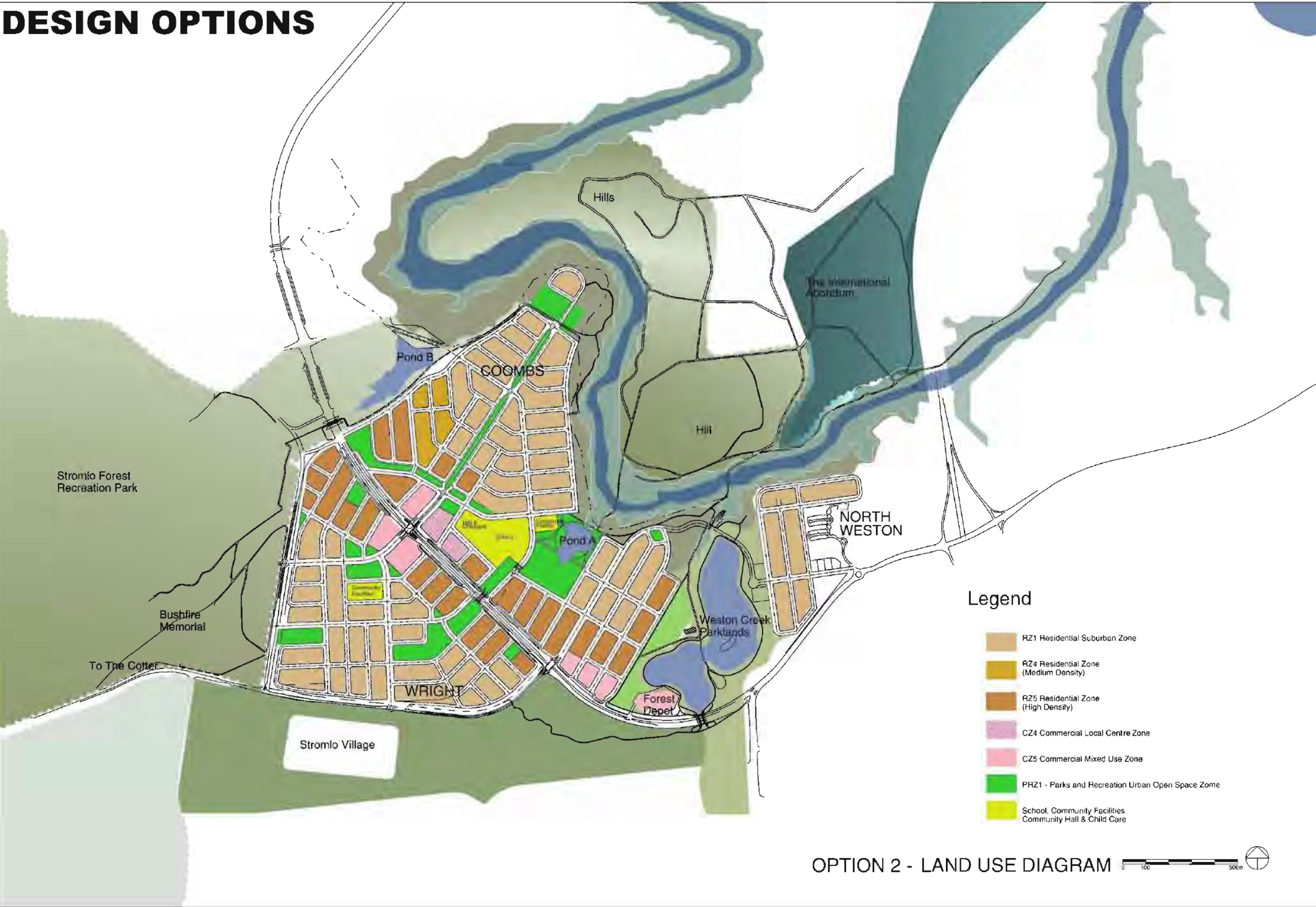


DESIGN OPTIONS

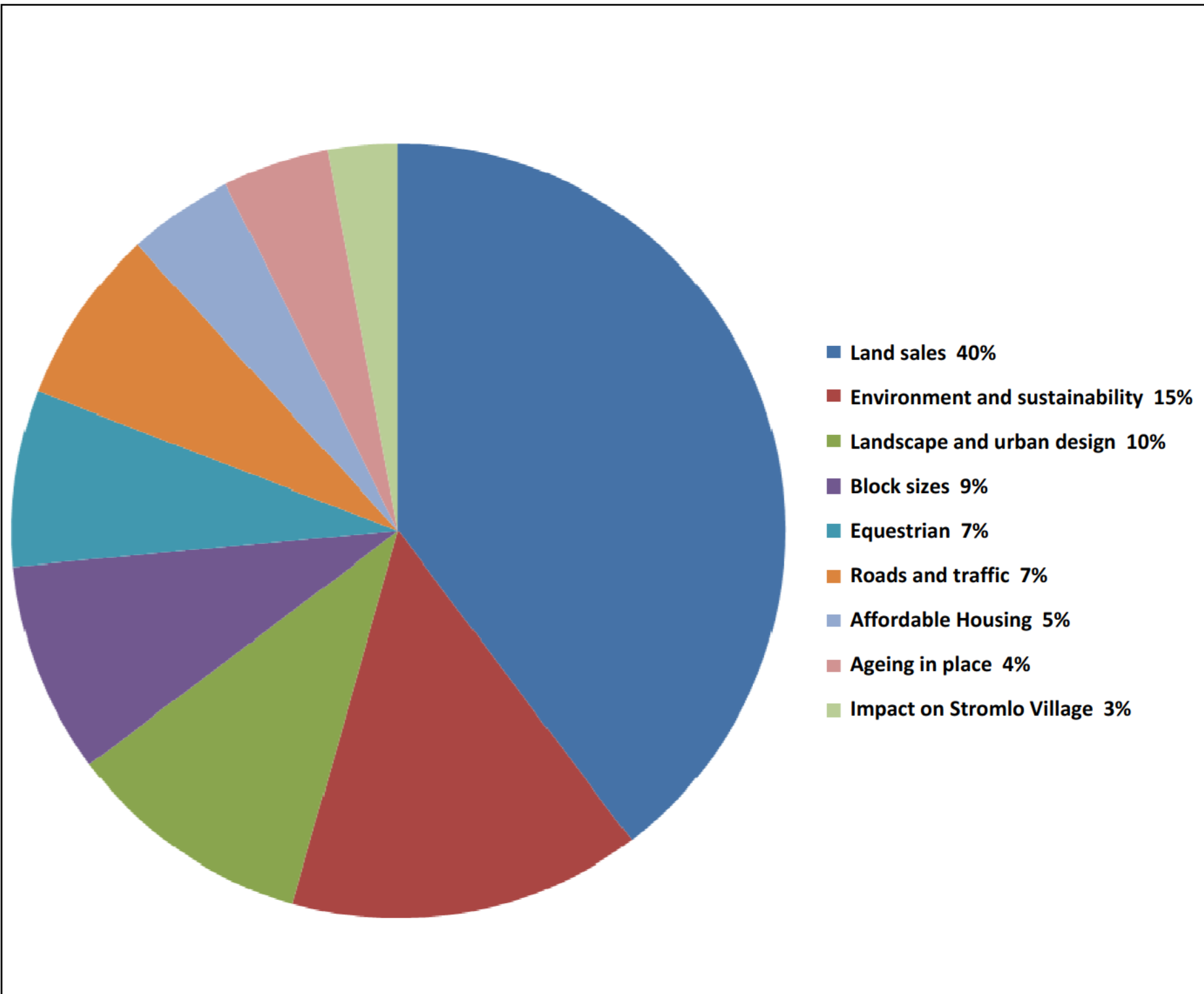


Legend

- RZ1 Residential Suburban Zone
- RZ4 Residential Zone (Medium Density)
- RZ5 Residential Zone (High Density)
- CZ4 Commercial Local Centre Zone
- CZ5 Commercial Mixed Use Zone
- PRZ1 - Parks and Recreation Urban Open Space Zone
- School, Community Facilities, Community Hall & Child Care

OPTION 2 - LAND USE DIAGRAM 0 100 500m

COMMUNITY FEEDBACK FROM DECEMBER 2009 PUBLIC INFORMATION SESSIONS



SUMMARY OF COMMUNITY FEEDBACK:

Land Sales

- Timing and method of sale

Environment and sustainability

- River corridor
- Solar orientation
- Biodiversity
- Water Sensitive Urban Design
- Community Garden

Landscape and Urban Design

- Future tree plantings
- Deek's Park
- Buffer zones

Block sizes

- Larger blocks

Equestrian

- Temporary and long term access

Roads and traffic

- Impact of construction and additional population on roads and congestion

Affordable housing

- Mix of support and opposition

Ageing in Place

- Provision of and accessibility to facilities
- Single storey dwellings

Impact on Stromlo Village

- Buffer zone plantings

MAIN DESIGN PRINCIPLES SUPPORTED BY COMMUNITY:

- Connection to features- river corridor, mountains, The International Arboretum and Stromlo Forest Park.
- Using landmarks for way finding.
- Out of two options presented (Option 1 & 2), Option 2 was identified as preferred and has been progressed further.

Appendix G
Noise Study



CLIENTS PEOPLE PERFORMANCE

ACT Planning and Land Authority

Molonglo Valley Development Road Traffic Noise Assessment

November 2008

Revision 0



Contents

Glossary	i
1. Introduction	1
1.1 Project Overview	1
1.2 Scope of Works	2
1.3 Limitations	2
2. Road Traffic Noise Criteria	3
3. Noise Modelling	4
3.1 Model Configuration	4
3.2 Results	5
4. Recommendations	7
5. Conclusions	8

Table Index

Table 2-1	Maximum External Traffic Noise Level L_{A10} (18 hour) dB(A) (Source ACTPLA)	3
Table 3-1	Australian Road Conversions – ARRB Study – Austroads 2002	4
Table 3-2	10-year Projected (2021) North-South Arterial Road Traffic Flows	5

Figure Index

Figure 1-1	Molonglo Valley Development	1
Figure 3-1	Predicted Traffic Noise Contours – North-South Arterial Road – dB(A) L_{A10} , (18 hour)	6



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.

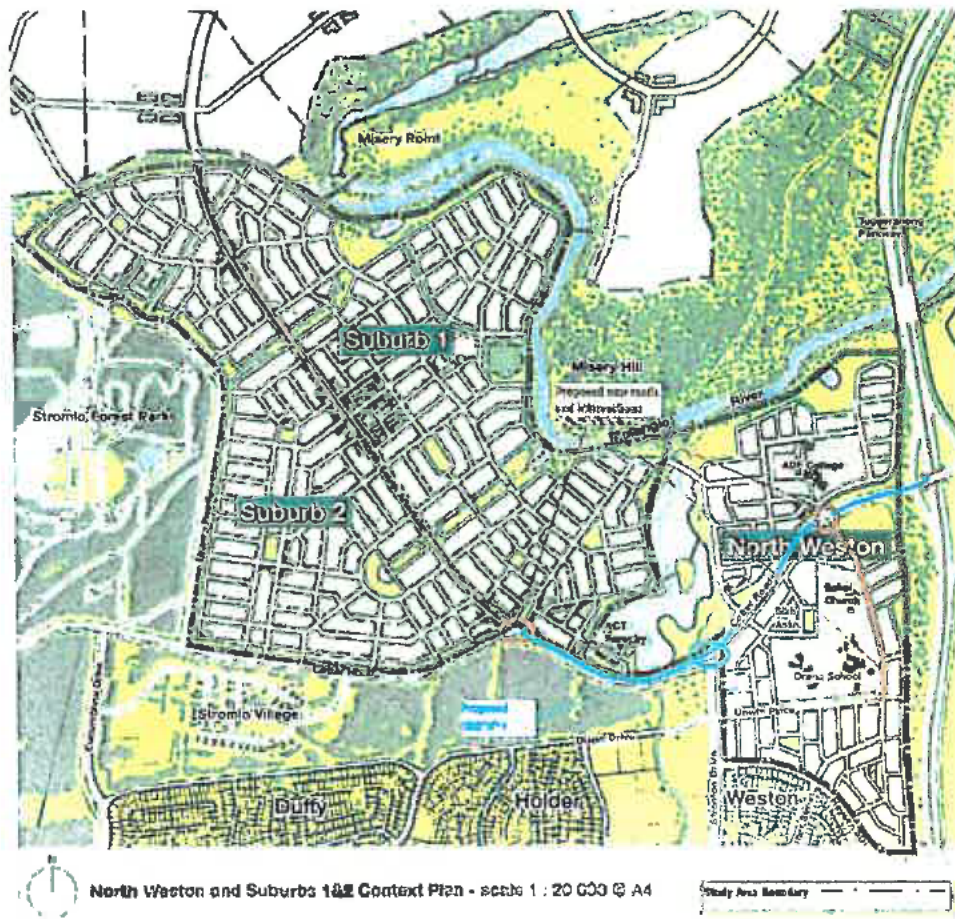


Figure 1-1 Molonglo Valley Development



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 $L_{A10(18\text{ hour})}$ 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 ⁽²⁾ .	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) $L_{10(18\text{ hour})}$ 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) $L_{10(18\text{ hour})}$ 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) $L_{A10(18\text{ hour})}$ 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 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.

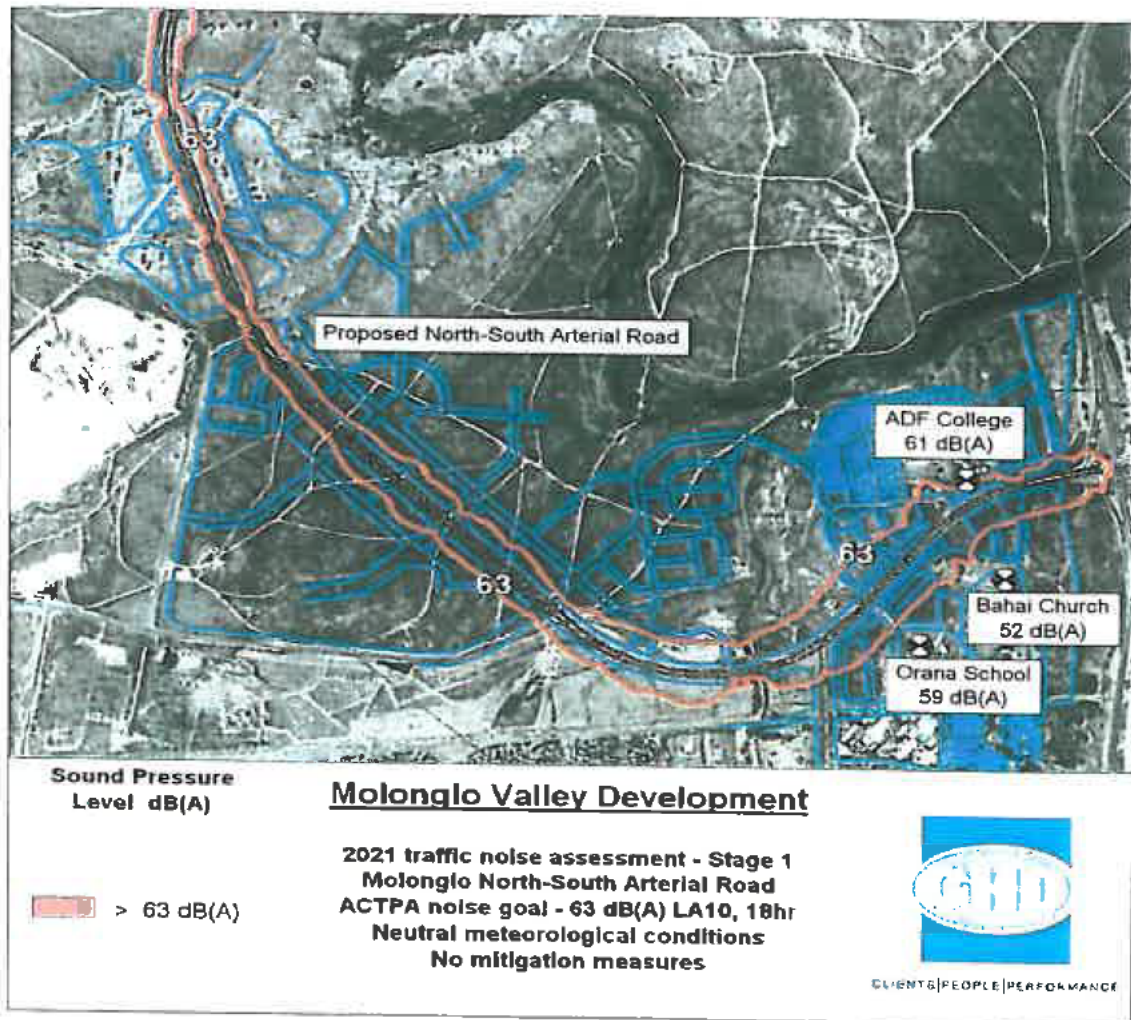


Figure 3-1 Predicted Traffic Noise Contours – North-South Arterial Road – dB(A) LA10, (18 hour)



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) $L_{10(18-h)}$ 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



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	<p>The following measures must be taken to avoid significant impacts on:</p> <ul style="list-style-type: none">Listed threatened species and communities (sections 18 & 18A). <ol style="list-style-type: none">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.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
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inconsistent with other measures in this notice.

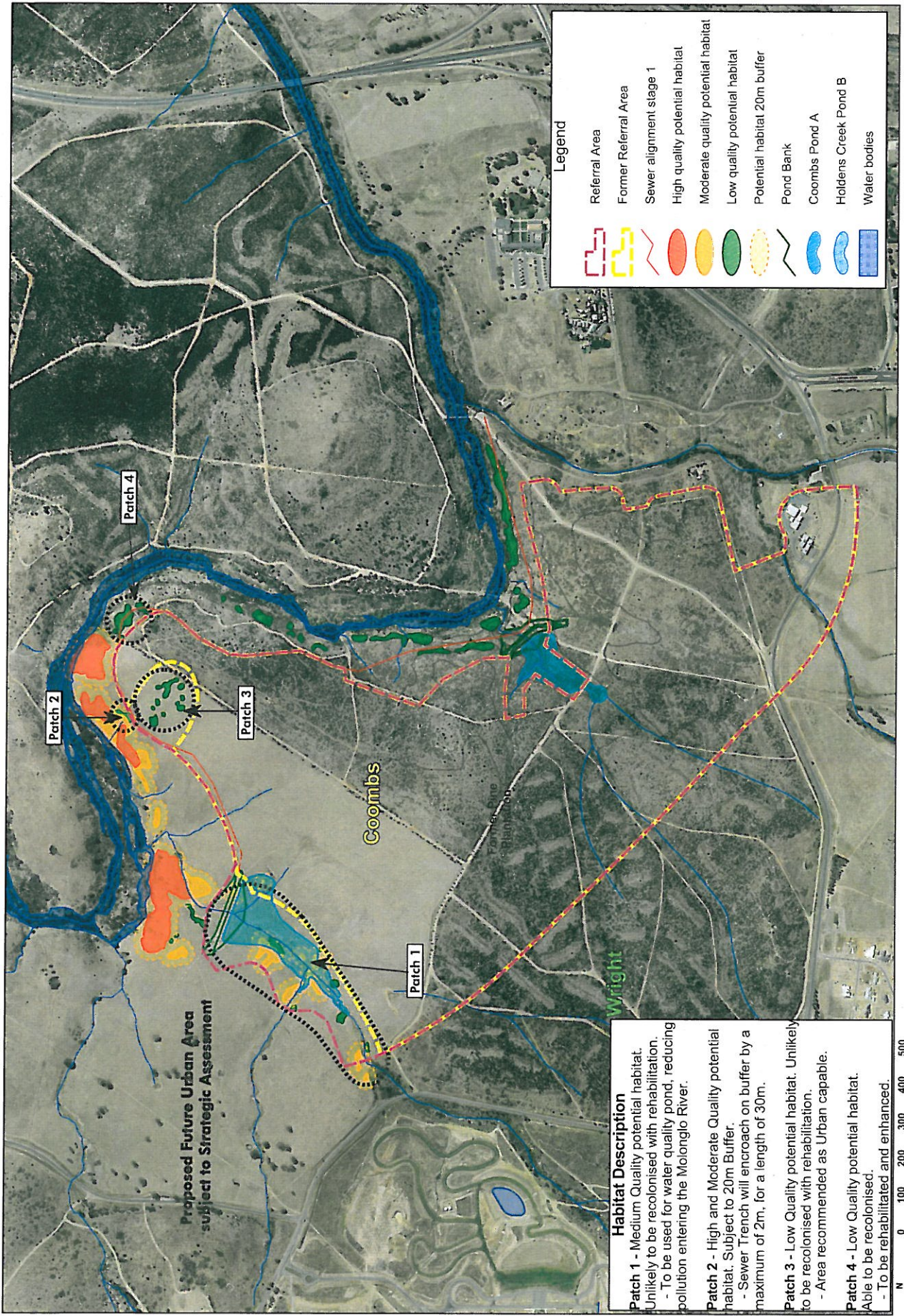
3. Prevent construction spoil and any material used in soil stabilisation and revegetation from running down slope over mapped *Aprasia parapulchella* habitat areas at Annexure 1.
4. Prevent the spread or planting of trees, shrubs or weeds (e.g. Blackberry *Rubus fruitcosus*) within 20 m of high and 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.*

Annexure 1 Aprasia parapulchella habitat near the Coombs development area



Appendix I
EIS Exemption