The West Belconnen Project

Bushfire Management Strategy

Prepared for
Riverview Group

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DOCUMENT TRACKING

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Project Manager	Rod Rose Phone: 02 4201 2267 8/128 Island Point Road, St Georges Basin NSW 2540
Prepared by	Rod Rose
Reviewed by	Lew Short
Approved by	Rod Rose
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Executive Summary

The report provides a bushfire risk assessment of the proposed re-zoning for The West Belconnen Project. It provides bushfire protection measures that meet the statutory and policy requirements for bushfire protection in ACT and NSW.

Most sections of this assessment include separate statements for ACT and NSW through application of the ACT Planning for Bushfire Risk Mitigation General Code (2008) and Planning for Bushfire Protection Guidelines (NSW RFS, 2006).

The proposal includes up to 6,500 dwellings within the ACT and up to 5,000 dwellings in NSW. The perimeter of this development, including its various stages abuts bushfire prone land and is vulnerable to bushfire attack. The assessment assumes a worst likely bushfire attack scenario on a day of catastrophic bushfire danger (i.e. Fire Danger Rating of 100).

A number of strategies have been provided in the form of planning controls such that the risk from bushfire is reduced to an appropriate level and a level that meets the deemed to satisfy bushfire protection requirements for both the ACT and NSW. The bushfire protection measures applied represent at least national best practice bushfire risk reduction.

The strategies used to reduce the bushfire risk associated with the re-zoning, include:

- Setbacks from bushfire prone vegetation (APZs)
- Fuel management within the IAPZ that is appropriate for the management of Pink Tailed Worm Lizard habitat and the Yellow Box – Blakely's Red Gum Woodland
- Integration of non-combustible infrastructure within APZs such as roads, easements and parking areas
- Access and egress from the site through a well-designed road system
- Underground electricity and gas services
- Compliant water supplies
- Emergency response planning
- Interim APZs and perimeter roads provided for each stage of development
- SFPP and more vulnerable development types are located further from the hazard.

More detailed bushfire assessment to accurately prescribe setbacks, roading and landscaping is required for each stage of subdivision, however the re-zoning application has provisions that allow this more detailed designed to occur smoothly and achieve the deemed to satisfy standards for subdivisions within the ACT and NSW.

1 Introduction

1.1 Purpose of assessment

The report provides a bushfire risk assessment of the proposed re-zoning for The West Belconnen Project (hereafter referred to as the subject land). It specifically addresses:

- Whether the statutory and policy requirements for bushfire protection in ACT and NSW are met by the structure plan
- The extent to which best practice approaches to bushfire planning are achieved.

The existing and potential bushfire hazard and associated risk (post development) is assessed using the respective State and Territory bushfire planning provisions. Most sections of this assessment include separate statements for ACT and NSW under the ACT Planning for Bushfire Risk Mitigation General Code (2008) and Planning for Bushfire Protection Guidelines (NSW RFS, 2006).

1.2 Location

Figure 1 shows the location and extent of the subject land.

1.3 Description of re-zoning proposal and process

The West Belconnen proposal is for the development of the land at West Belconnen and in adjacent NSW for residential and related purposes and for a contiguous conservation corridor along the Murrumbidgee River and Ginninderra Creek. It will include open space, community, school and recreation facilities, wetlands and Creeks, roads, streets and an off-road movement system as well as retailing and employment uses.

Of the total area of 889ha in the ACT approximately 371ha or 42% is proposed to be zoned for river corridor or conservation purposes – the proposed “conservation corridor”. The balance of the land is anticipated to yield up to 6,500 dwellings. In NSW approximately 206ha, or 34% of the total 600ha, is proposed for inclusion in the conservation corridor along the Murrumbidgee River and Ginninderra Creek corridors. The balance of land, 394ha is anticipated to yield up to 5,000 dwellings.

Development is intended to commence at Stockdill Drive (the eastern boundary of the site), and extend westward in stages to the ACT/NSW border. Assuming a sales rate of approximately 300 dwellings per year the project will extend over a period of approximately forty years following commencement of sales. If sales proceed at a slower or faster rate the program will be adjusted accordingly.

The proposed rezoning of the West Belconnen site will involve changes to the planning controls that currently apply over the site, on both sides of the border. This means a change to the types of development permissible.

This report is part of a thorough process of environmental assessment and planning review at Commonwealth, Territory, State and Local Government levels. Building on the substantial amount of work that has already been undertaken a “strategic assessment” under part 10 of the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act will be prepared. This will be overseen by the Commonwealth Department of the Environment.

The Strategic Assessment will run in parallel with the three rezoning processes: The National Capital Plan, The Territory Plan, and Yass Valley Shire Local Environment Plan will require amendment if the project is to proceed.

The EPBC assessment is concerned particularly with endangered and vulnerable species and ecological communities listed as such under the EPBC legislation. At West Belconnen these include the Pink Tailed Worm Lizard, Yellow Box Red Gum Grassy Woodland and the Golden Sun Moth. These are also listed under the ACT legislation.

The Strategic Assessment and subsequent EPBC approval (if granted) will satisfy both the requirements of the ACT legislation and the Commonwealth regarding threatened species and communities. This is a necessary pre-condition for the ACT rezoning. The environmental approvals will also be in place concurrently with the National Capital Plan amendment and the Yass Shire rezoning.

Other matters that are also important elements of the total environment such as social and economic impacts, traffic, noise and odour, are required to be assessed under ACT and NSW legislation. These are included in this report that will accompany the ACT rezoning proposal and the Local Environment Study documentation that will be prepared as part of the NSW rezoning process.

The various statutory agencies that will oversight, and ultimately determine, the rezonings are:

- ACT Planning Authority
- National Capital Authority
- Yass Valley Council
- NSW Department of Planning and Infrastructure
- Commonwealth Department of the Environment.

The planning approval processes administered by these agencies all involve substantial periods of formal community consultation.

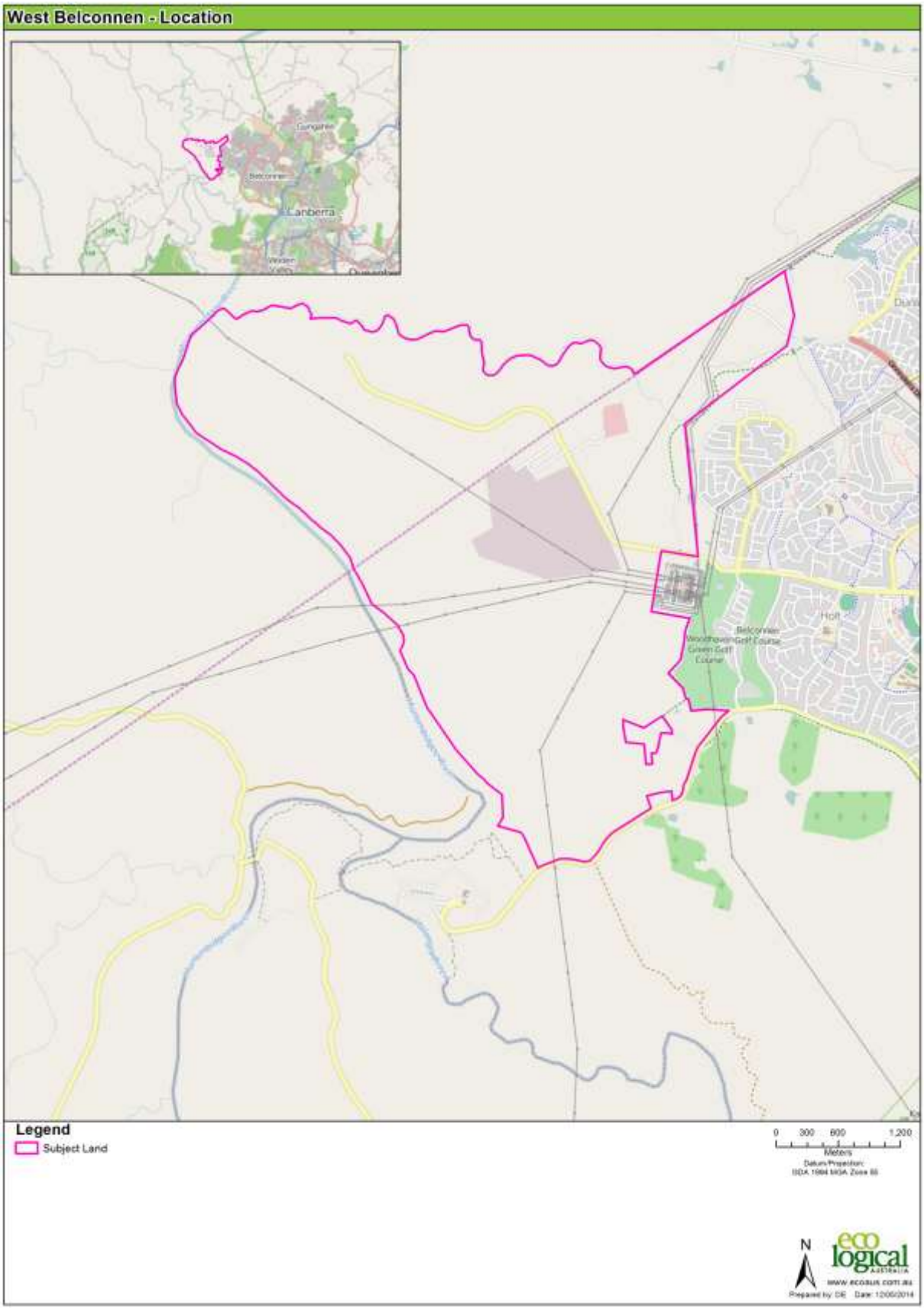

Figure 1: Location of subject land

Figure 2: Proposed Land Use Structure Plan

Requires latest figure to be added – Steve/Tony please provide

1.4 Legislative and policy requirements

The proposal crosses the border between the ACT and NSW and the bushfire planning related legislation and policy is different between these jurisdictions. Section 1.4.1 identifies the requirements for the ACT and Section 1.4.2 those applicable to NSW.

1.4.1 ACT legislation and policy

1.4.1.1 Emergencies Act 2004

Among many other things the Emergencies Act requires the development of a Strategic Bushfire Management Plan (SBMP) for the ACT. Section 74 of the Act defines the elements of bushfire management that must be addressed in the Plan. The SBMP requirements are discussed below.

1.4.1.2 Planning for Bushfire Risk Mitigation General Code (2008)

This Code provides guidance to mitigate adverse impacts from bushfires in the ACT; and addresses the planning and development processes. To ensure a high level of compatibility between the ACT and NSW, the Code refers to the NSW Government's Planning for Bush Fire Protection, 2006 (PBP). With the exception of the requirements for Asset Protection Zones which vary between the ACT and NSW, the NSW PBP is the primary design standard referred to herein. Specific areas of discrepancy between ACT/NSW are noted throughout the report.

The Code is one of many documents that informs planning and development in the ACT and is taken into account by the ACT Planning and Land Authority (Authority) when determining development applications and by certifiers determining building applications.

This Code is complementary to the ACT Emergency Services Authority's Strategic Bushfire Management Plan Version 2, 2009 (SBMP).

The Code requires the assessment and recommendations of this report to be endorsed by the ACT Planning and Land Authority and the ACT Emergency Service Authority.

1.4.1.3 Strategic Bushfire Management Plan (v2 October 2009)

The PBRM General Code (2008) and the SBMP apply the ACT Government's policy of bushfire risk reduction being a shared responsibility between the Government and the public. That is, the responsibility for risk mitigation does not belong to the Government or private landowners alone. The Plan includes specifications for various bushfire protection zones (e.g. Inner and Outer Asset Protection Zones) and generalised strategies required to achieve objectives in each zone. It also includes specifications for the management of fire and the environment.

1.4.2 NSW legislation and policy

1.4.2.1 Environmental Planning and Assessment Act 1979

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal planning legislation for the state, providing a framework for the overall environmental planning and assessment of development proposals. Various legislation and instruments, such as the NSW *Threatened Species Conservation Act 1995* (TSC Act) and Rural Fires Act 1997 (RF Act) are integrated with the EP&A Act.

Section 117(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) issues directions to be followed when considering rezoning. Direction 4.4, *Planning for Bushfire Protection* identifies matters for consideration for planning proposals that will affect, or are in proximity to land mapped as bush fire prone. The Director General Requirement is that:

> *Council is to consult with the Commissioner of the NSW Rural Fire Service prior to undertaking community consultation and take into account any comments made as per the requirements of S 117 Direction 4.4 Planning for Bushfire Protection.*

1.4.2.2 Threatened Species Conservation Act 1995

The Threatened Species Conservation Act 1995 (TSC Act) aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. The TSC Act is integrated with the EP&A Act and requires consideration of whether a development (Part 4 of the EP&A Act 1974) is likely to significantly affect threatened species, populations and ecological communities or their habitat.

In relation to bushfire, the TSC Act also identifies high frequency fire regimes as a key threatening process.

1.4.2.3 Rural Fires Act, 1997

A large proportion of the bushfire issues in NSW are regulated by the Rural Fires Act, 1997 (RF Act). Both the EP&A Act and the RF Act were modified by the Rural Fires and Environmental Assessment Legislation Amendment Act, in 2002 to enhance bushfire protection through the development assessment process (NSW RFS 2006b). Key requirements of the RF Act include:

- The need for a bushfire safety authority to be issued by the RFS under section 100B of the RF Act for any development applications for subdivision (therefore considered integrated development)
- All landowners to exercise a duty of care to prevent bushfire from spreading on or from their land under Section 63 of the RF Act. This relates to the appropriate provision and maintenance of Asset Protection Zones (APZ), landscaping and any retained vegetation when developing land (NSW RFS 2006b).

1.4.2.4 Planning For Bush Fire Protection 2006 (PBP)

Development on bushfire prone land must satisfy the requirements of *Planning for Bush Fire Protection* (NSW RFS, 2006) which includes having regard to the following planning principles:

- Provision of a perimeter road with two way access which delineates the extent of the intended development
- Provision at the urban bushland interface for the establishment of adequate asset protection zones for future housing
- Specifying minimum residential lot depths to accommodate asset protection zones for lots on perimeter roads
- Minimising the perimeter of the area of land, interfacing the hazard, which may be developed
- Introduction of controls which avoid placing inappropriate developments in hazardous areas
- Introduction of controls on the placement of combustible materials in asset protection zones.

PBP also provides performance and acceptable solutions for a range of bushfire protection measures required to minimise the risk associated with bushfire attack.

1.5 Building Code of Australia

The Building Code of Australia (BCA) is adopted in the ACT through the Building Act 2004. It contains provisions, which can be used for construction to resist bushfires in order to reduce the risk to life and minimise the risk of property loss in designated bushfire prone areas. The BCA has also been adopted in NSW.

The BCA specific 'deemed to comply' measure is the *Australian Standard AS3959 Construction of buildings in bushfire-prone areas*.

1.6 Australian Standard AS3959 Construction of buildings in bushfire-prone areas

The standard is applied throughout Australia to the construction of buildings on bushfire prone lands. Its objectives are to prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire while the fire front passes. NSW has a number of alternate provisions to AS3959 for BAL FZ but these are unlikely to be applicable to this proposal.

1.7 Bushfire prone lands

A Bushfire Prone Area for the ACT was declared through the Building Regulations and came into effect on 1 September 2004. Under the declaration, all parts of the ACT outside the defined urban area have been designated bushfire prone. The subject land is declared bushfire prone land in the ACT.

The NSW portion of the subject land is also bushfire prone land on the Yass Bushfire Prone Land map.

1.8 Assessment framework

The planning process for The West Belconnen Project has involved considerable consultation with the ACT and NSW Rural Fire Services and various other agencies with an interest in bushfire protection. Preliminary Draft Land Use / Structure Plan and Precinct Plans have been discussed. The following section outlines how the relevant types of development will be assessed in accordance with *Planning for Bush Fire Protection* 2006 (PBP).

As the ACT has largely aligned its *Planning for Bushfire Risk Mitigation General Code* (2008) with the *NSW Planning for Bushfire Protection (2006)* document (except for APZ), the NSW requirements will generally meet the minimum requirements for the ACT.

1.8.1 ACT

Codes under the Territory Plan can require site specific bushfire risk assessment to be undertaken during the planning/design process. As part of the planning process, a number of steps are undertaken before land is released and developed. These are:

- Structure Plan - broadly sets the Territory Plan's policy and principles of the area

- Concept Plan - defines the specific planning framework and requirements for the area; and
- Estate Development Plan - details the subdivision design and lodged as a Development Application.

The ACT Planning and Land Authority (Authority) require all new urban areas to achieve adequate levels of bushfire protection. A bushfire risk assessment is required at the Structure Planning stage. The Authority and the Emergency Services Authority (ESA) endorse complying assessments and recommendations.

1.8.2 NSW Residential

Future residential subdivision will be assessed under Section 100B of the RF Act and a Bush Fire Safety Authority (BFSA) must be obtained from the NSW Rural Fire Service (RFS). Section 100B of the RF Act specifies conformance with the intent and performance criteria of the Bushfire Protection Measures outlined in PBP. The bushfire protection measures relevant to 100B of the RF Act within PBP 2006 are:

- *The provision of clear separation of buildings and bushfire hazards, in the form of fuel-reduced APZ (and their subsets, inner and outer protection areas and defendable space)*
- *Construction standards and design*
- *Appropriate access standards for residents, fire fighters, emergency service workers and those involved in evacuation*
- *Adequate water supply and pressure*
- *Emergency management arrangements for fire protection and/or evacuation; and*
- *Suitable landscaping, to limit fire spreading to a building.*

1.8.3 NSW Special Fire Protection Purpose (SFPP)

SFPP developments include developments where occupants may be more vulnerable to bushfire attack. These developments require considerably larger APZs than residential developments and include the following types of uses:

- *A school*
- *A child care centre*
- *A hospital (including a hospital for the mentally ill or mentally disordered)*
- *A hotel, motel or other tourist accommodation*
- *A building wholly or principally used as a home or other establishment for mentally incapacitated persons*
- *Housing for older people or people with disabilities within the meaning of State Environmental Planning Policy No 5 - Housing for Older People or People with a Disability (now State Environmental Planning Policy (Seniors Living))*
- *A group home within the meaning of State Environmental Planning Policy No 9 - Group Homes*
- *A retirement village*
- *Any other purpose prescribed by the regulations. (Section 100B (6) of the RF Act).*

For these developments the specific objectives of SFPP developments within PBP should be followed in addition to the requirements for residential developments. The specific objectives for SFPP developments are:

- *Provide for the special characteristics and needs of occupants. Unlike residential subdivisions, which can be built to a construction standard to withstand the fire event, enabling occupants and firefighters to provide property protection after the passage of fire, occupants of SFPP developments may not be able to assist in property protection. They are more likely to be adversely affected by smoke or heat while being evacuated*
- *Provide for safe emergency evacuation procedures. SFPP Developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bushfire threats. During emergencies, the risk to firefighters and other emergency services personnel can be high through prolonged exposure, where door-to-door warnings are being given and exposure to the bushfire is imminent.*

1.8.4 NSW Industrial, Commercial, Other Development

Commercial, employment and/or industrial uses are classified in PBP 2006 as 'Other Development'. As such these developments need to satisfy the aims and objectives of PBP and a proposal needs to incorporate these considerations along with an adequate combination of relevant bushfire protection measures (BPM). Generally, the BPMs listed in PBP 2006 for residential development can be used as a guide and are discussed in the following sections. The aim and objectives of PBP 2006 are as follows.

Aim of PBP

To use the NSW development assessment system to provide for the protection of human life (including firefighters) and to minimise impacts on property from the threat of bush fire, while having due regard to development potential, on-site amenity and protection of the environment.

Objectives of PBP

(i) Afford occupants of any building adequate protection from exposure to a bush fire

(ii) Provide for a defendable space to be located around buildings

(iii) Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition

(iv) Ensure that safe operational access and egress for emergency service personnel and residents is available

(v) Provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ); and

(vi) Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire fighting).

2 Bushfire Hazard Assessment

The bushfire hazard was assessed using the method prescribed in PBP and is described in the following sections. The assessment method used is applicable in both the ACT and NSW portions of the subject land.

2.1 Vegetation

Figure 3 shows the vegetation of the subject land and a line representing the edge of the 'conservation corridor'. This line is coded according to the vegetation classification used in determining the size of the APZ required. The colour coded line overlaying the vegetation map enables review of the appropriateness of the vegetation classification input into the hazard assessment.

Low hazard vegetation (as classified under AS3959) is proposed within the various 'internal green areas' such as those associated with existing powerlines. No APZ have been identified for these internal green areas as they will be APZ compliant as orchids, playing fields, managed landscapes etc. More detailed description of the vegetation management within these areas will be provided at later stages in the process.

2.2 Slope

Figure 4 shows the slope on the subject land using the slope classes of PBP. A line representing the edge of the 'conservation corridor' is coded according to this slope classification for use in determining the size of the APZ required.

2.3 Interpretation of the vegetation and slope assessment

Vegetation

Subsequent stages in the development planning process will include APZ appropriate to each stage of implementation based upon the vegetation likely to affect each stage up until it is removed under subsequent development. The re-zoning proposal is capable of providing compliant APZ at its final extent and at each stage of development.

The low hazard vegetation within the various internal vegetated areas (See Figure 2) will be a mix of urban agriculture, greenhouses and parkland.

The proposed spatial patterns of the low hazard vegetation within the corridors will inhibit the potential spread of wildfire. This is in part achieved by alternating the types of low hazard vegetation along the corridors and providing the least hazardous types at the point where the corridors connect with the bushfire hazard beyond the development perimeter.

Slopes

Whilst steeper slopes occur along the river corridor, the slopes abutting the majority of the development perimeter and within the low hazard corridors are typically gentle. The steeper slopes

Steeper slopes in the river corridor will contribute to the development of bushfire intensity, particularly with fire approaching from the west and north-west. The proposed APZ and the management of the river corridor will mitigate this risk.

2.4 Predicted Fire intensity

Figure 5 shows the indicative wildfire intensity for the subject land and nearby areas under a Fire Danger Index of 100 and winds from the north to south-west sector. It shows that the highest intensity fires are likely to come from the north-west and that fire intensities are uncontrollable (i.e. above 4,000 kW/m) over much of the river corridor under these extreme weather conditions. Fire intensity has not been provided for grassland areas as it is not directly comparable with wooded areas. Potential rate of spread in the grassland areas can be used to identify fire risk.

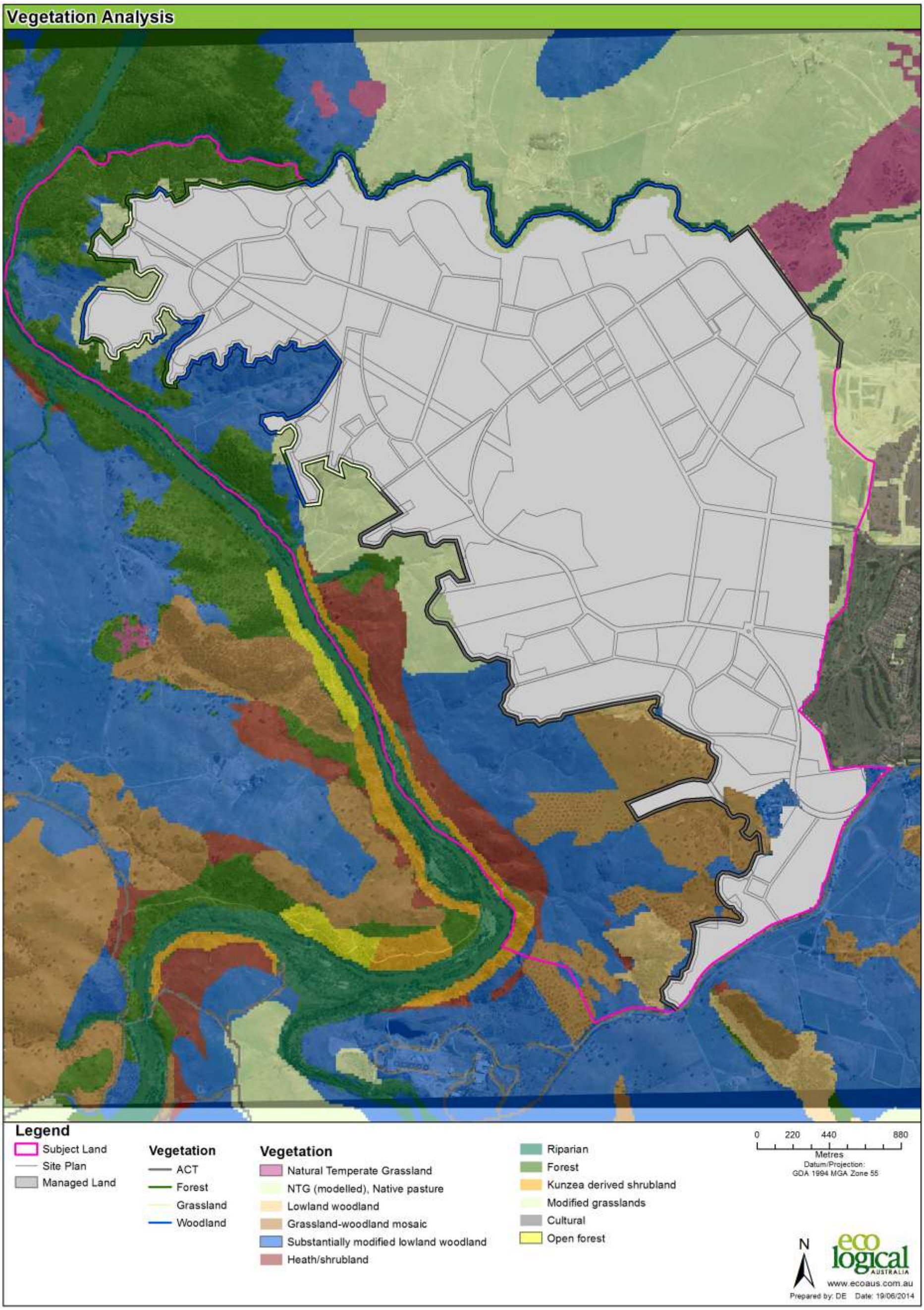

Figure 3: Vegetation Assessment

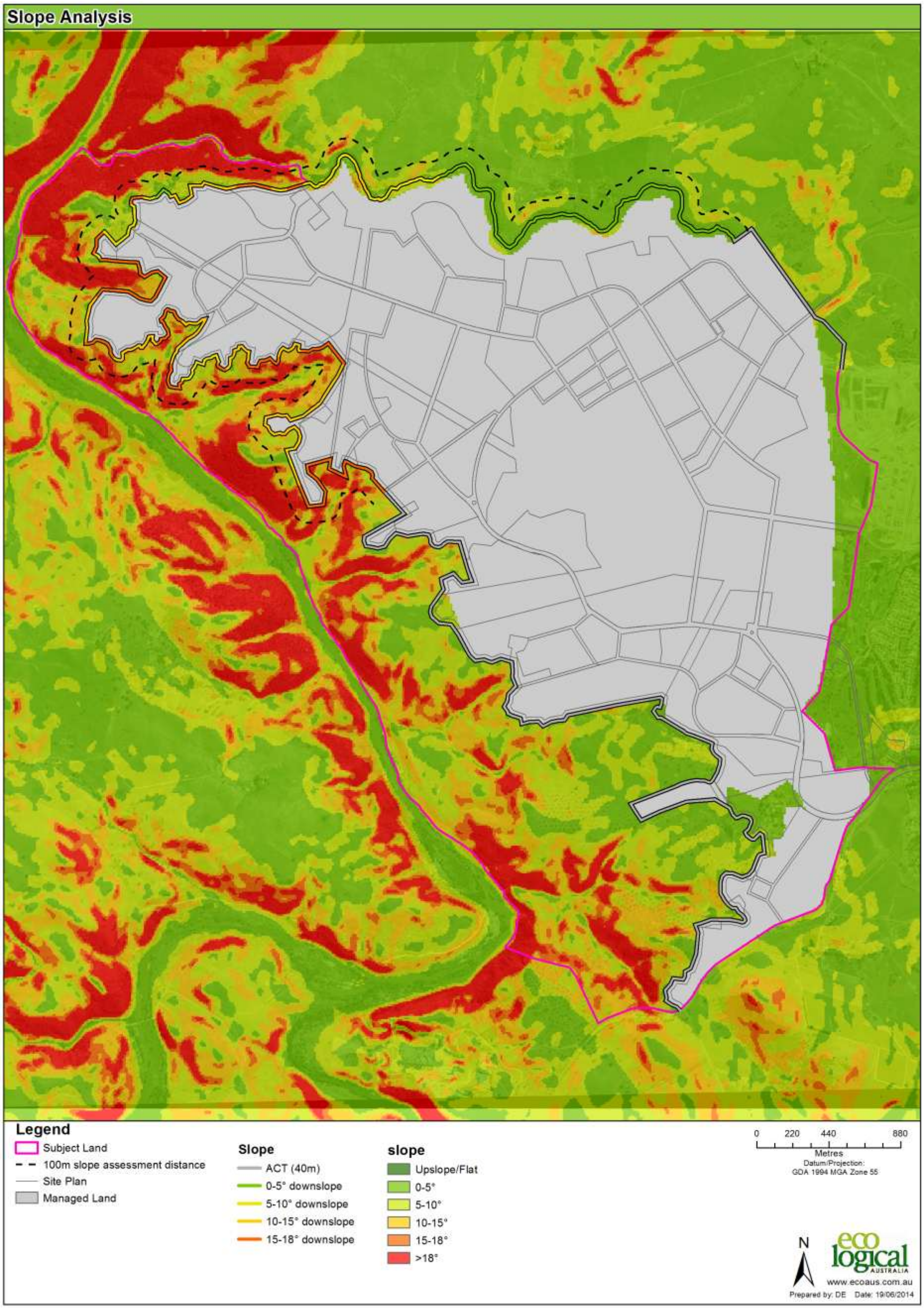

Figure 4: Slope assessment

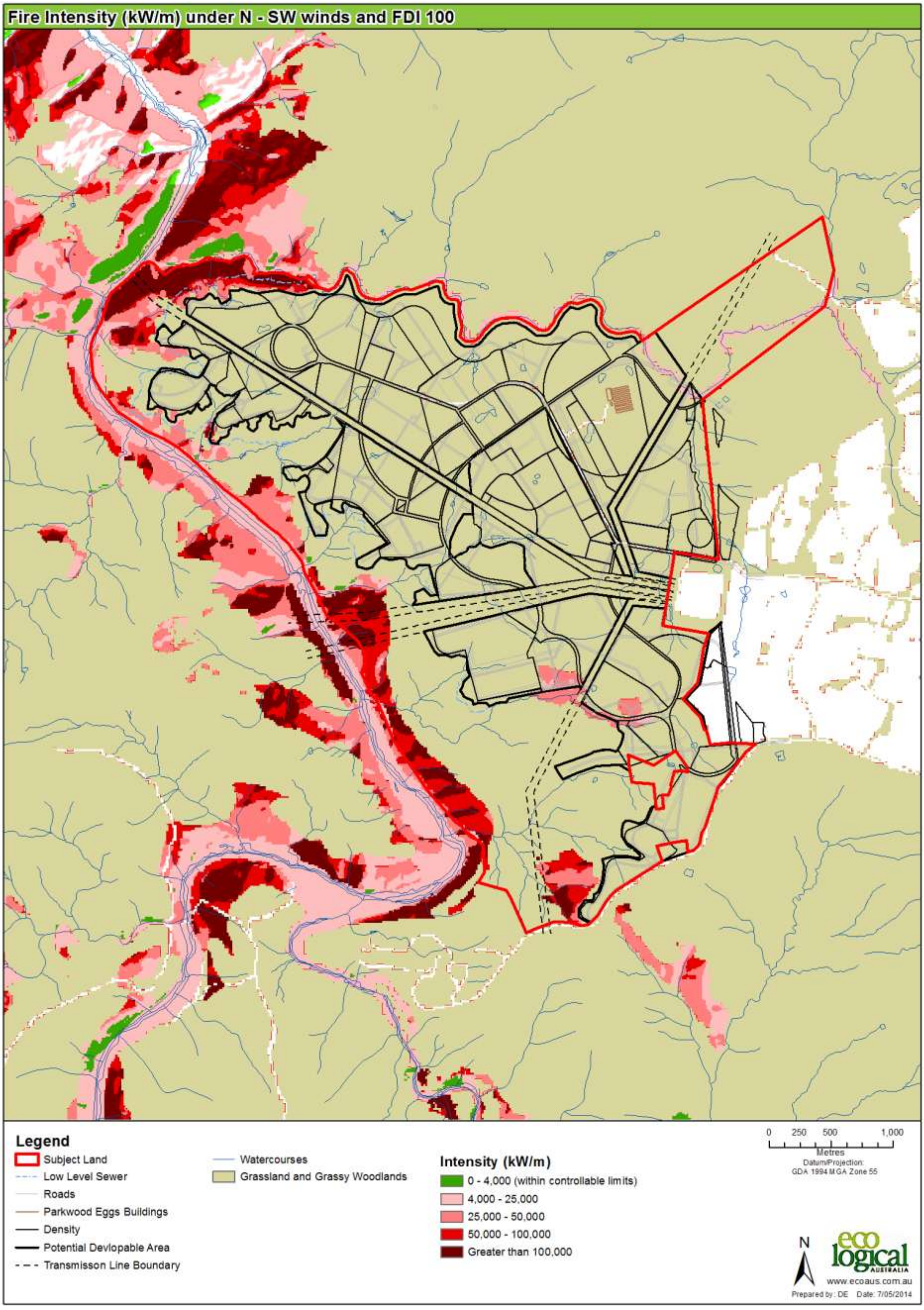

Figure 5: Indicative Wildfire Intensity

3 Bush Fire Protection Measures

Application of the bushfire protection measures described in PBP minimise the risks from bushfire and ensure that the aims and objectives of PBP are met. This PBP approach has been applied strictly in NSW, however some new measures within the ACT portion of the development has been developed through discussions with the Emergency Management Agency (including the Commissioner).

The following key bushfire protection measures are addressed in this assessment:

- Asset Protection Zones (APZs)
- Water supplies
- Infrastructure (including access road provisions and other services); and
- Evacuation and emergency management (including emergency access/egress arrangements)
- Landscape management.

3.1 Asset Protection Zones (APZs)

APZs are areas located between bushfire hazards and development to provide a defendable space in which to undertake emergency operations and to provide a buffer from direct flame contact, and the impacts of radiant heat, smoke and embers.

The width of APZs is based on a combination of:

- Predominant vegetation (using structural classification)
- Effective slope (i.e. slope most affecting fire behaviour adjacent to the interface)
- Fire Danger Index (FDI) of 100 (a catastrophic fire weather day).

In NSW, PBP and the APZ dimension for residential development is currently undergoing review by the RFS, however there is no release date for the revised document. It is understood the APZ requirements in NSW would not change significantly.

APZ are typically refined during subdivision stages with the Structure Plan at re-zoning stage ensuring the APZ dimensions required at subdivision stage in both the ACT and NSW can be achieved. The APZ dimensions cited in this assessment should not be relied on for future subdivision as a more detailed assessment of slope, vegetation and bushfire attack is required for each individual allotment. However, no APZ will need to be enlarged beyond that provided under the Structure Plan as it has taken a conservative position with the APZ widths.

In NSW APZs should be wholly contained within the proposed lot or subject land for which they are benefitting or protecting. However, in some circumstances APZs may consist of managed areas outside an allotment e.g. managed open space, managed service easements and roads. Perimeter roads form part of the APZ's throughout the site except within the powerline corridors which are low hazard and are separated by a road or trail where it abuts higher hazard areas. In the ACT APZ are typically measured out from the roadside curb nearest housing.

Figure 6 shows the proposed APZ for the subject land. A 40 m IAPZ is provided in the ACT as agreed with the Emergency Management Agency (see Commissioner's letter provided as Appendix 1). Table 1 identifies the slope and vegetation type used to determine the APZ in NSW and shown in Figure 6. The vegetation and slope used to determine the size of the APZ in NSW is also evident in Figure 3 and Figure 4 (respectively).

Table 1: APZ proposed within the ACT and NSW portions of the subject land

	Effective slope	Predominant vegetation	IAPZ	OAPZ
ACT	For all slope classes	Grassy woodland or Grassland	40 m	none required as no forests adjoin the development*
NSW	Upslope/ flat	Grassland	10m	none proposed
		Grassy woodland	10m	none proposed
		Forest	20m	none proposed
	>0 – 5	Grassland	15m	none proposed
		Grassy woodland	15m	none proposed
		Forest	25m	none proposed
	>5 – 10	Grassland	12m	none proposed
		Grassy woodland	20m	none proposed
		Forest	35m	none proposed
	>10 - 15	Grassland	15m	none proposed
		Grassy woodland	25m	none proposed
		Forest	50m	none proposed
	>15 - 18	Grassland	15m	none proposed
		Grassy woodland	30m	none proposed
		Forest	60m	none proposed

* As per ESA Commissioner's letter (see Appendix 1)

3.1.1 Fuel management within the APZ within the ACT

The ACT SBMP Version 2 has fuel management standards for IAPZ. Where these standards cannot be achieved, alternative treatments to meet the overall objectives of the IAPZ may be applied, but any significant variation on the standard requires approval by the ESA. The treatment strategy for grass and open woodland is for grassland to be maintained at less than 200 mm height when grassland curing ≥ 70%.

3.1.2 Fuel management within the APZ within NSW

The APZs are to be maintained by the owner of each future lot; where the APZ is part of a road reserve or public place it will be maintained by the agency responsible e.g. Yass Shire Council. It is proposed that the total APZ will be managed to an Inner Protection Area standard, except where it adjoins forest, where an Outer Protection Area of a size permissible under Table A2.7 of PBP will be applied.

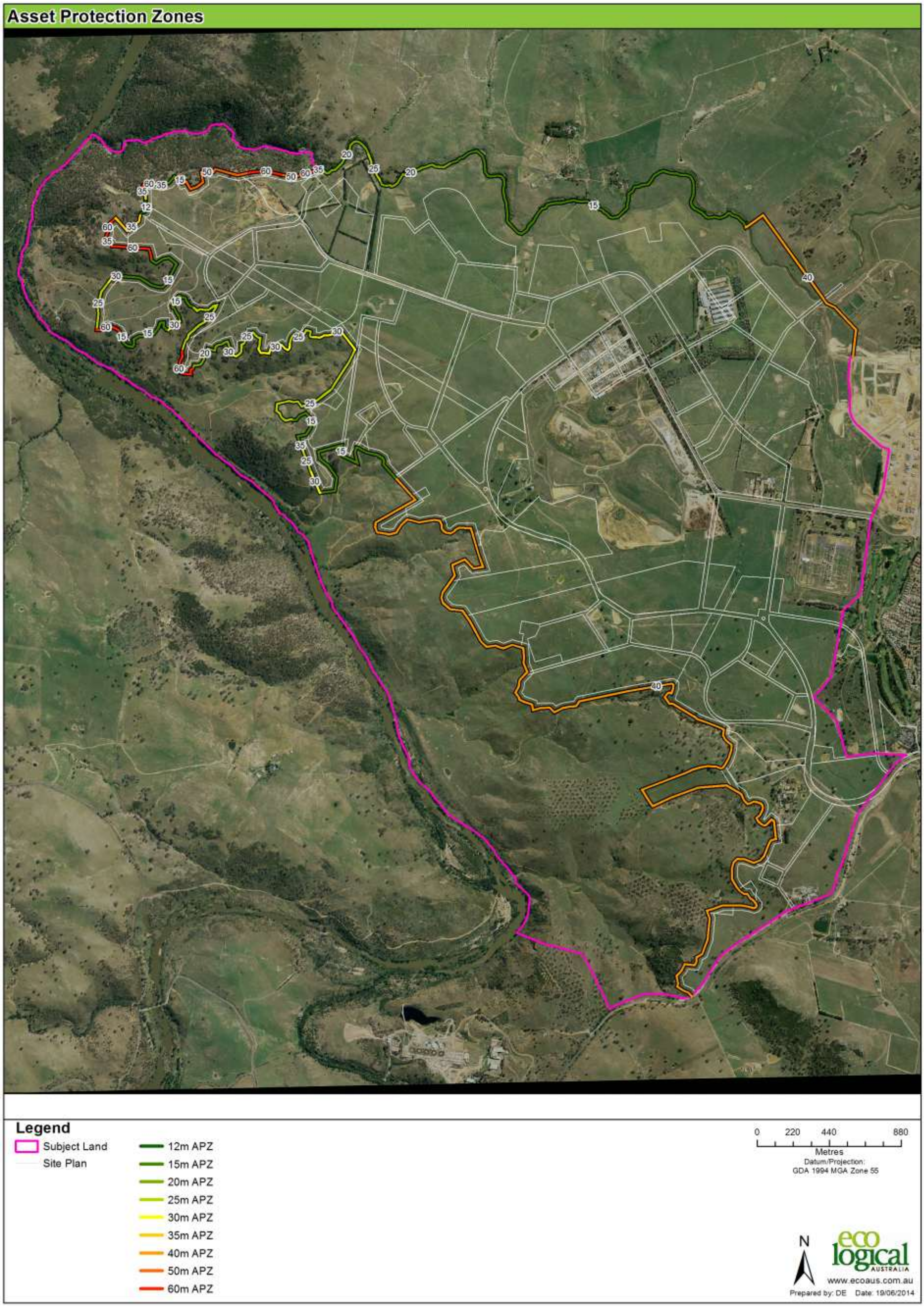

Figure 6: Asset Protection Zone (APZ)

3.1.3 Vegetation Management Requirements

The measures described in Appendix 5 of PBP 2006 will be applied to all lots within 100m of bushland in NSW and 200 m in the ACT (equivalent to the ember protection zone for Grassy Woodland). These measures are to be applied to residential, industrial and public zoned lots. A summary of these measures is below.

3.1.4 APZ maintenance

Fuel management within the APZ is to be as follows:

- No tree or tree canopy is to occur within 2 m of the dwelling roofline
- The presence of a few shrubs or trees in the APZ is acceptable provided that they:
  - Are well spread out and do not form a continuous canopy
  - Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period
  - Are located far enough away from the building so that they will not ignite the building by direct flame contact or radiant heat emission
- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species
- A minimal ground fuel is to be maintained to include less than 4 tonnes per hectare of fine fuel (fine fuel means ANY dead or living vegetation of <6 mm in diameter e.g. twigs less than a pencil in thickness. 4 t/ha is equivalent to a 1 cm thick layer of leaf litter)
- Any structures storing combustible materials such as firewood (e.g. sheds) must be sealed to prevent entry of burning debris.

3.1.4.1 Fuel management within APZs in Threatened species habitat and EEC

Habitat of the Pink Tailed Worm Lizard (a Nationally Vulnerable species) and an Endangered Ecological Community (Yellow Box - Blakely's Red Gum Woodland) is overlapped by a small portion of Inner Asset Protection Zone (IAPZ). Osborne (2014) has provided management guidelines for these important ecological assets and the compatibility of these with the performance requirements of the ACT Strategic Bushfire Management Plan (SBMP) and PBP are assessed below.

Pink-tailed Worm Lizard (PTWL)

The habitat occupied by the PTWL is rocky and naturally carries fuel loads that are near to meeting the performance requirements for IAPZ. Where fuel loads exceed that required by the ACT SBMP some small scale ecological burning or hand slashing may be periodically required. In addition to the rocky habitats a 20m buffer zone has been identified around each rocky area (Osborne 2014) and this will require more active fuel management to meet the IAPZ requirements. This fuel management within the habitat buffer will most commonly be slashing but may include a mix of burning, manual slashing or herbicide treatments.

Endangered Ecological Community (Yellow Box - Blakely's Red Gum Woodland)

Osborne (2014) identified appropriate fuel management techniques within the woodland as burning, grazing and, selective manual slashing. Given these habitat areas are small in size mechanical slashing as part of the program of slashing the remainder of the IAPZ is most likely to be applied. Other appropriate techniques include, burning, hand slashing and grazing.

3.1.5 Bushfire Management Plan

A bushfire management plan is proposed for the Conservation Corridor to specify the spatial and temporal patterns of fuel management through ecologically and environmentally appropriate fire regimes. The spatial and temporal patterns of fire and grazing can be designed to achieve best practice management of ecological and environmental assets and the mitigation of wildfire threats.

A Conservation Trust will manage the Conservation Corridor.

3.2 Access

Safe access, egress and defendable spaces are required for emergency services. Emergency management arrangements are also required such as procedures and routines for evacuation and consideration of safer places.

Specific management and evacuation plans may be required at a later stage especially where SFPP developments are proposed (e.g. schools, seniors living). The emergency management requirements of the ESA and their capacity to meet response times and related safety measures is also critical. (see Figure 7).

Bushfire and other related emergency services for the development will likely be provided from the ACT, as it is unlikely to be feasible to establish a NSW RFS brigade for the NSW portion of the development as this brigade would have insufficient bushland to manage to sustain a typical brigade. An ACT based bushfire response could be augmented by provision of basic fire equipment at key locations for local residents if the travel times were considered inadequate.

Given the importance of rapid first attack on bushfires the travel times for the nearest ACT Fire and Rescue Service units is critical especially given there is likely to be no NSW based fire service within the development. The Charnwood (West Belconnen) station is the nearest ACT Fire and Rescue station. Whist this station will provide good response times on completion of roads for the subject development, the staging of development will likely provide inadequate response times to some new areas until the Parkwood Road connections are constructed. This concern could potentially be overcome with the provision of an emergency only access road (e.g. a fire trail with locked gates) until the final Parkwood Road is constructed. Appendix 4 identifies the standards for fire trails in the ACT.

A key to emergency access is a perimeter road with frequent direct access to the internal road system for easy and rapid access/egress. Feeder roads off the perimeter road should where possible radiate away from the bushfire hazard. Specifications for public roads and property access roads are provided below.

3.2.1 Public roads

Public roads include both the perimeter road and the internal road system. A safe operational access to structures and water supply for emergency services personnel, while residents are seeking to evacuate from an area is required. Key requirements include road size (safe/efficient access/egress) and suitable location of water supply points (readily accessible during bushfire), Appendix 2 provides additional details for NSW, and the ACT requirements are below:

Design requirements from ACT Planning for Bushfire Risk Mitigation General Code

- Emergency access should be provided in the form of an outer ring road or fire trail and access points which together with an edge road has a sealed width of 7.5m plus kerbs, indented parallel parking provision and a minimum hardstand area on the hazard side of 1.5m clear of retaining walls or stone pitched batters for passing of two emergency tankers. An additional clearance of 0.5m on both sides of the road is required to be kept clear of all street furniture including signs
- Verge width to residential blocks a minimum of approximately 7m with dryland grass surface
- Street trees species selected for low bark flammability characteristics.

Internal roads must comply with the widths specified in AS2890.2-2002 reproduced in Table 2.

Table 2: Internal Road Specifications

Curve Radius (inside edge) (metres)	Swept path (metres width)	Single lane (metres width)	Two way (metres width)
<40	3.5	4.5	8.0
40-69	3.0	3.9	7.5
70-100	2.7	3.6	6.9
>100	2.5	3.5	6.5
ACT requirements			• sealed width of 7.5m plus kerbs • Verge width to residential blocks a minimum of approximately 7m with dryland grass surface

3.2.2 Perimeter roads

The requirements for perimeter roads are as follows:

- Located between (or within) the Asset Protection Zone and the boundary of the allotments.
- Providing fire fighters with easier access to structures, allowing more efficient use of fire fighting resources
- Providing a safe retreat for fire fighters
- Providing a clear control line from which to conduct hazard reduction or back burning operations
- Providing two-way access (carriageway 8 metres kerb to kerb) and compliance with the design specifications identified in PBP 2006 (see Appendix 2).

3.2.3 Property access roads

PBP 2006 states that property access is access from the public road system onto private land and to the habitable building by fire fighters. The intent is to provide safe access to/from the public road system for fire fighters providing property protection during a bushfire and for occupants faced with evacuation.

Property access road requirements are identified below:

- Short access roads are preferable; therefore buildings should be located as close as possible to the public road system

- No access requirements apply to an urban development where the furthest part of the building is no farther than 70 m (unobstructed) from the public road system
- Any building located more than 200 m from a public through road must provide one alternative property access road
- Access roads should have a minimum width of 4 m
- Additional detail is provided in Appendix 3.

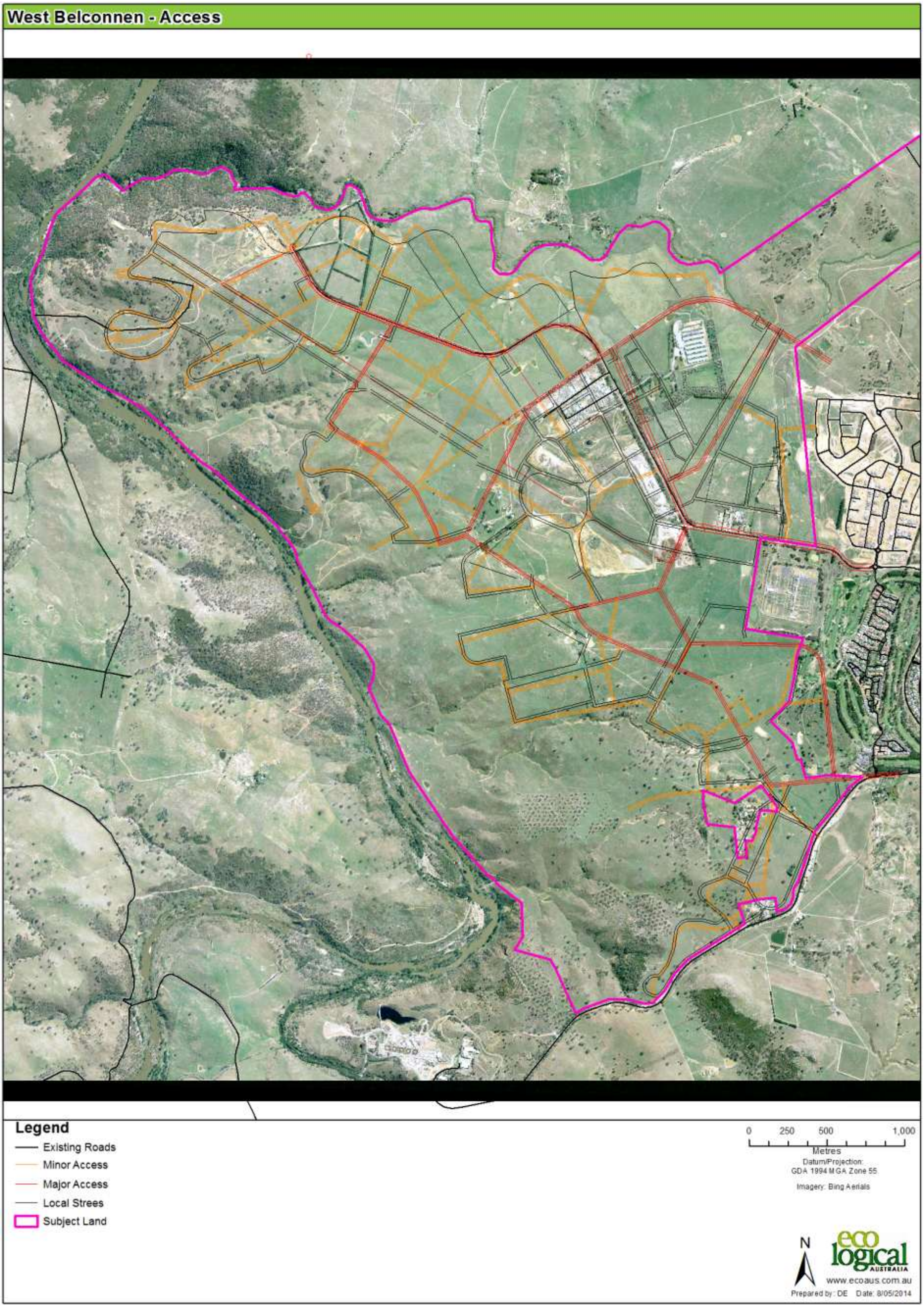

Figure 7: Access

3.3 Supply of Services

The purpose of this protection measure is to provide adequate supply of water for the protection of buildings during and after the passage of a bushfire, and to locate gas and electricity services so as not to contribute to the risk of fire to a building.

It is anticipated that the water supply to the site will be provided via a reticulated ring main system. The ring main system must be of sufficient pressure and fire hydrants located to comply with *AS 2419.1-2005 Fire Hydrant Installations (SAI Global, 2005)*.

In NSW if the reticulated water supply is unable to attain the required pressure, then a dedicated static water supply reserve must be created and maintained. The quantity of water required is determined on the basis of lot size and density and is shown in Table 3 below.

Table 3: Static Water Requirements

Development Type	Water Requirements
Residential Lots (<1,000m2)	5,000 l/lot
Rural-residential Lots (1,000m2 - 10,000 m2)	10,000 l/lot
Large Rural/Lifestyle Lots (>10,000m2)	20,000 l/lot

Electricity and gas services should be located such that they do not pose a hazard to surrounding bushland and buildings, or provide an obstacle for emergency service personnel. The subject development has all power and gas services located underground.

3.4 Emergency management

The proximity of emergency services to the precinct are considered adequate, subject to the accessibility of the Parkwood Road connections during the early stages of development (See discussion of this matter in Section 3.2.

Consultation with the ACT and NSW RFS and Fire and Rescue services should occur during subdivision design to ensure adequate emergency response during all phases of construction and occupation of development on the subject land.

4 Development Staging

The APZ required for the interim 'bushland' interface of each stage of subdivision will be wide enough to provide the building construction standard (i.e. BAL) envisaged under AS3959 at the completion of development for the whole site. This avoids unnecessarily high BAL and construction costs for buildings located at interim subdivision boundaries.

Perimeter roads or trails are also to be provided for each stage of subdivision to separate development from the hazard.

Extensions off the Parkwood Road are recommended for the initial stages of development to ensure the Fire and Rescue fire response times are minimised.

5 Conclusions

A number of strategies have been provided in the form of planning controls such that the risk from bushfire is reduced to an appropriate level and a level that meets the deemed to satisfy bushfire protection requirements for both the ACT and NSW. The bushfire protection measures applied represent at least national best practice bushfire risk reduction.

The strategies used to reduce the bushfire risk associated with the re-zoning, include:

- Setbacks from bushfire prone vegetation (APZs)
- Fuel management within the IAPZ that is appropriate for the management of Pink Tailed Worm Lizard habitat and the Yellow Box – Blakely's Red Gum Woodland
- Integration of non-combustible infrastructure within APZs such as roads, easements and parking areas.
- Access and egress from the site through a well-designed road system;
- Underground electricity and gas services
- Compliant water supplies
- Emergency response planning
- Interim APZs and perimeter roads provided for each stage of development
- SFPP and more vulnerable development types are located further from the hazard.

More detailed bushfire assessment to accurately prescribe setbacks, roading and landscaping is required for each stage of subdivision, however the re-zoning application has provisions that allow this more detailed designed to occur smoothly and achieve the deemed to satisfy standards for subdivisions within the ACT and NSW.

6 Recommendation

It is recommended that the re-zoning application be approved based upon the bushfire protection measures identified in this report.

References

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NSW NPWS 2004. *Guidelines for Ecologically Sustainable Fire Management,* NSW Biodiversity Strategy.

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SAI Global (2009 incorporating Amendment 3, 2012). AS3959-2009 *Construction of Building in Bushfire Prone Areas*.

Appendix 1: EMA letter regarding bushfire protection measures

ACT Government

Mr David Maxwell
THE RIVERVIEW GROUP PTY LTD
PO Box 3908
MANUKA ACT 2603

Dear Mr Maxwell,

Re: ESA Bush Fire Concerns Proposed Riverview Development

Following our recent discussions, I have grave concerns for Public Safety for any developments on the Murrumbidgee Corridor due to the extreme risk of bush fires. However, I look forward to your development proposal if it provides a higher level of safety to the people of Canberra. In relation to your request for guidance on standards and obligations upon the proposed development, I would like to take this opportunity to provide you with advice on such requirements. As I have previously advised, as part of the review of the Strategic Bushfire Management Plan (SBMP) the ESA is considering revision of the current policy and standards for the provision of bushfire protection measures for new developments. The Draft SBMP version three will be provided for public consultation shortly and will include the following:

Asset Protection Zones: APZ need to be identified. As a standard approach, intensively managed Inner APZs will be identified within the footprint of the developable area. In considering the issues associated with management of the adjacent areas that were outlined in meetings with you, it is recommended a minimum Inner APZ width of 40 m be applied to grassland / grassy woodland areas. This width may also apply to adjacent forest areas as long as the adjoining areas is managed to Strategic Fire fighting Advantage Zone (SFAZ) Standards. If SFAZ standards cannot be met higher standards may apply.

The Fuel management standards in these zones will be the same as for the current SBMP version 2.

Construction Standards: Concurrent to the review of the SBMP, the ACT Government is working towards extending formal declaration Bushfire Prone Areas (BPAs) to include part of the built-up area of Canberra. This extension is for the purpose of allowing Australian Standards AS 3959 – Construction of building in bushfire prone areas to be applicable for structures in these areas.

- Blocks for residential development are not permitted within the Flame Zone or BAL 40 assessed as per AS 3959
- Blocks to be assessed under AS3959 to determine the appropriate level of construction, as well as a **minimum** application of BAL 12.5 construction for 60 m from the edge of grassland vegetation that does not meet the criteria for exempt vegetation under AS 3959, and 150m for forest vegetation
- Note that Inner APZs can be considered exempt vegetation

ACT Emergency Services Agency
The trusted agency for emergency management in the ACT

Web www.esa.act.gov.au
Email esahaveyoursay@act.gov.au

GPO Box 158, Canberra, ACT 2601
Phone (02) 6205 0400

Appendix 2: Road standards public roads (PBP 2006)

Performance Criteria	Acceptable solutions
The intent may be achieved where:	
• firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)	• public roads are two-wheel drive, all weather roads.
• public road widths and design that allow safe access for firefighters while residents are evacuating an area	• urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle). • the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas. • traffic management devices are constructed to facilitate access by emergency services vehicles. • public roads have a cross fall not exceeding 3 degrees. • all roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard. • curves of roads (other than perimeter roads) are a minimum inner radius of six metres and minimal in number, to allow for rapid access and egress. • the minimum distance between inner and outer curves is six metres. • maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient. • there is a minimum vertical clearance to a height of four metres above the road at all times.
• the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.	• the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating.
• roads that are clearly sign- posted (with easily distinguishable names) and buildings/properties that are clearly numbered.	• public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression.

Performance Criteria	Acceptable solutions
	• public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.
• there is clear access to reticulated water supply	• public roads up to 6.5 metres wide provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression. • one way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.
• parking does not obstruct the minimum paved width	• parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays. • public roads directly interfacing the bushfire hazard vegetation provide roll top kerbing to the hazard side of the road.

Appendix 3: Property access road standards (PBP 2006)

Performance Criteria	Acceptable solutions
The intent may be achieved where:	
• access to properties is provided in recognition of the risk to fire fighters and/ or evacuating occupants.	• at least one alternative property access road is provided for individual dwellings (or groups of dwellings) that are located more than 200 metres from a public through road
• the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles. • all weather access is provided.	• bridges clearly indicate load rating and pavements and bridges are capable of carrying a load of 15 tonnes • roads do not traverse a wetland or other land potentially subject to periodic inundation (other than a flood or storm surge).
• road widths and design enable safe access for vehicles	• a minimum carriageway width of four metres for rural-residential areas, rural landholdings or urban areas with a distance of greater than 70 metres from the nearest hydrant point to the most external part of a proposed building (or footprint). *Note: No specific access requirements apply in a urban area where a 70 metres unobstructed path can be demonstrated between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply).* • in forest, woodland and heath situations, rural property access roads have passing bays every 200 metres that are 20 metres long by two metres wide, making a minimum trafficable width of six metres at the passing bay. • a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches. • internal roads for rural properties provide a loop road around any dwelling or incorporate a turning circle with a minimum 12 metre outer radius. • curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress. • the minimum distance between inner and outer curves is six metres. • the crossfall is not more than 10 degrees. • maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads. *Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.* • access to a development comprising more than three dwellings have formalised access by dedication of a road and not by right of way.

Appendix 4: Fire trail standards for the ACT

Classification	Performance standard	Nominal width and maximum grade	Surface	Nominal Horizontal curve radius	Nominal Vegetation maintenance
Walking track	To allow the safe passage of firefighters on foot	Generally these features will be less than 1 m in width	Natural surface, grass, sealed or gravel surface	Not Applicable	Vegetation maintained to allow single file walking
Light unit	To allow the safe passage of light units (4x4 Landcruiser or similar carrying a water tank of 400 – 600 litres	Generally these features will have a width of 3 m, with a maximum grade of 20 degrees	Natural surface, grass, sealed or gravel surface	Corners of sufficient radius to make 3 point turns by light units unnecessary	Roadside vegetation maintained to allow unimpeded access by light units
Tanker	To allow the safe passage of tankers (4x4 trucks 8 – 12 tonnes carrying a tank of 2500 – 5000 litres)	Generally these features will have a width of 4 m, with a maximum grade of 15 degrees	Natural surface , grass, sealed or gravel surface	Corners of sufficient radius to make 3 point turns by tankers unnecessary	Roadside vegetation maintained to allow unimpeded access by tankers

http://www.esa.act.gov.au/wp-content/uploads/2011/08/act-sbmp-version-two.pdf

ecological AUSTRALIA

HEAD OFFICE
Suite 4, Level 1
2-4 Merton Street
Sutherland NSW 2232
T 02 8536 8600
F 02 9542 5622

SYDNEY
Level 6
299 Sussex Street
Sydney NSW 2000
T 02 8536 8650
F 02 9264 0717

ST GEORGES BASIN
8/128 Island Point Road
St Georges Basin NSW 2540
T 02 4443 5555
F 02 4443 6655

CANBERRA
Level 2
11 London Circuit
Canberra ACT 2601
T 02 6103 0145
F 02 6103 0148

NEWCASTLE
Suites 28 & 29, Level 7
19 Bolton Street
Newcastle NSW 2300
T 02 4910 0125
F 02 4910 0126

NAROOMA
5/20 Canty Street
Narooma NSW 2546
T 02 4476 1151
F 02 4476 1161

COFFS HARBOUR
35 Orlando Street
Coffs Harbour Jetty NSW 2450
T 02 6651 5484
F 02 6651 6890

ARMIDALE
92 Taylor Street
Armidale NSW 2350
T 02 8081 2681
F 02 6772 1279

MUDGEE
Unit 1, Level 1
79 Market Street
Mudgee NSW 2850
T 02 4302 1230
F 02 6372 9230

PERTH
Suite 1 & 2
49 Ord Street
West Perth WA 6005
T 08 9227 1070
F 08 9322 1358

WOLLONGONG
Suite 204, Level 2
62 Moore Street
Austinmer NSW 2515
T 02 4201 2200
F 02 4268 4361

GOSFORD
Suite 5, Baker One
1-5 Baker Street
Gosford NSW 2250
T 02 4302 1220
F 02 4322 2897

DARWIN
16/56 Marina Boulevard
Cullen Bay NT 0820
T 08 8989 5601

BRISBANE
51 Amelia Street
Fortitude Valley QLD 4006
T 07 3503 7193

1300 646 131
www.ecoaus.com.au