help protect native fauna which are preyed upon by cats.

### 5.2.2 Tracks

As illustrated in the schematic cross-section in **Figure 9**, the urban edge on the southern side of the river should comprise:

- A sealed footpath adjacent to the residential property boundaries

- A landscaped verge
- A sealed road
- A landscaped verge incorporating WSUD features
- A multi-use sealed path (e.g. for cycling and pedestrian)
- A landscaped zone
- An unsealed track suitable for pedestrian, mountain biking and equestrian

It is recommended that the main track along the north side of the river be unsealed and graded, suitable for a range of recreational uses such as mountain biking, walking and equestrian. Detailed planning of the track network will determine the appropriate width and alignment of the track, and need for sections of the track to be split or separated if needed for different users.

The alignment of the main tracks on both sides of the river needs to connect with tracks and paths in adjacent areas. In designing these intersections, careful consideration needs to be given to safety issues associated with sight lines and merging recreational activities.

Track design must consider requirements for emergency services. For example, Schedule B of the *Strategic Bushfire Management Plan for the ACT* (2009) recommends standards for access by fire-fighting vehicles and personnel.

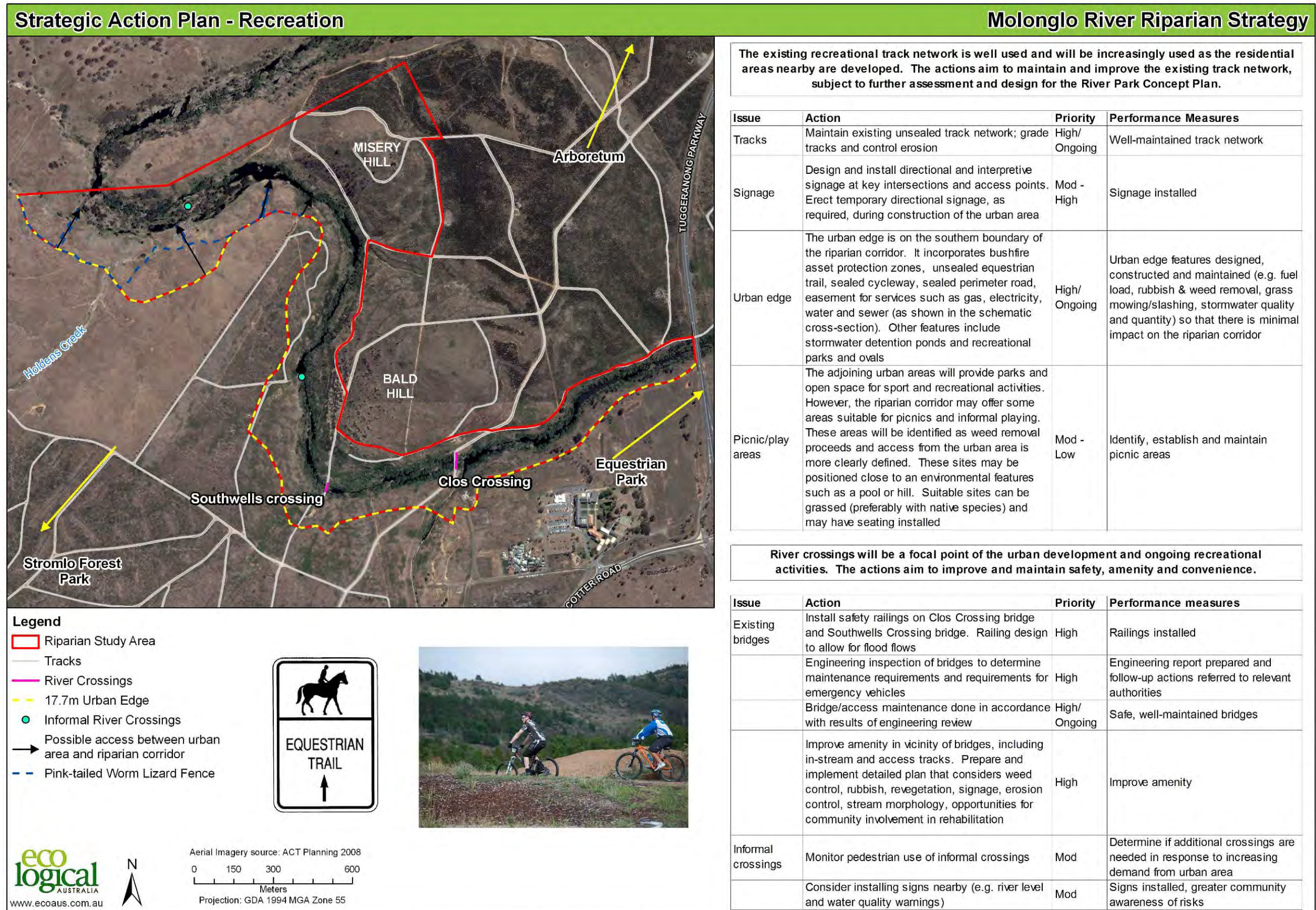
Where possible, the track alignment should be designed and constructed to minimize the risk of erosion and associated maintenance costs.

Table 5: Requirements for recreational activities

TYPE	REQUIREMENTS
All	<p>Recreational facilities to conform to the <i>TAMS Design Standards for Urban Infrastructure No.20 - Urban Edge Management Zones</i> (refer to <b>Section 3.1</b> for further details)</p> <p>Conditions to be maintained consistent with emergency services' requirements</p> <p>Recreational users will need to be educated/informed regarding trail etiquette, consistent with Stromolo Forest Park procedures<sup>7</sup></p> <p>Safety railings are needed on bridge river crossings. Design of railings needs to consider floodway requirements</p> <p>Bridge river crossings and their approaches need maintenance or improvement</p> <p>The width of the main tracks needs to allow multiple uses (as illustrated in <b>Figure 9</b>). If the tracks are not wide enough, markers should be used to separate users, or separate designated tracks should be available</p> <p>Lines of sight need to be clear, particularly on bends, bridges and underpasses. Where recreational users are forced into close proximity, a fenced trail accessible via cavaletti may be required (e.g. as the trail leaves the river's edge and turns along Holdens Creek)</p> <p>Connectivity needs to be maintained with surrounding track networks, including during the development construction phase</p> <p>Recreation 'traffic' needs to be directed away from sensitive areas toward more robust areas</p>
Walking	<p>Variety of unsealed tracks, including road-width to single-file walking tracks</p> <p>Directional and interpretive signage</p> <p>Destinations (e.g. picnic areas and lookouts) and loop tracks</p>
Mountain biking	<p>Unsealed, formed tracks that offer a variety of experiences i.e. easy to challenging (note that Stromlo Forest Park is and will continue to be the focus for mountain biking in the region)</p> <p>Restrict to designated tracks to reduce environmental impact</p> <p>May require separation from other track users (e.g. equestrian, walkers) in some areas for safety reasons</p>

<sup>7</sup> <http://www.stromloforestpark.com.au/mtb/etiquette.php>

TYPE	REQUIREMENTS
Equestrian	<p>Unsealed track along the urban perimeter (see <b>Figure 9</b>) and away from the river itself to avoid bank erosion and water quality problems</p> <p>Existing river crossings with safety railings designed to cater for flood conditions</p> <p>Clear sight lines, particularly on bends, bridges and underpasses</p> <p>Separation of use for safety reasons</p>
Trail bikes	Not permitted because of noise, erosion and safety issues
Swimming	<p>Not permitted unless water quality improves</p> <p>If water quality improves, swimming should be in large natural pools</p>
Fishing	<p>Not permitted until monitoring indicates that water quality and aquatic ecosystems have reached acceptable standards</p> <p>If fishing is allowed at a future date it will need to be ecologically sustainable (e.g. fishing permits) and may require additional fish stock to be added to the river</p>
Dog walking	<p>Dog off-lead areas should be provided in the urban area</p> <p>On-lead dog walking should be allowed along the urban perimeter</p> <p>Dogs should be prohibited from ecologically sensitive areas (e.g. Pink-tailed Worm Lizard habitat) through signage and fencing</p> <p>Education to manage waste and other potential impacts</p>
4WD	Unauthorised 4WD activity will be prohibited primarily because of public safety concerns along multi-use tracks
Road cycling	<p>Requires sealed surface along urban perimeter</p> <p>Separation of use for safety reasons</p>
Picnicking	<p>Suitable picnic areas should be level, cleared and safe</p> <p>Seats, BBQs and waste bins may need to be provided</p> <p>Maintenance e.g. mowing, rubbish removal</p> <p>Suitable picnic areas are to be situated based on environmental sensitivity, accessibility and potential value of the picnic experience (e.g. access to water, play areas, views)</p>
Bird watching	Once native vegetation has been re-established, consider the possibility of installing a bird hide
Lookouts and seating	<p>Provide seating and interpretive signage at the top of the main hills and other viewpoints in the study area</p> <p>Seating should be provided at regular intervals, preferably in shady areas, along walking tracks to provide rest points</p>
Camping	Not allowed because of the potential impacts in the narrow riparian corridor



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Figure 13: Recreation areas strategic action plan

### 5.2.3 River crossings

Clos and Southwells Crossings will continue to be the main formalized locations for crossing the river. An engineering assessment should be performed to determine requirements for maintenance and improvement to existing infrastructure, including requirements for emergency vehicles. High priority should also be given to improving amenity in the vicinity of these crossings, possibly including the creation of open space picnic areas on the southern side of the river.

There are a number of locations where informal crossings exist, including rocky and braided sections of the river channel. Examples are shown in **Figure 13**.

### 5.2.4 Open space recreation areas

Eventually there will be some 55,000 people living in the adjoining suburbs. The urban area will include parks and sporting fields. However, the river corridor will offer a more 'natural' setting for picnics and open space recreation. While it is envisaged that the majority of the river corridor will be rehabilitated with native vegetation communities, it is recommended that small areas within the corridor be cleared and landscaped for open space recreation.

Suitable locations and staged development of these areas needs to be integrated with other rehabilitation activities outlined in **Section 5.1**. Detailed plans of these areas will need to consider seating, signage, views, proximity to water, access and landscaping. It is recommended that the initial focus should be on the areas adjacent Clos and Southwells Crossings because these are likely to be more frequently used by new and prospective residents, and visitors to the area.

### 5.2.5 Signage and communication

A signage and communications plan needs to be developed and implemented to:

- Increase visitor awareness and understanding of the values under management
- Increase visitor enjoyment
- Inform the community about the purpose of the riparian corridor
- Increase community support for management programs
- Minimize impacts from visitors and neighbours

Directional, regulatory and interpretive signage will be an essential part of the communications strategy. Reference should be made to Australian Standard 2156 and the TAMS guidelines, for the erection of symbols and signs on all tracks.

The style and materials used in the sign should be consistent through the study area (refer to TAMS design standards). Consideration should be given to the position of the sign, including its height, so that it is easily visible to the target audience. Standard symbols should be used where possible.

Directional signs need to have a brief clear message and be located wherever a visitor needs to make a decision quickly. The distance or walking time, degree of difficulty (e.g. steep grades) and user restrictions should be indicated. There may be a hierarchy of signs e.g. major entrance points/main tracks and features/minor tracks.

Interpretive signage can be used effectively to 'tell a story' e.g. land use history and conservation/recovery of threatened species. The signs will require regular maintenance, especially if vandalism occurs.

Other or alternative forms of communication that could be used initially as part of the marketing strategy for the urban release, and then later for residents and visitors to the area include brochures, media articles (e.g. regular feature in the local newspaper) and web profiles. Eventually, there may be opportunities for guided walks by rangers or community volunteers.

### 5.3 COMMUNITY PARTICIPATION

#### 5.3.1 Benefits

Opportunities for community involvement in management of the study area are currently limited but will increase with an influx of residents and visitors to the area. Community participation in environmental management has many benefits, including:

- Local stewardship
- Improving social networks
- Improving the environment and amenity for minimal cost

#### 5.3.2 Opportunities for involvement

There are a number of ways in which the community could become involved in managing the riparian corridor:

- Education to prevent environmental degradation e.g. garden escapees, stormwater pollution. There is a body of educational material available from catchment groups and other agencies/organizations for the community regarding environmental matters
- On-ground work to maintain and improve environmental conditions. Initial community involvement should focus on the downstream reach (Zone 1 in the Biodiversity Strategic Action Plan - **Figure 11**) because it has easy, safer access and would require less work than upstream (Zones 2 and 3)
- An interpretive trail linking key ecological features, viewpoints, recreational areas and regeneration areas could enhance community interest and meet education objectives

The community involvement plan should coordinate with related groups and programs, such as those outlined below. The plan should utilize available educational material and tailor it to the specific issues in the area e.g. Pink-tailed Worm Lizard habitat.

#### 5.3.3 Molonglo Catchment Group

The Molonglo Catchment Group is one of three community-based catchment groups in the ACT, although its catchment is largely in NSW. It formed in 2003 and acts as an umbrella group for all the Landcare and other natural resource management groups within the catchment. The mission of the Molonglo Catchment Group is to:

*Encourage and assist the community of the Molonglo Catchment to furthering understanding, skills, motivation and capacity in achieving sustainable use and management of our natural and cultural resources*

### 5.3.4 Programs

There are a number of excellent community programs available. Many of these are coordinated through the Molonglo Catchment Group. Examples of some of these programs are outlined below.

#### *Land Keepers*

The ACT Land Keepers Program has four components:

- VegLink: on-ground activities in native vegetation protection and enhancement
- Biodiversity Incentives: on-ground conservation work on rural and non-urban land
- Greening Industry: on-ground conservation work with agricultural and horticultural enterprises
- ACT River Rescue: implementing riparian habitat recovery along priority streams in the ACT to address biodiversity and water quality

Activities that the community can become involved in include:

- Fencing off creeks to allow:
  - erosion control in major gullies and other soil conservation works
  - protection of remnant vegetation
  - control of grazing stock
- Revegetation projects that supplement remnant native vegetation and help restore ecological connectivity across the landscape
- Weed control, particularly of willows and other weeds of national significance

#### *ACT Waterwatch*

Waterwatch involves local community catchment groups, Landcare, as well as residents, schools, utilities and landowners to regularly monitor the water quality of local creeks, wetlands, lake, rivers and stormwater drains. Waterwatch provides all the training and equipment to do physical and chemical analysis, macro-invertebrate surveys, riparian assessments, and frog censuses.

#### *Frogwatch*

Frogwatch is a community frog monitoring program that collects important information about frog species and therefore catchment health and water quality. Frogs are well known for their sensitivity to pollution and habitat degradation, which makes them ideal indicators of the health of our catchments and waterways. The Frogwatch Census involves a simple assessment of our waterways by assuming that healthy habitats provide suitable conditions for diverse and abundant frog populations.

#### *Bush on the Boundary*

The 'Bush on the Boundary' Reference Group brings together representatives from a number of organisations spanning the government, community and business sectors. The group provides a forum for the exchange of information on biodiversity conservation and management of natural areas and nearby suburban areas. It also provides coordinated support for participants' new and existing projects and initiatives that assist the advancement of biodiversity conservation and land management, including research, monitoring, community engagement, education and on-ground projects.

## 5.4 CONCURRENT WORKS IN ADJACENT AREAS

Work in the riparian corridor will be most effective if adjacent areas are also managed well. This includes the riparian corridor upstream to Scrivener Dam, the burnt pine forest to the north (between the study area and the Arboretum) and the future urban areas of Coombs, North Weston and Wright. The

River Park Concept Plan is expected to provide a broader context to managing the riparian corridor adjacent future suburbs of the Molonglo Valley.

#### 5.4.1 Upstream to Scrivener Dam

The upstream catchment will continue to be a source of weeds, sediment and pollutants unless management practices change between Tuggeranong Parkway and Scrivener Dam. The *ACT Aquatic Species and Riparian Zone Conservation Strategy* has the following objectives:

- Upstream river sections also need to be rehabilitated. (Willows are being removed upstream of the study area in accordance with the *Lake Burley Griffin Willow Management Plan* by Greening Australia Capital Region 2006.)
- River flows should be protected at a level and regime that sustains all in-stream biota and ecological processes. Calculations and management of environmental flows for Lake Burley Griffin are being reviewed by the National Capital Authority

Treatment of upstream areas would also be consistent with the approach outlined in the *Draft Molonglo River Rescue Plan* (Molonglo Catchment Group and ACT NRM Council 2010). The Rescue Plan defines Reach 8 as Scrivener Dam to the Lower Molonglo River Corridor Nature Reserve, thus including the current study area. Areas within Reach 8 were considered to have similar issues and require similar actions.

#### 5.4.2 Northern area

The area to the north of the riparian corridor is a burnt pine forest infested with Blackberries and pine regrowth. In the long term, part of this area will be developed for residential purposes. However, some of this area may be suitable for extension of the Arboretum and could be investigated further. Hill tops would offer excellent views across the Molonglo Valley and could be accessed via the existing track network (once upgraded).

#### 5.4.3 Coombs, North Weston and Wright

Further changes will occur as part of the urban development. These will include stormwater detention ponds (proposed locations shown in **Figure 5**) and an associated stormwater pipe network. Water sensitive urban design features will be incorporated in the urban development in accordance with *Waterways – Water Sensitive Urban Design General Code* (ACT Planning and Land Authority 2009).

Actions within this Strategy will be further developed and implemented concurrent with significant activity in adjacent urban development areas. To prepare the site for development, heavy machinery will be used to remove the vegetation (mainly Pines and Blackberries). Appropriate follow-up will be needed in accordance with guidelines for Weeds of National Significance to ensure that future urban areas are not weed infested and do not continue to be a source of weeds for the riparian corridor.

### 5.5 CLIMATE CHANGE

Predicted climate change is expected to impact the Molonglo riparian corridor. Key climate change predictions for the ACT are (ACT Government 2007 and CSIRO<sup>8</sup>):

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<sup>8</sup> <http://www.csiro.au/resources/psrs.html>

- Higher air temperatures, including more hot days over 35 °C (up to three times as many by 2070) and a reduction in the number of frost days
- Increase winds in summer
- Drier average seasonal conditions (wetter in summer and autumn, drier in winter and spring)
- An increase in frequency and duration of extreme events such as storms and droughts
- An increase in frequency and duration of bushfires

Human activities and natural systems will need to adapt to these changes. The ACT Government's *Climate Change Strategy 2007-25* outlines the principles, targets and objectives to mitigate and adapt to climate change in the ACT. The first Action Plan<sup>9</sup> of the Climate Change Strategy sets out 43 separate action items, to be delivered by 2011. Actions likely to be directly relevant to the Molonglo Riparian Strategy are indicated below. Maintaining terrestrial and aquatic habitat connectivity will be important for the viability of species populations at a local and regional level. Care needs to be taken to ensure that barriers to wildlife movement are avoided.

- Develop integrated land use and transport planning
- Pursue an urban forest replacement program
- Protect areas of high conservation value
- Develop an ecosystem connectivity map
- Plant one million new trees
- Undertake a community education program
- Undertake a carbon sequestration audit

Biodiversity corridors such as the Molonglo River and riparian buffers will be needed to enable ecosystems to move through the landscape under changing climate conditions. The connectivity study recently undertaken by the ANU to fulfil dot point four above indicates that the Molonglo River Corridor is important for habitat connectivity for woodland birds, strongly flying birds (e.g. superb parrot), mammals and amphibians.

Volumes of water released from Scrivener Dam are likely to be affected by climate change and will require ongoing review to ensure environmental flow objectives are met.

## 5.6 LAND USE CLASSIFICATION

As indicated in **Figure 1**, the study area is currently zoned Non-Urban 'NUZ4 River Corridor' and classified as 'special purpose reserve' under the *Planning and Development Act 2007* 'to provide for public and community use of the area for recreation and education'. To more accurately reflect the objectives of conserving and rehabilitating biodiversity, amenity and recreational opportunities as described in this Strategy, it is recommended that the study area be rezoned as 'nature reserve'. Management objectives for this zone are listed in Schedule 3 of the Act as follows:

- To conserve and restore the natural environment
- To provide for public use of the area for recreation, education and research

<sup>9</sup> [http://www.environment.act.gov.au/climate\\_change/weathering\\_the\\_change/Climate\\_Change\\_Action\\_Plan.pdf](http://www.environment.act.gov.au/climate_change/weathering_the_change/Climate_Change_Action_Plan.pdf)

Appropriate land use zonings for areas within the river corridor will be investigated further during development of the River Park Concept Plan.

## 5.7 MONITORING

Monitoring will be needed to determine the effectiveness of actions in meeting objectives in **Table 1** and be essential to inform adaptive management practices. Monitoring and record keeping needs to be conducted in accordance with TAMS (LMP)'s requirements. A detailed monitoring plan should be developed and implemented so that the success in the fulfilment of the management objectives can be gauged. Such a monitoring plan would include some of the elements listed under **Sections 5.7.1** and **5.7.2**.

### 5.7.1 Biodiversity

- Location of monitoring sites e.g. transects, quadrats, incidental observations, photo points. All monitoring sites should be identified in the field by star picket, GPS location (easting and northing) and individual code.
- Templates and database (e.g. the MERV<sup>10</sup> customised Access database)
- Flora monitoring
  - Vegetation community structure and condition
  - Dominant plant species (including weeds)
  - Threatened species and potential habitat
  - Condition assessment (e.g. fire history, disturbance, resilience)
  - Number size, extent and condition of fauna habitat features (e.g. logs, hollows, stags, litter, rock, water bodies)
  - Opportunistic fauna observations
- Targeted fauna monitoring that capture seasonal differences. The fauna monitoring techniques to be used will depend on the habitat available. For example:
  - Diurnal bird surveys
  - Herpetological surveys
  - Anabat surveys
  - Call Playback and Spotlighting for nocturnal birds and mammals, frogs
- Results of on-ground work (e.g. species, area and numbers planted, and weed management).
- GIS maps to illustrate, as a minimum:
  - Monitoring locations
  - Ecological features at each monitored site
  - Changes over time to compare baseline conditions with subsequent results

### 5.7.2 Recreational usage

User surveys and automated monitoring could be employed to determine:

- Types of recreation being conducted e.g. mountain bike riding, equestrian, walking, picnicking

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<sup>10</sup> MERV is a freely available database for Monitoring and Evaluation of the Restoration of Vegetation. For more details refer to: <http://www.envite.org.au/>

- Locations where recreation is occurring e.g. Clos Crossing, southern perimeter track
- Frequency of recreational experience in the area e.g. daily, weekly, monthly, rarely
- Demand for additional or different facilities and experiences
- Breaches of restricted activities e.g. unauthorised 4WD
- Perception of value e.g. amenity, safety

### **5.7.3 Reports**

Monitoring reports will need to interpret the data and provide plain English conclusions suitable to inform a non-scientific audience of values and trends (which may be suitable for use in community education material). Monitoring reports should build on each other as additional information becomes available. The analysis in each report should be supported by information such as maps, tables and photographs.

## 6 Next steps

In summary, the steps to be taken to implement this Strategy are as follows:

- Prepare a River Park Concept Plan that examines in detail the recommendations of this Strategy, provides an integrated plan for the whole of the Molonglo River corridor adjoining future urban areas, and provides the framework for a detailed plan of management
- Clarify and assign roles and responsibilities for implementation
- Prepare a business case for funding and obtain funds
- Obtain required approvals, licences and permits
- Establish and implement monitoring and reporting procedures

A construction environmental management plan (CEMP) should be prepared for implementation by contractors and agency staff working in the development area. The CEMP should provide (for example) protocols for removal of weeds and pine wildlings, controlling soil erosion and stockpiling rocks for reuse in Pink-tailed Worm Lizard habitat.

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# Appendix A: Methodology

This strategy was developed in close consultation with agencies and the community, and informed by field observations and literature/data review.

## Consultation

December 2009 – Project inception and site visit

11 January 2010 – Recreation trails

11 January 2010 – Equestrian trails

February 2010 – Catchment groups

18 February 2010 – Agencies

February 2010 – Community

## Fieldwork

Eco Logical Australia has conducted ecological survey in the corridor in 2008 and 2009. Results from these surveys were incorporated in the Strategy, where relevant.

Additional fieldwork was undertaken specifically for this Strategy. An initial inspection of the study area was performed with representatives from the LDA in December 2009. This was used to get an overview of the site and discuss the key issues.

A second round of fieldwork was done by Tammy Haslehurst (Senior Ecologist) and Beth Medway (Project Manager) in early February 2010 to:

- Review possible locations for new river crossings, with particular consideration given to PTWL habitat and buffers
- Validate the vegetation mapping, consistent with ACT vegetation classifications
- Determine the main types of weeds
- Determine if erosion is a problem

A final site inspection was done after a period of heavy rainfall in February 2010. The main changes observed were:

- Greater erosion along tracks
- Higher water levels in the river
- Substantial debris (mainly logs) in the river

## Appendix B: Legislation and policies

This Strategy has been prepared within the legislative and policy framework outlined below. Both Commonwealth and ACT law and policy govern planning in the Molonglo study area.

### Commonwealth legislation

#### *Australian Capital Territory (Planning and Land Management) Act 1988*

The *Australian Capital Territory (Planning and Land Management) Act 1988* introduced arrangements for the planning and development of the Territory. The necessity for the new planning arrangements was a consequence of the Commonwealth's decision to introduce self-government to the Australian Capital Territory. The *Australian Capital Territory (Planning and Land Management) Act 1988* established the National Capital Planning Authority as a Commonwealth Government agency with the responsibility to prepare, administer and review a National Capital Plan.

Chapter 8 of the *Consolidated National Capital Plan* (National Capital Authority 2009) states that the Molonglo River corridor is part of the National Capital Open Space System and that its integrity as a natural system is preserved in the context of the urban system. As an area of 'Special Requirements', the National Capital Plan considers the river corridor to be of national significance and as such should be developed in accordance with its national significance.

The National Capital Plan states that the Molonglo River Corridor defines zones for which the primary aim is to:

*Reinforce and preserve their landscape and heritage values and their ecological continuity, while providing for a balanced range of recreational and tourist related uses.*

General policies for the entire river corridor set in the National Capital Plan are tabulated below.

ISSUE	POLICIES
Key Objective	To conserve the essential landscape and environmental character of the river and its natural and cultural values and to provide a balanced range of river and off-river recreation and other uses in a manner that reinforces and protects the river corridor as a unified system.
Streamflow and Water Quality	To maintain the streamflow, and to protect the water quality of the river from any adverse external influences, and ensure compatibility between land uses, water uses and the natural character of the river.
Nature Conservation	To protect the ecological resources of the river and river corridor, preserving natural areas in a relatively undisturbed state, maintaining a diversity of habitats, protecting significant natural sites and native plants and animals, and sustaining the ecological integrity and continuity of the river system for migrating fish and other wildlife populations

ISSUE	POLICIES
Landscape	To maintain and enhance the scenic and landscape character of the corridor and associated areas, preserving that which is valuable and enhancing unsatisfactory areas; and to ensure that any development is unobtrusive and compatible with its surroundings and the intrinsic landscape qualities of the river corridor.
Cultural Heritage	To protect and conserve the cultural heritage resources, including their landscape context.
Recreation	To provide opportunities for a balanced range of recreational activities appropriate to the characteristics of the river and adjacent land and in the context of the provision of recreation in the ACT.
Transport and Access	To provide for public access to the river corridor for Canberra residents and tourists in a manner compatible with the other planning policies, and which recognises the need for choice and diversity for the different sections of the community. Make provision for a system of walking and interpretation trails within the river corridor.
Education, Scientific Study and Research	To provide opportunities for appropriate environmental education, interpretation, research and scientific programmes; these should also enrich and broaden the recreational experience.
Timber Production	To use and manage the existing softwood plantations of the river corridor for continuing commercial timber production.

Source: Appendix F of the National Capital Plan

The National Capital Authority is involved in the project steering committee for this Strategy to ensure consistency with the National Capital Plan.

#### *Environment Protection and Biodiversity Conservation Act 1999*

ACTPLA has prepared *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC) referrals to the Commonwealth for the suburbs of Coombs and Wright, and a Strategic EPBC Act Assessment for the entire East Molonglo Structure Plan. These documents address a range of Matters of National Environmental Significance that are relevant to the river corridor, and have identified the need to address urban and recreation interface issues and the long term conservation management objectives of the river corridor in more detail.

The Pink-tailed Worm Lizard (*Aprasia parapulchella*) has been recorded within the study area and its habitat has been mapped. The *Environment Protection and Biodiversity Conservation Act 1999* lists *A. parapulchella* as a threatened species. The Department of the Environment, Water, Heritage and the Arts has decided that urban development in parts of Coombs is 'not a controlled action if undertaken in a particular manner'. Measures that must be taken to avoid significant impacts are applicable to the riparian study area and surrounds, and these are incorporated in this Strategy.

#### **ACT legislation**

##### *Planning and Development Act 2007*

The planning framework for the study area is provided by the *Planning and Development Act 2007*, as described below. The object of the *Planning and Development Act 2007* is to provide a planning and

land system that contributes to the orderly and sustainable development of the ACT. It sets out requirements for the Territory Plan, which is the key statutory planning document, providing the policy framework for the administration of planning and development in the ACT. The purpose of the Territory Plan is to manage land use change and development in a manner consistent with strategic directions set by the ACT Government, Legislative Assembly and the community.

The Territory Plan must not be inconsistent with the National Capital Plan (refer to the *Australian Capital Territory (Planning and Land Management) Act 1988*).

The Territory Plan includes a statement of strategic directions, a map (the Territory Plan Map) which sets out zones and precincts in the ACT, objectives and development tables applying to each zone as well as a series of general, development and precinct codes. It also includes structure plans and concept plans for the development of future urban areas. **Figure 1** replicates the Structure Plan for Molonglo.

The study area is currently zoned Non-Urban 'NUZ4 River Corridor' and classified as 'Special Purpose Reserve' through Variation 281 to the Territory Plan, as shown in **Figure 1**. Its boundary reflects topographic features, ecological values and the provision of adequate land for public access and landscaping. Schedule 3 of the *Planning and Development Act 2007* states the management objective for special purpose reserve as being 'to provide for public and community use of the area for recreation and education'.

Objectives of NUZ4 River Corridor are:

- Conserve the ecological and cultural values of the ACT's major river corridors
- Protect stream flow, water quality and flood plains from adverse impacts
- Ensure that the type and intensity of development is sustainable
- Provide opportunities for a range of ecologically sensitive water and land based recreational activities
- Ensure compatibility between land uses, water uses and the general character of the rivers
- Provide opportunities for appropriate environmental education and scientific research activities
- Prevent development that would significantly increase fire hazard

#### *Nature Conservation Act 1980*

The *Nature Conservation Act 1980* provides authority for the Conservator of Flora and Fauna to manage public land reserved for conservation of the natural environment. Activities that are inconsistent with management objectives for nature conservation are controlled. Special measures for the conservation of a species or community of concern can be introduced in a reserved area, including restriction of access to important habitat. The *Nature Conservation Act* gives Special Protection Status to *A. parapulchella*.

Part 8 of the *Nature Conservation Act 1980* sets provisions for reserved areas. A reserved area includes an area of public land that is reserved under the Territory Plan as a special purpose reserve and is not leased land. The provisions under Part 8 include limitations and restrictions to activities within a reserved area, native vegetation clearing, and damage to land. For example, the following activities and facilities need to be controlled:

- Entry fees
- Signage

- Rubbish
- Barbeques
- Driving or parking motor vehicles
- Camping
- Infrastructure e.g. picnic shelters
- Revegetation
- Clearing native vegetation

The Conservator may restrict access or certain types of activities following consideration of a detailed plan of management.

#### *Pest Plants and Animals Act 2005*

The *Pest Plants and Animals Act 2005* aims to protect the ACT's land and aquatic resources from threats from pest plants and animals; to promote a strategic and sustainable approach to pest management; to identify pest plants and animals; and to manage pest plants and animals. The Act provides for the declaration of pest plants and animals and the preparation of management plans. It also prescribes offences in relation to propagation, supply and reckless disposal of pest plants, and supply, keeping and reckless disposal of pest animals.

#### *Fisheries Act 2000*

The *Fisheries Act 2000* provides the framework for sustaining and protecting native fish species and providing high quality fishing opportunities in the ACT. The Molonglo study area is classified as 'Open Waters' which means it is open to fishing all year. However, fishing is banned because of poor water quality.

#### *Environment Protection Act 1997*

The main purpose of the *Environment Protection Act 1997* is to provide protection for the environment from pollution and other forms of environmental harm. The Act sets water quality guidelines.

#### *Water Resources Act 1998*

The *Water Resources Act 1998* establishes the Environmental Flow Guidelines which specify the flows required to maintain aquatic ecosystems in the ACT and cover both surface and groundwater. Environmental flows have a profound effect on the riparian environment, however this Strategy does not comment on the adequacy of flows released from Scrivener Dam because it is not likely that this regime will be managed differently in future.

### **Structure Plan and Concept Plan**

Molonglo and North Weston are identified in The Canberra Spatial Plan (2004) as the next major potential 'greenfield' area to accommodate Canberra's urban development over the next thirty years and beyond. Subsequent investigations by ACTPLA, in collaboration with the National Capital Authority (NCA), determined that the area is suitable for urban development and ultimately propose that the area could support a future population of around 55,000 people.

Territory Plan Variation No. 281 (DV281) introduced a Structure Plan for Molonglo and North Weston. It sets out the principles and policies that apply to the Molonglo Valley future urban area, including:

- The river corridor is recognised as an important natural asset to the ACT and region. It will be planned as an integral part of the National Capital Open Space System by providing for continuity of recreation use with surrounding open space and the Murrumbidgee River corridor.

- The environmental quality, landscape setting, natural and cultural values of the river corridor will be reinforced by the provision of an open space corridor on each side of the Molonglo River.
- Provision will be made along the river corridor for a balanced range of recreational activities appropriate to the characteristics of the river and adjacent land, and in a manner that reinforces and protects the natural and cultural values of the river corridor.
- Strong recreational links are to be facilitated in Molonglo and North Weston from Lake Burley Griffin to the Molonglo River, and between Stromlo Forest Park and the Canberra International Arboretum and Gardens.

The Structure Plan only applies to urban development areas, so does not directly affect this riparian strategy. However, this Strategy needs to consider edge effects and connectivity with recreation tracks, open space corridors, and pressures on the corridor generated by the urban population.

DV281 also introduced concept plans for the suburbs of North Weston, Coombs and Wright. These provide further detail design and policies relevant to the development

The first residential estate (North Weston) and capital works at Coombs and Wright (major road, stormwater ponds and trunk sewer) commenced in 2010.

### Other plans and strategies

There are a number of other programs, strategies and guidelines relevant to this Strategy. These include:

- Coombs, Wright and North Weston estate development plan, and landscape and urban design guidelines (LDA)
- Molonglo District Sustainability Strategy (LDA)
- National Weed Strategy
- TAMS Design Standards for Urban Infrastructure No. 20 - Urban Edge Management Zones
- Ribbons of Life: ACT Aquatic Species and Riparian Zone Conservation Strategy. Action Plan No. 29 (ACT Government 2007)
- Draft Molonglo River Rescue Action Plan (Molonglo Catchment Group and ACT NRM Council 2010)

### *ACT Aquatic Species and Riparian Zone Conservation Strategy (ASRZCS)*

The vision for the Murrumbidgee and Molonglo Rivers set by the ACT Government (2007) in the *ACT Aquatic Species and Riparian Zone Conservation Strategy* is to:

*Make an outstanding contribution to the conservation of aquatic and riparian ecosystems of the upper Murrumbidgee River catchment.*

The vision of the ASRZCS is supported by the following goals:

- *Conserve in perpetuity viable, wild populations of all aquatic and riparian native flora and fauna species\* in the ACT (\*including declared threatened species).*
- *Conserve in perpetuity aquatic and riparian native vegetation communities in the ACT as viable and well-represented ecological communities.*
- *Aquatic and riparian communities and habitats in the ACT are maintained and where degraded, rehabilitated to support the range of flora and fauna typical of the ACT. Rehabilitation may*

*include the re-introduction of threatened or locally extinct fish species to ACT and/or regional streams where they no longer occur naturally.*

- *Maintain in perpetuity a well-connected system of aquatic and riparian environments that support movement of aquatic and riparian fauna in the ACT and region.*

#### *Molonglo River Rescue Action Plan (MRRAP)*

The *Draft Molonglo River Rescue Action Plan* (Molonglo Catchment Group and ACT NRM Council 2010) has the following vision for the Molonglo River:

*A healthy river managed for sustainability and enjoyment*

Supporting the vision of the MRRAP are the following concepts:

- To stop further degradation of the river, and see it become healthier, more attractive and more accessible through actions such as:
  - Improving the health of instream and riparian habitats
  - Improving water quality, particularly reducing sediment and nutrient input
  - Creating an environment that fosters native flora and fauna, and is accessible and amenable to people
  - Protecting threatened species and communities where they occur on or near the river
  - Reducing the spread and impacts of woody weeds particularly Willow, Blackberry and other deciduous trees
  - Making best use of available and environmental flows to improve the health of the river
- To demonstrate what is possible through strategic, coordinated interventions involving government and non-government organisations and landholders working together
- To strengthen community and commercial interest and engagement in working to restore the Molonglo River

#### *Molonglo Valley Landscape and Visual Assessment (Annan Alcock 2006)*

Landscape Corridors: Riparian ... landscape corridors should remain primarily natural. Where these corridors intersect with centres and urban areas, a more formalised treatment should be considered, analogous to riverine urban parklands. Significant vegetation should be retained and planted in these areas to create linear open spaces for habitat and recreation.

Typical Riparian Corridors: Riparian corridors provide significant environmental and recreational linkages throughout the Molonglo Valley development. These areas are used to structure the overall plan in the following ways:

- Natural drainage lines
- Cycle, pedestrian and equestrian routes
- Natural habitat avenues for wildlife and endangered species
- Promote and preserve Canberra's country/city feel as inspired by Walter Burley Griffin

Riparian corridors will have a core vegetation component of largely untouched native vegetation although pedestrian and occasional vehicle bridge crossing will be required. Outside this, including the requirement for abatement, water management and recreation, will be managed with reduced density of vegetation and understorey management. This corridor will contain water sensitive urban design features ... and recreational trails.

## Appendix C: SWOT analysis

VALUE	STRENGTH OF EXISTING CONDITIONS	WEAKNESS OF EXISTING CONDITION	OPPORTUNITY FOR FUTURE	POSSIBLE FUTURE THREATS
<b>Recreation</b>	<p>Existing network of tracks and two constructed river crossings</p> <p>Area is currently well used for recreation activities such as mountain bike riding and equestrian</p> <p>Incorporates the Bicentennial National Trail</p> <p>Links to nearby areas such as the Arboretum, Stromlo Forest Park and Equestrian Park</p>	<p>Some tracks are steep, eroded or won't link to proposed urban access points</p> <p>Need to install safety rails on crossings and check that engineering standards are met for all recreational facilities</p> <p>Swimming is not currently recommended because of poor water quality</p>	<p>Create 'open space' recreation areas (e.g. for picnics) in suitable locations that are currently heavily weed infested</p> <p>Improve the condition and position of the track network to connect with urban links and provide for a variety of users</p> <p>Improve opportunities for swimming by improving water quality</p>	<p>Safety needs to be addressed, especially for multi-use trails</p> <p>Tracks and recreation areas will need to be maintained to avoid erosion, litter etc</p>
<b>Amenity</b>	<p>High points along the river corridor and nearby hills offer views across the Molonglo Valley</p>	<p>Heavy weed infestation, including burnt pine forest, has resulted in poor amenity throughout much of the study area</p>	<p>Amenity along the tracks is likely to improve as weeds are progressively removed and native vegetation is rehabilitated</p> <p>Better track maintenance will also improve amenity</p>	<p>Litter, vandalism, noise and other issues associated with urban development may adversely affect amenity</p>
<b>Topography and drainage</b>	<p>Diversity of alluvial flats and terraces, steep slopes and hilltops</p> <p>Molonglo River defines the landscape and offers pools, rapids, braided sections and has a number of ephemeral tributaries</p>	<p>Flow is controlled by Scrivener Dam</p> <p>Flash floods can occur following heavy rain in the catchment or dam release, and are particularly noticeable in rocky sections of the river</p>	<p>Maintain 'natural' characteristics within the riparian corridor</p> <p>Implement water sensitive urban design features in the adjacent urban areas</p>	<p>Stormwater inflows will change as impervious surfaces and other engineering structures are created as part of the urban development</p> <p>The main channel is relatively stable at present, but could become eroded or unstable if the flow regime changes significantly</p>
<b>Terrestrial ecology</b>	<p>Some native flora and fauna species are present even though the area has undergone significant modification associated with past rural and forestry activities, and the 2003 wildfire</p> <p>Presence of <i>Aprasia parapulchella</i> - the only threatened species that has been recorded in the study area</p>	<p>Severe weed infestation in the mid and upper reaches of the study area has reduced habitat value and ecosystem health</p> <p>Difficult to recognise the distribution of remnant vegetation communities</p>	<p>Significant scope to improve ecosystem health, including the proportion of native species and communities, and to improve connectivity with rehabilitated riparian areas upstream and downstream</p> <p>Maintain and improve habitat for threatened species</p>	<p>Rehabilitation will be difficult to achieve unless substantial resources are applied over a long time</p> <p>Grazing by stock will need to be phased out carefully to ensure that weeds that may have been suppressed are replaced by native species</p>
<b>Aquatic ecology and water quality</b>	<p>The Molonglo River appears to offer a variety of aquatic habitats including in-stream, fringing vegetation and large woody debris</p>	<p>Swimming is not recommended in the Molonglo River because of poor water quality</p> <p>Limited data is available regarding water quality and aquatic ecology</p>	<p>Improved water quality would enable swimming and enhance aquatic ecosystems</p> <p>'Showcase' good stormwater management practices associated with urban development</p>	<p>Urban development often results in a decline in water quality and aquatic ecosystem health</p> <p>Grazing by stock will need to be phased out to reduce adverse impacts to water quality and soils</p> <p>Predicted climate change may result in less rainfall and a reduction in river flows and aquatic habitat</p>

## Appendix D: Potential threatened species

Potential threatened and migratory species and their habitat characteristics are tabulated below for species listed under the ACT *Nature Conservation Act* and the Commonwealth *Environment Protection and Biodiversity Conservation Act*. Habitat availability is an estimation of the likelihood of occurrence of the species in the study area, including low or high potential. Future habitat availability refers to habitat conditions that are predicted to occur in future following rehabilitation of the study area in accordance with this Strategy.

SPECIES (COMMON NAME)	SPECIES (SCIENTIFIC NAME)	EPBC ACT	NC ACT	HABITAT CHARACTERISTICS	CURRENT HABITAT AVAILABILITY	FUTURE HABITAT AVAILABILITY
Macquarie Perch	<i>Macquaria australasica</i>	Yes	Yes	Cool, shaded upland streams with deep rocky pools and substantial cover	Low	Low
Murray River Crayfish	<i>Euastacus armatus</i>	-	Yes	Large and small streams in a variety of habitats. Prefers faster flowing cool water habitats of the main channel of rivers	Low	Low
Varied Sitella	<i>Daphoenositta chrysoptera</i>	-	Yes	Well treed habitats rather than sparsely trees habitats. In ACT, species has preference for areas with <i>E. macrorhyncha</i>	Low	Low
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	Yes	Yes	Wide range of forested habitats. Favours areas with relatively complex midstorey, often in association with complex rock formations, hollow bearing trees, rocky escarpment, fallen logs	No	No
Brown Tree creeper	<i>Climacteris picumnus</i>	-	Yes	Grassy woodland with native understorey, fallen wood, large live and dead trees	Low	Low
Hooded	<i>Melanodryas</i>	-	Yes	Drier Eucalypt forest, woodland and scrub, grasses and low shrubs. Yellow	Low	Low

SPECIES (COMMON NAME)	SPECIES (SCIENTIFIC NAME)	EPBC ACT	NC ACT	HABITAT CHARACTERISTICS	CURRENT HABITAT AVAILABILITY	FUTURE HABITAT AVAILABILITY
Robin	<i>cucullata</i>			Box-Red Gum Grassy Woodland important		
Regent Honeyeater	<i>Xanthomyza phrygia</i>	Yes	Yes	Drier temperate woodlands and open forests including forest edges and wooded farmland. Yellow Box-Red Gum Grassy Woodland important	Low	Low
Small Purple Pea	<i>Swainsona recta</i>	Yes	Yes	Open woodland with native grassy understorey dominated by kangaroo grass, poa tussock or spear grasses	No	No
Superb Parrot	<i>Polytelis swainsonii</i>	Yes	Yes	Forages on ground for grass seeds and herbs but also feeds in the canopy and outer branches of shrubs. Yellow Box-Red Gum Grassy Woodland important	Low	High
Swift Parrot	<i>Lathamus discolor</i>	Yes	Yes	Inhabits mainly dry open Eucalyptus forests and woodlands, usually box-ironbark communities and Yellow Box-Red Gum Grassy Woodland	Low	High
White-winged Triller	<i>Lalage sueurii</i>	-	Yes	In ACT, found in and around grassy woodland areas including Yellow Box-Red Gum Grassy Woodland, and Apple Box and Candlebark woodlands	Low	High
Brown Wrinklewort	<i>Rutidosis leptorrhynchoides</i>	-	Yes	Margins of Yellow Box-Red Gum Grassy Woodland with native understorey. Extends into native grasslands	No	No
Perunga Grasshopper	<i>Perunga ochracea</i>	-	Yes	Natural temperate grasslands and secondarily derived grasslands dominated by wallaby, kangaroo and spear grasses with forb food plants in intertussock spaces	Low	Low
Grassland Earless Dragon	<i>Tympanocryptis pinguicolla</i>	Yes	Yes	Restricted to temperate grasslands including secondarily derived grasslands	Low	Low
Ginniderra	<i>Lepidium</i>	Yes	Yes	Natural temperate grasslands dominated by <i>Bothriochloa</i> and <i>Austrostipa</i>	Low	Low

SPECIES (COMMON NAME)	SPECIES (SCIENTIFIC NAME)	EPBC ACT	NC ACT	HABITAT CHARACTERISTICS	CURRENT HABITAT AVAILABILITY	FUTURE HABITAT AVAILABILITY
Peppercress	<i>ginninderrense</i>			species		
Golden Sun Moth	<i>Synemon plana</i>	Yes	Yes	Native grasslands dominated by <i>Austrodanthonia</i> species	Low	Low
Striped Legless Lizard	<i>Delma impar</i>	Yes	Yes	Natural temperate grasslands and secondarily derived grasslands dominated by perennial tussock grasses, although it is also present in exotic-dominated grass areas	High	High
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Yes	-	Large rivers, fresh and saline lakes, reservoirs, coastal seas and islands	Low	Low
Rainbow Bee Eater	<i>Merops ornatus</i>	Yes	-	Open country, most vegetation types; sand dunes, banks	High	High
Rufous Fantail	<i>Rhipidura rufifrons</i>	Yes	-	Occurs in rainforest and wet sclerophyll forests along the east coast and adjacent ranges	No	No
No common name	<i>Pomaderris pallida</i>	Yes	-	Occurs along the plateau edge and very steep upper slopes and cliffs of river valleys	No	No
White-throated Needletail	<i>Hirundapus caudacutus</i>	Yes	-	Inhabit forested coastal and mountain regions, farmland and orchards	Low	Low
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	Yes	-	Breed and forage in the taller, wetter eucalypt forests of coastal SE Aust in gullies, plains and tablelands	No	No
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Yes	-	Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, fruits of rainforest trees and vines, and also forage	Low	Low

SPECIES (COMMON NAME)	SPECIES (SCIENTIFIC NAME)	EPBC ACT	NC ACT	HABITAT CHARACTERISTICS	CURRENT HABITAT AVAILABILITY	FUTURE HABITAT AVAILABILITY
				in cultivated gardens and fruit crops		
Austral Toadflax	<i>Thesium australe</i>	Yes	-	Occurs in grassland or grassy woodland. Often found in damp sites in association with Kangaroo Grass	Low	Low
Cattle Egret	<i>Ardea ibis</i>	Yes	-	Forage on or near cattle and roost in trees lining waterways	High	High
Pink-tailed Worm Lizard	<i>Aprasia parapulchella</i>	Yes	-	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by kangaroo grass. Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks.	Present	Present
Australian Painted Snipe	<i>Rostratula australis</i>	Yes	-	Found in shallow inland wetlands, either freshwater or brackish, that are either permanently or temporarily filled	Low	Low
Booroolong Frog	<i>Litoria booroolongensis</i>	Yes	-	Mountainous areas near rocky streams, often found under rocks and debris.	Low	Low
Yellow-spotted Tree Frog, Yellow-spotted Bell Frog	<i>Litoria castanea</i>	Yes	-	Lives in permanent water bodies such as lakes, ponds and dams with lots of vegetation around the edges.	Low	Low
Murray Cod, Cod, Goodoo	<i>Maccullochella peelii peelii</i>	Yes	-	Occurs in the waterways of the Murray–Darling Basin in a wide range of warm water habitats that range from clear, rocky streams to slow flowing turbid rivers and billabongs.	Low	Low
Hoary	<i>Leucochrysum albicans var.</i>	Yes	-	Occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils.	Low	Low

SPECIES (COMMON NAME)	SPECIES (SCIENTIFIC NAME)	EPBC ACT	NC ACT	HABITAT CHARACTERISTICS	CURRENT HABITAT AVAILABILITY	FUTURE HABITAT AVAILABILITY
Sunray	<i>tricolor</i>					
Tuggeranong Lignum	<i>Muehlenbeckia tuggeranong</i>	Yes	-	<p>This species is known only from flood terraces on the eastern bank of the Murrumbidgee River near Tuggeranong on the southern outskirts of Canberra (NSW Southern Tablelands botanical district) (Makinson &amp; Mallinson 1997). It is as yet only known from the Pine Island area in the Murrumbidgee Corridor Nature Reserve (Mallinson et al. 1998).</p> <p>Occur on river bank terraces prone to occasional flooding, and on an adjacent gentle slope. This section of the river is typified by rapids, sand reaches and boulders, with uneven rocky flood terraces, some up to about 100 m wide, at 2-8 m above normal river level.</p>	No	Low
Button Wrinklewort	<i>Rutidosia leptorrhynchoides</i>	Yes	-	Occurs in box-gum woodland, secondary grassland derived from box-gum woodland or in natural temperate grassland; and often in the ecotone between the two communities.	Low	Low
Great Egret, White Egret	<i>Ardea alba</i>	Yes	-	Occurs in wide range of wetland habitats (inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small, natural and artificial).	High	High
Latham's Snipe, Japanese Snipe	<i>Gallinago hardwickii</i>	Yes	-	Occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation.	Low	Low
Painted Snipe	<i>Rostratula benghalensis s. lat.</i>	Yes	-	Inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank	Low	Low

SPECIES (COMMON NAME)	SPECIES (SCIENTIFIC NAME)	EPBC ACT	NC ACT	HABITAT CHARACTERISTICS	CURRENT HABITAT AVAILABILITY	FUTURE HABITAT AVAILABILITY
				emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum <i>Muehlenbeckia</i> or canegrass or sometimes tea-tree ( <i>Melaleuca</i> ).		
Fork-tailed Swift	<i>Apus pacificus</i>	Yes	-	Migrates to eastern and northern Australia in October and leaves between May and August.	High	High

# Appendix E: EPBC Act Referral Decision



## Australian Government

### Department of the Environment, Water, Heritage and the Arts

Kelvin Walsh  
 Director  
 Planning Service  
 ACT Planning and Land Authority  
 GPO Box 1908  
 Canberra ACT 2601

Date: 16/04/2010  
 EPBC Ref: 2009/5050  
 EPBC contact: Chris Murphy  
 6274 1821  
 chris.murphy@environment.gov.au

Dear Mr Walsh

**Decision on reconsideration  
 Urban development in parts of the suburb of Coombs – Molonglo Valley, ACT  
 (EPBC 2009/5050).**

I am writing to advise of the outcome of the request for reconsideration of the above proposal pursuant to section 78 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) dated 2 March 2010.

I have carefully considered the information and the circumstances concerning the proposed action and the impacts that the action will have, or is likely to have, on the matters protected under the EPBC Act.

**I have decided to revoke the original decision and substitute a new decision that the proposal is a not controlled action if undertaken in a particular manner.**

**Please note that the particular manner requirements that form part of this new decision differ from the original particular manner requirements.**

The proposed action must be undertaken in the manner specified if it is to avoid having a significant impact on the following matters protected by the EPBC Act:

- Listed threatened species and ecological communities (sections 18 & 18A)

Please note that this decision only relates to the potential for significant impact on the specific matters protected by the Australian Government under Chapter 4 of the EPBC Act.

A copy of the document recording this decision is enclosed.

If you have any questions about the referral process or this decision, please contact the EPBC project manager and quote the EPBC reference number shown at the beginning of this letter.

Thank you for your assistance in this matter.

Yours sincerely

Ms Vicki Middleton  
 Assistant Secretary  
 Environment Assessment Branch



## Australian Government

Department of the Environment, Water, Heritage and the Arts

### Notification of REFERRAL DECISION – not controlled action if undertaken in a particular manner

#### URBAN DEVELOPMENT IN PARTS OF THE SUBURB OF COOMBS – MOLONGLO VALLEY, ACT (EPBC 2009/5050)

This decision is made under Sections 75 and 77A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

#### Proposed action

**person named in the referral** Director Planning Policy,  
ACT Planning and Land Authority.

**proposed action** To develop part of the suburb of Coombs, Molonglo Valley, ACT, as described in the referral received by the Department on 25 August 2009 (EPBC 2009/5050) and request for reconsideration dated 2 March 2010.

#### Referral decision: Not a controlled action if undertaken in a particular manner

**status of proposed action** The proposed action is not a controlled action provided it is undertaken in the manner set out in this decision.

#### Person authorised to make decision

**Name and position** Ms Vicki Middleton  
Assistant Secretary  
Approvals and Wildlife Division

#### signature

**date of decision** 16 April 2010

#### manner in which proposed action must be taken

- The following measures must be taken to avoid significant impacts on:
- Listed threatened species and communities (sections 18 & 18A).
1. Maintain a buffer zone of at least 20 metres from moderate and high quality *Aprasia paraputchella* habitat as identified at Annexure 1, except when inconsistent with other measures in this notice.
  2. Ensure vehicles do not drive over and keep all forms of disturbance, such as heavy earth moving equipment and other construction activity away from moderate and high quality *Aprasia paraputchella* habitat at Annexure 1, except when

inconsistent with other measures in this notice.

3. Prevent construction spoil and any material used in soil stabilisation and revegetation from running down slope over mapped *Aprasia parapulchella* habitat areas at Annexure 1.
4. Prevent the spread or planting of trees, shrubs or weeds (e.g. Blackberry *Rubus fruticosus*) within 20 m of high and moderate quality *Aprasia parapulchella* habitat at Annexure 1. Trees and shrubs will not be planted in areas that could potentially shade moderate and high quality habitat or buffers;
  - 4.1. All construction machinery will be washed to prevent the spread of weeds prior to entering the site. All machinery operating below the proposed edge road will be washed; if machines have been (a) offsite or (b) entered or operated in the area of former pine plantation identified at Annexure 1.
5. Prevent stormwater, occurring as a result of this action, from flowing over moderate and high quality *Aprasia parapulchella* habitat patches below the sewer line at Annexure 1.
6. Erect permanent fencing to enclose all moderate and high quality *Aprasia parapulchella* habitat at Annexure 1. Fencing will be designed to minimise unregulated public access, rock collection, access by domestic animals and unregulated stock grazing.
7. An edge road as indicated on page 27 of the Coombs and Wright Concept Plan will separate residential development from the river corridor.
8. A management strategy will be implemented, and ensure that;
  - 8.1. Habitat values for high and moderate quality *Aprasia parapulchella* patches below the edge road are maintained and improved, including removal and on-going management of weeds.
  - 8.2. Any fire, biomass management, or fuel reduction required as a result of the action within 20 m of moderate and high quality habitat at Annexure 1 will be conducted in an ecologically sympathetic manner with the conservation of *Aprasia parapulchella*. Grazing will only be used as a management technique when it is undertaken in accordance with expert advice;
  - 8.3. Signs containing educational/public information concerning the conservation of *Aprasia parapulchella* in the Molonglo Valley will be erected in consultation with expert advice.
9. Measures 1 and 2 will not apply with respect to the construction of public access ways to the river corridor through moderate quality *Aprasia parapulchella* habitat or buffer areas at Annexure 1. Access ways will be planned and designed in accordance with expert advice to minimise impact and conserve habitat values for *Aprasia parapulchella*;
  - 9.1. Access ways will not pass through high quality *Aprasia parapulchella* habitat at Annexure 1.

- 
10. Surface rocks suitable for *Aprasia parapulchella* from within the Coombs pond inundation area and access way alignments will be used to rehabilitate areas of potential habitat below the sewer line in accordance with expert advice. Rehabilitation will not take place within mapped high quality habitat at Annexure 1. Rocks and any machinery will be washed of all soil and organic matter prior to use for rehabilitation.
    - 10.1. A monitoring program developed in accordance with expert advice will survey rehabilitated habitat areas annually for 5 years, following final completion of the trunk sewer. As part of the monitoring program, a baseline survey will be conducted prior to the construction of houses and annual results will be published on an appropriate ACT Government website.
  11. For Patch 2 (Annexure 1) all measures, except measure 1 apply. In addition;
    - 11.1. Within 20 m of patch 2, machinery will only operate from within or above the sewer alignment; excavated material will not be stockpiled below the alignment.
    - 11.2. All land disturbed within 20 m of Patch 2 will be rehabilitated to improve current *Aprasia parapulchella* habitat value in accordance with expert advice. Specifically surface rocks will be retained and replaced and disturbed areas will be revegetated with local native grasses, sterile Rye and specifically Kangaroo grass (*Themeda australis*).
  12. Patch 4 (Annexure 1) will be rehabilitated to improve *Aprasia parapulchella* habitat value below the sewer alignment as per the measure outlined in 11.2.
    - 12.1. All development other than the trunk sewer will avoid the rehabilitated portion of Patch 4 (Annexure 1) by a minimum buffer of 20m.
  13. A wildlife expert experienced with *Aprasia parapulchella* will check all potential habitat that is disturbed prior to construction. Any *Aprasia parapulchella* specimens found will be relocated to the nearest suitable habitat.
  14. The above measures do not apply to the area identified as Patch 1 (Annexure 1), except for measures 10 and 13.

\*The 20 m buffer referred to in this notice is to be measured from the edge of relevant mapped *Aprasia parapulchella* habitat.

\*\*Expert advice means: someone with demonstrated expertise in *Aprasia parapulchella*.

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## Appendix L

### Phase 1 Contamination – Coombs Mapping and Agency Endorsement



DEPARTMENT OF  
THE ENVIRONMENT,  
CLIMATE CHANGE,  
ENERGY AND WATER

ID MS  
SCANNED

File Ref: 05/6199

Mr Miloje Beljic  
ACT Planning and Land Authority  
2nd Floor North, Dame Pattie Menzies House, 16 Challis Street,  
Dickson ACT 2602

Dear Mr Beljic

**ENDORSEMENT OF PHASE 1 ENVIRONMENTAL SITE ASSESSMENT  
REPORT FOR PRECINCT OF NORTH WESTON - REISSUED –  
BLOCKS 671, 672, 673, 1137, 1138, 1155, 1193, 1208, 1210 WESTON CREEK  
BLOCKS 5 & 7 SECTION 81 WESTON WESTON CREEK  
BLOCKS 2, 3, 8, 12, 13, 14 & 15 SECTION 83 WESTON WESTON CREEK  
BLOCKS 5, 9 & 10 SECTION 94 WESTON WESTON CREEK**

The Environment Protection Unit (EPU) has reviewed the report titled "Final Phase 1 Environmental Site Assessment Report for the precinct of North Weston in Weston Creek" (Project Number 3002156) by SMEC Australia Pty Ltd dated February 2009.

The EPU has assessed the report and endorses the consultant's findings that on the basis of the studies remedial works and validation sampling must be undertaken by a suitably qualified environmental consultant within the areas of the site identified below prior to it being suitable for its intended residential development:

- animal burial pit (TP1336)
- leaking sewer point (TP1122)

On completion of remediation and validation works a validation report must be prepared by the suitably qualified environmental consultant and forwarded to the EPU for review and endorsement.

**DEPARTMENT OF THE ENVIRONMENT, CLIMATE CHANGE, ENERGY AND WATER • ENVIRONMENT PROTECTION**

Level 3 Annexe, Macarthur House 12 Wattle Street, Lyneham ACT GPO Box 158 Canberra ACT 2601

Telephone Canberra Connect 132281 Fax 02 6207 6084 website [www.tams.act.gov.au](http://www.tams.act.gov.au)

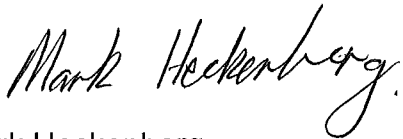
A site specific construction environmental management plan (CEMP) must also be prepared by a suitably qualified environmental consultant and endorsed by the EPU prior to the commencement of redevelopment works at the site. The CEMP must detail appropriate management strategies to deal with the building and waste materials identified in the Phase 1 Environmental Site Assessment report and any unexpected findings encountered during site development works.

The works to date have been undertaken to the satisfaction of the Environment Protection Authority in accordance with the Contaminated Sites Environment Protection Policy November 2000 and associated guidelines.

This letter of endorsement must be read in conjunction with the above report and supersedes the previous letter of endorsement dated 12 January 2009.

This should not be taken as a warranty by the Environment Protection Authority or the Territory that the land is fit for any particular purpose.

Yours sincerely

A handwritten signature in black ink that reads "Mark Heckenberg". The signature is written in a cursive style with a prominent initial 'M' and a long, sweeping tail on the 'g'.

Mark Heckenberg  
Environment Protection

12/02/2009



DEPARTMENT OF  
THE ENVIRONMENT,  
CLIMATE CHANGE,  
ENERGY AND WATER

ID MS  
SCANNED

File Ref: 05/6199

Mr Miloje Beljic  
ACT Planning and Land Authority  
2nd Floor North, Dame Pattie Menzies House, 16 Challis Street,  
Dickson ACT 2602

Dear Mr Beljic

**ENDORSEMENT OF PHASE 1 ENVIRONMENTAL SITE ASSESSMENT  
REPORT FOR COOMBS AND WRIGHT – REISSUED  
PART BLOCK 13 - STROMLO  
PART BLOCKS 658, 1171, 1187, & 1196 - WESTON CREEK**

The Environment Protection Unit (EPU) has reviewed the report titled "Final Phase 1 Environmental Site Assessment Report for Coombs and Wright, Molonglo" (Project Number 3002156) by SMEC Australia Pty Ltd dated February 2009.

The EPU has assessed the report and endorses the consultant's findings that on the basis of the studies remedial works and validation sampling must be undertaken by a suitably qualified environmental consultant within the areas of the site identified below prior to it being suitable for its intended residential development:

- TP2151 and TP 2152 (Reference Point Number 6)

On completion of remediation and validation works a validation report must be prepared by the suitably qualified environmental consultant and forwarded to the EPU for review and endorsement.

A site specific construction environmental management plan (CEMP) must also be prepared by a suitably qualified environmental consultant and endorsed by the EPU prior to the commencement of redevelopment works at the site. The CEMP must detail appropriate management strategies to deal with the building and waste materials identified in the Phase 1 Environmental Site Assessment report and any unexpected findings encountered during site development works.

The works to date have been undertaken to the satisfaction of the Environment Protection Authority in accordance with the Contaminated Sites Environment Protection Policy November 2000 and associated guidelines.

DEPARTMENT OF THE ENVIRONMENT, CLIMATE CHANGE, ENERGY AND WATER • ENVIRONMENT PROTECTION

Level 3 Annexe, Macarthur House 12 Wattle Street, Lyneham ACT GPO Box 158 Canberra ACT 2601

Telephone Canberra Connect 132281 Fax 02 6207 6084 website [www.tams.act.gov.au](http://www.tams.act.gov.au)

This letter of endorsement must be read in conjunction with the above report and supersedes the previous letter of endorsement dated 20 January 2009.

This should not be taken as a warranty by the Environment Protection Authority or the Territory that the land is fit for any particular purpose.

Yours sincerely

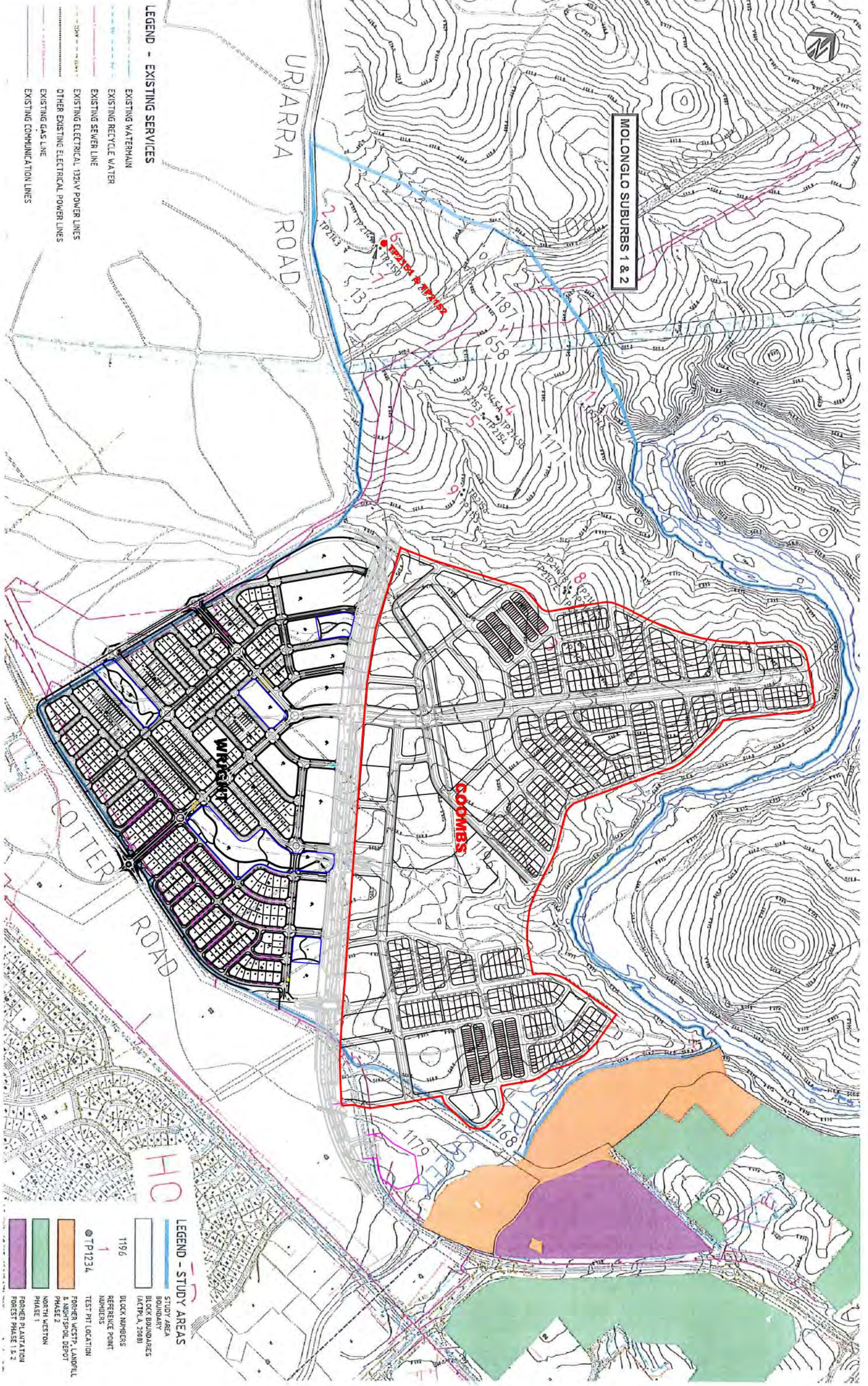
A handwritten signature in black ink that reads "Mark Heckenberg". The signature is written in a cursive style with a large, looping 'M' and 'H'.

Mark Heckenberg  
Environment Protection

12/02/2009

- X\_MOL\_CADASTRAL
- X\_MOL\_CONV\_23\_EX
- X\_MOL\_MH\_ID\_CLASS\_11
- X\_MOL\_PHASE\_BODY
- X\_MOL\_UTLK
- X\_MOL\_UTLK\_PRES
- X\_MOL\_PHASE\_AREA
- X\_MOL\_PHASE\_AREA
- X\_MOL\_PHASE\_AREA
- X\_MOL\_FEATURE\_NAMES
- X\_MOL\_SERVICES\_PRES
- X\_MOL\_ESA\_ECH2018\_1

- LEGEND - EXISTING SERVICES**
- EXISTING WATERMAIN
  - EXISTING RECYCLE WATER
  - EXISTING SEWER LINE
  - EXISTING ELECTRICAL 132kV POWER LINES
  - OTHER EXISTING ELECTRICAL POWER LINES
  - EXISTING GAS LINE
  - EXISTING COMMUNICATION LINES



**MOLONGO SUBURBS 1 & 2**

**URRIARRA ROAD**

**COTTER ROAD**

**COOMBS**

**WRIGHT**

**HQ**

- LEGEND - STUDY AREAS**
- STUDY AREA BOUNDARY
  - BLOCK BOUNDARIES (ACTPLA, 2008)
  - BLOCK NUMBERS
  - REFERENCE POINT NUMBERS
  - TEST PIT LOCATION
  - FORMER WESTP. LANDFILL & NIGHT-SPILL DEPOT PHASE 2
  - NORTH WEST PHASE 1
  - FORMER PLANTATION FOREST PHASE 1 & 2

# MOLONGO

## WRIGHT and COOMBS

SCALE 1:500  
 SCALE AT A1 SIZE DRAWING



MOLONGO - DETAILED GEOTECHNICAL INVESTIGATION  
 AND ENVIRONMENTAL SITE ASSESSMENT  
**COOMBS AND WRIGHT**  
 SAMPLE LOCATION PLAN

FIGURE 2