Draft Molonglo Development Fire Management Strategy

Version 3

Territory and Municipal Services

Introduction

The Molonglo area is the latest of the ACT Governments' major development areas. This document describes alternative fire management strategies to be applied in the Molonglo area to protect houses, people and other assets within the area from fire and to meet the standards specified in the Strategic Bushfire Management Plan Version 3 (SBMP) as well as meeting the commitments and undertakings made by the ACT Government for the protection and management of matters of national environmental significance (NES) protected under the Commonwealth's EPBC Act as outlined in the *Molonglo Valley Plan for Protection of Matters of National Environmental Significance Plan - NES Plan September 2011*.

Version 3 of the Molonglo Development Fire Management Strategy refines and corrects many of the issues identified in versions I and 2. This includes:

- Recognising high priority Pink-tailed Worm-lizard (PTWL) habitat restoration areas or areas where PTWL habitat restoration has already been undertaken.
- Recognising changes in the boundary of the Molonglo Development area, especially in the South West and in the vicinity of Kama.
- Recognising other plans which have already been developed and the actions they contain such as the Barrer Restoration Plan.

Further changes may be required due to a pending application to alter the NES plan to reflect legislated ACT Government fire management obligations which were not compatible with the NES plan.

Background Information

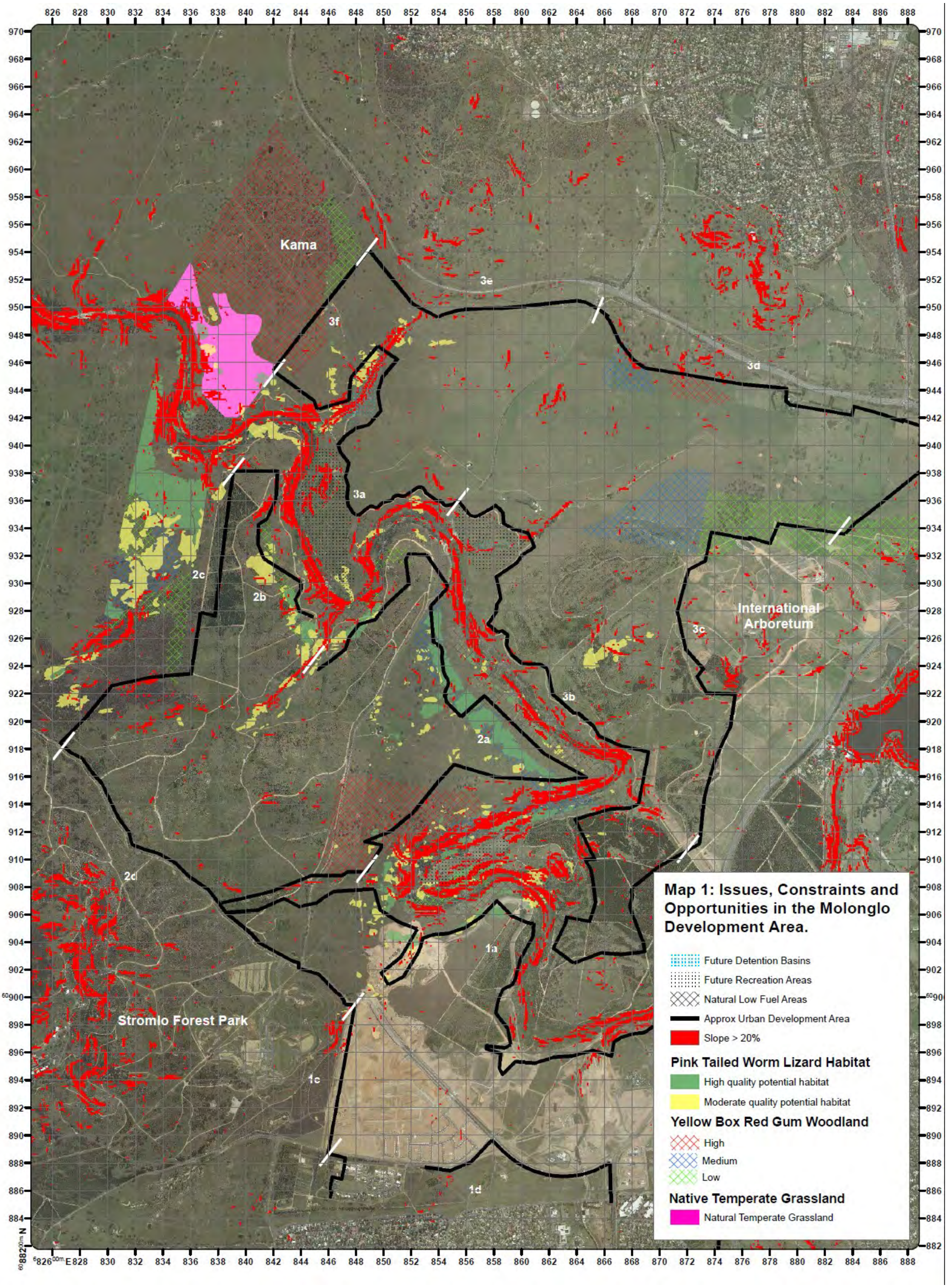
Issues, Constraints and Opportunities

The Molonglo area contains a large number of fire management issues, constraints and opportunities (see Map 1). Collectively, these make the Molonglo area one of the most challenging areas in the ACT to manage bushfires.

Bushfire Risk The Molonglo development is located on the western edge of Canberra and has a long length of classic urban interface where houses will be located uphill from bushland. There is also a history of bushfires burning up the Molonglo valley in the area of the Molonglo development. Together these characteristics make the Molonglo development the highest bushfire risk part of the Canberra urban area.

Pink-tailed Worm-lizard Habitat The Molonglo development area contains extensive areas of habitat of a nationally listed threatened reptile, the Pink-tailed Worm-lizard (PTWL). The Commonwealth and ACT Governments have made a commitment to protect PTWL habitat and this is detailed in the Matters of National Environmental Significance (MNES) plan for the Molonglo Valley. No activities that are incompatible with conservation of moderate and high quality PTWL and a 20m buffer surrounding it are permitted. Fire management treatments which are incompatible with the conservation of PTWL habitat include slashing

by tractor, any treatment which may involve the displacement of rocks and burning more frequently than once every 6 years. Grass fuels in moderate and low quality lizard habitat generally exceed SBMP Outer Asset Protection Zone (OAPZ) standards without annual fuel treatments.



There appears to be something wrong with this map in relation to the urban boundary and the PTWL habitat areas. The shading on the map is hard to read.

Natural Low Fuel Accumulation Areas. A number of areas along the Molonglo River are rocky, have skeletal soils and limited grass cover (Photo 1). These areas naturally do not accumulate a large amount of bushfire fuels and generally meet SBMP OAPZ fuel standards without frequent fuel management treatment. These natural low fuel accumulation areas tend to be associated with areas of high quality PTWL habitat although are not 100% coincident with them.

Yellow Box Red Gum Woodland The Molonglo Development Area, particularly Kama, contains extensive areas of high quality Yellow Box Red Gum Woodland, a nationally listed threatened community. This community generally accumulates fuels to exceed SBMP OAPZ standards within 5 – 7 years unless fuel management treatments are implemented. Fuel management treatment, particularly prescribed burning more frequently than once every 10 years may reduce the biodiversity in this community (Reference).

Natural Temperate Grasslands This nationally threatened ecological community accumulates fuels to above SBMP fuel standards within 2 – 5 years. Prescribed burning more frequently than once every 6 years is likely to reduce biodiversity in this community (Reference).

Former Pine Plantations The development area and what will become fire protection zones for the development contain areas of former pine plantation. While not necessarily incompatible with fire protection, these areas of pine plantation will require additional management if they are to remain in fire protection zones. If pine plantations are to be removed, considerable earth works will be required before other fuel management treatments can be implemented.

Terrain The Molonglo development area, particularly along the Molonglo River and minor creeks, contains extensive areas over 20 degree slope; the limit for slashing by tractor. Many areas, even with slopes less than 20 degrees, are very rocky or contain obstacles, such as trees or holes, which prevent slashing by tractor.

Detention Basins A number of detention basins are planned as part of the urban development. These may provide fire management advantages including meeting the requirements of IAPZ, OAPZ and SFFAZ. They may also increase fire risk if located close to assets, rapidly accumulate fuel due to moist conditions and cannot be mowed due to slope or boggy ground.

Molonglo River Reserve A strip of land 200m - 700m wide along the Molonglo River is to be developed as the Molonglo River Reserve. This will include the development of a number of recreation reserves that will be managed primarily for recreation purposes but will also meet SBMP fuel standards.

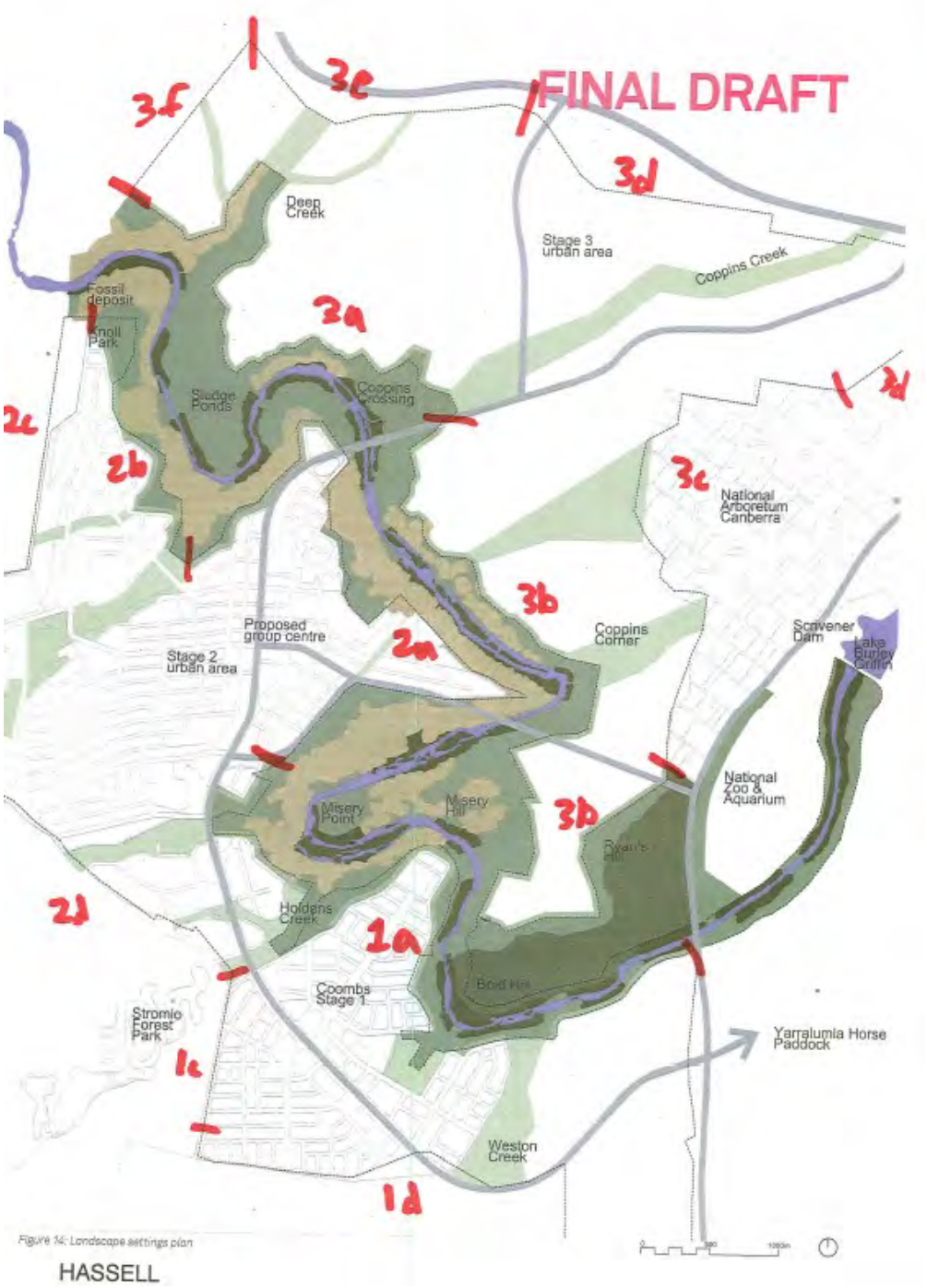
Stromlo Forest Park Stromlo Forest Park occurs to the south of Uriarra Rd. Extensive tree plantings have been undertaken in Stromlo Forest Park. An existing fire management strategy, that recognises the Molonglo Development Area, has been prepared for Stromlo Forest Park.

Grazing Except in broad areas to the west of the development area, grazing has generally been excluded as a possible fire management treatment because past experience in the ACT has shown it is difficult to attract and maintain graziers for small blocks of land surrounded by urban development. This is largely due to difficulties such as cut fences and dogs.

Photo 1: Natural Low Fuel Accumulation Area. The area in the photos has no record of fuel management having been undertaken and meets Strategic Bushfire Management Plan Outer Asset Protection Zone and Strategic Fire Fighter Advantage Zone fuel standards.

Development Stages

The development of Molonglo is proposed in three stages. However, for the purposes of this fire management strategy, the urban edge of Molonglo has been divided into the sections as illustrated in Map 2.



Map 2. Molonglo development stages and sections of the rural – urban interface used in this fire management strategy.

Previous Fire Management Studies

A fire management plan has previously been prepared and implemented for the Coombs rural – urban interface along the Molonglo River (1a). The strategy implemented in this area required the construction of a 50m wide Inner Asset Protection Zone (IAPZ) within the bounds of the development and the construction of a 100m wide OAPZ within Molonglo River Park. It is estimated that maintaining the IAPZ will require biannual slashing and the maintenance of the OAPZ will require annual slashing with small areas to be maintained by annual brush cutting. The recurrent costs of maintaining the IAPZ and OAPZ are included in this fire management strategy but the one off costs associated with constructing them have been excluded because they have already been constructed.

A fire management plan has previously been prepared for the Molonglo Stage 2 Development along the Molonglo River predominantly south of Coppins Crossing (2a). The plan proposed a wide range of once off and recurrent fire management activities. The costs of implementing the once off and recurrent fire management activities proposed in the plan are included in this strategy because they are yet to be implemented.

A fire management plan for Stromlo Forest Park has previously been prepared by Territory Venue and Events. This plan recognises that parts of the OAPZ and SFFAZ for the Molonglo Development lie within Stromlo Forest Park (1c and 2d). The once off and recurrent costs associated with the OAPZ and SFFAZ within Stromlo Forest Park have been excluded from this strategy because they are funded by Territory Venue and Events.

Version 1 of this strategy proposed three alternative treatment strategies with the difference between the three strategies being the treatment proposed for:

- areas of grassland which are too steep to slash by tractor (slopes > 20 degrees); and
- areas of moderate and high quality PTWL and 20m buffers which do not coincide with naturally low fuel areas.

Version 3 of the Molonglo Development Fire Management Strategy corrects a number of deficiencies in version 1 and 2 of the strategy.

The once off costs associated with constructing IAPZ throughout the development area have been excluded from this fire management strategy because it is assumed these will be constructed as part of the urban development with the costs covered by the urban developer.

Fuel Management Zones and Standards

Map 3 illustrates the fuel management zones to be applied in the Molonglo Valley. Table 1 summarises these zones. The location of IAPZ and OAPZ has been defined according to Schedule C in the SBMP and Table 1 in the SBMP supporting documentation volume two. The location of Strategic Fire Fighting Advantage Zones (SFFAZ) has been defined in accordance with the principles detailed in the SBMP.

The fuel management standards to be applied in the IAPZ, OAPZ and SFFAZ under the SBMP are detailed in Table 2.

Table 1. Summary of fire management zones by urban edge section in the Molonglo Development Area.

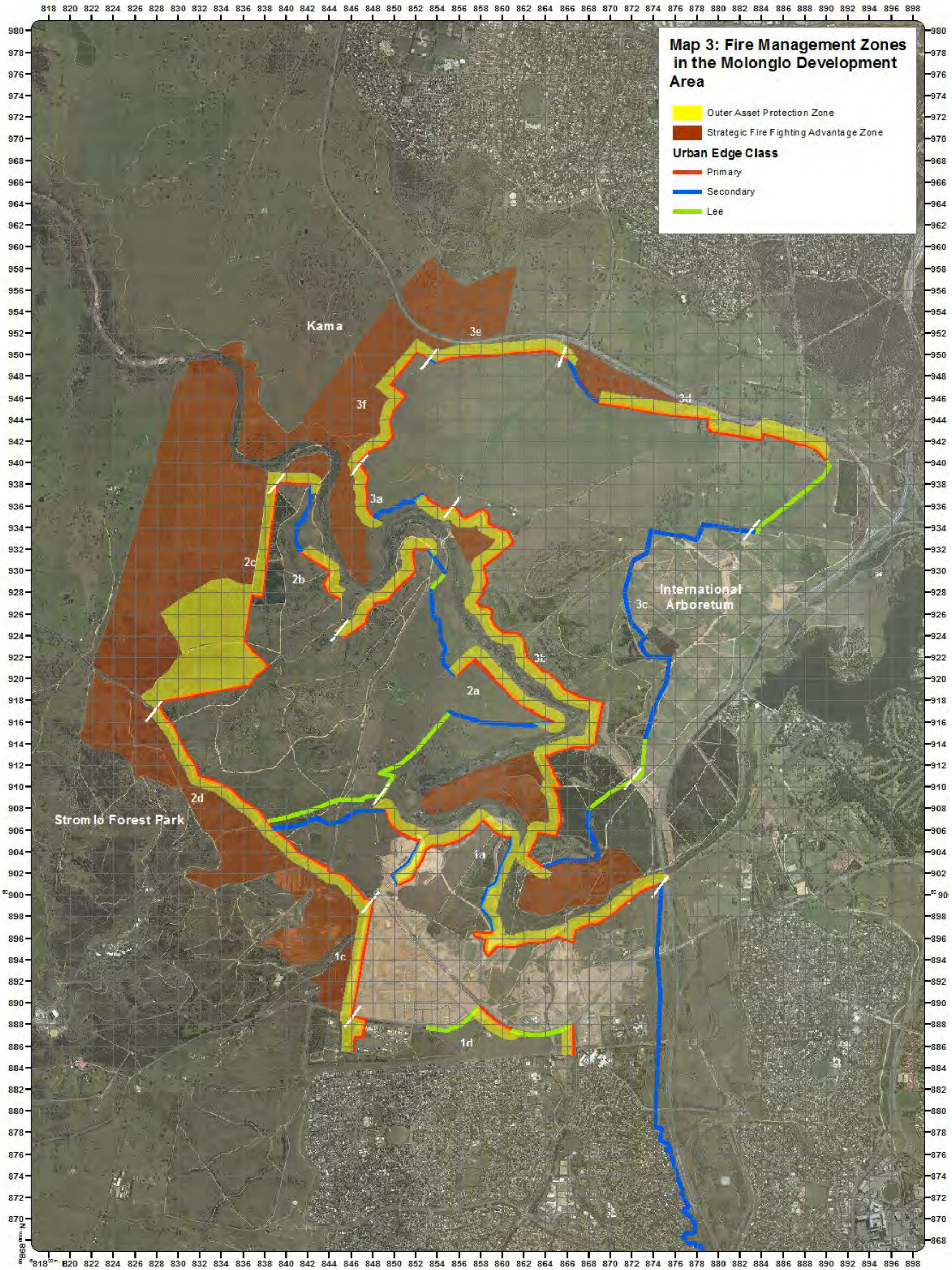
Urban Edge Section	*Fire Management Zone*	*Hectares*
1a	*IAPZ*	*28.5*
1c	*IAPZ*	*4.0*
1d	*IAPZ*	*3.1*
2a	*IAPZ*	*13.2*
2b	*IAPZ*	*4.6*
2c	*IAPZ*	*7.9*
2d	*IAPZ*	*8.8*
3a	*IAPZ*	*4.3*
3b	*IAPZ*	*13.2*
3c	*IAPZ*	*7.3*
3d	*IAPZ*	*8.1*
3e	*IAPZ*	*6.2*
3f	*IAPZ*	*3.0*
TOTAL	***IAPZ***	***112.2***
1a	*OAPZ*	*42.4*
1c	*OAPZ*	*15.6*
1d	*OAPZ*	*7.3*
2a	*OAPZ*	*35.5*
2b	*OAPZ*	*12.0*
2c	*OAPZ*	*81.2*
2d	*OAPZ*	*27.4*

Urban Edge Section	*Fire Management Zone*	*Hectares*
3a	*OAPZ*	*62.7*
3b	*OAPZ*	*54.1*
3c	*OAPZ*	*0*
3d	*OAPZ*	*26.2*
3e	*OAPZ*	*14.1*
3f	*OAPZ*	*6.6*
TOTAL	***OAPZ***	***385.1***
1a	*SSFAZ*	*0*
1c	*SSFAZ*	*47.6*
1d	*SSFAZ*	*0*
2a	*SSFAZ*	*0*
2b	*SSFAZ*	*6.5*
2c	*SSFAZ*	*243.0*
2d	*SSFAZ*	*108.4*
3a	*SSFAZ*	*72.6*
3b	*SSFAZ*	*97.5*
3c	*SSFAZ*	*0*
3d	*SSFAZ*	*19.6*
3e	*SSFAZ*	*53.7*
3f	*SSFAZ*	*58.1*
TOTAL	***SSFAZ***	***707***

Table 2. Fuel management standards to be achieved in each zone under the SBMP.

Inner Asset Protection Zone (IAPZ)	**Treatment Standards**	
Default standards to be applied over at least 80% of the zones as mapped. Where default standards cannot be achieved, the responsible land manager may identify alternative treatments to meet the overall objectives for the zone. Any significant variation on the default standards shall be approved by the ESA.	**Vegetation type**	**Fuel management standards**
	Forest and shrubland	Maintained at an overall fuel hazard ≤ low 3-5 m canopy separation or fuel gap to crown >3 m maintained
	Grass and open woodland	Grassland maintained at less than 200 mm height when grassland curing ≥ 70%.

Outer Asset Protection Zone (OAPZ)	**Treatment standards**	
Default standards to be applied over at least 70% of the zones as mapped. Where default standards cannot be achieved, the responsible land manager may identify alternative treatments to meet the overall objectives for the zone. Any significant variation on the default standards shall be approved by the ESA.	**Vegetation type**	**Fuel management standards**
	Forest and shrubland	Overall fuel hazard ≤ moderate
	Grass and open woodland	Grassland fire hazard ≤ 35 when grassland curing ≥ 70%
Strategic Firefighting Advantage Zone	**Treatment standards**	
Default standards to be applied over at least 70% of the zones as mapped. Where default standards cannot be achieved, the responsible land manager may identify alternative treatments to meet the overall objectives for the zone. Any significant variation on the default standards shall be approved by the ESA.	**Vegetation type**	**Fuel management standards**
	Forest and shrubland	Overall fuel hazard ≤ high
	Grass and open Woodland	Grassland fire hazard ≤ 50 when grassland curing ≥ 70%.
	Plantations	Manage stands as crown fire-reduced areas with progressive treatment to attain the following standards: • immature stands (<15 years old). Pruned to 2.0 m and thinned to 650 sph nominally at Year 8-10. Debris from thinning and pruning to be <1 m high. In areas immediately adjacent to potential ignition sources or built assets consider mechanical crushing of thinning and pruning debris or burning as soon as practicable without damaging the residual stand. • mature stands (>15 years old). Schedule harvesting to reduce contiguous areas of untreated slash during the fire season. Remove the outside row of trees (adjacent to fire trails) during first commercial thinning operation to improve access on fire trails.. • Maintain strategic fuel breaks through the maintenance of road pavements and verges, and edge pruning and thinning.
	Identified arterial roads, rural roads and easements	Grassland fire hazard ≤ 35 when grassland curing ≥ 70%.


Map 3: Fire Management Zones in the Molonglo Development Area
Outer Asset Protection Zone
Strategic Fire Fighting Advantage Zone
Urban Edge Class
Primary
Secondary
Lee
Kama
3e
3f
3d
3a
2c
2b
International Arboretum
3c
3b
2a
2d
Stromlo Forest Park
1a
1c
1d

Fire Management Treatment Strategies and Costs

Three alternative treatment strategies have been identified as described in Table 3 and 4.

While this document describes these alternatives as completely separate options, it is likely the best option would be a combination of the three alternatives presented but with one alternative predominating.

Table 3. The general[2] allocation of recurrent fire management treatments under the three alternative treatment strategies. The main difference between the three strategies have been highlighted.

Site Characteristics	*Recurrent Fire Management Treatments*		
	Alternative 1	*Alternative 2*	*Alternative 3*
Inner Asset Protection Zone			
All site characteristics	Slashing x 2 per year	Slashing x 2 per year	Slashing x 2 per year
Recreation Reserves	Routine maintenance of recreation reserve (not costed in this fire management strategy)	Routine maintenance of recreation reserve (not costed in this fire management strategy)	Routine maintenance of recreation reserve (not costed in this fire management strategy)
Detention Basins	Routine maintenance of detention basin (not costed in this fire management strategy)	Routine maintenance of detention basin (not costed in this fire management strategy)	Routine maintenance of detention basin (not costed in this fire management strategy)
Outer Asset Protection Zone			
Natural Low Fuel Area	Burn 1 in 6 years (no treatment may be required)	Burn 1 in 6 years (no treatment may be required)	Burn 1 in 6 years (no treatment may be required)
Existing PTWL Habitat Restoration Areas	Burn 1 in 6 years (no treatment may be required)	Conversion to High Quality PTWL Habitat (Natural Low Fuel Area).	Conversion to High Quality PTWL Habitat (Natural Low Fuel Area).
High and Moderate Quality PTWL Habitat and 20m Buffer Outside of Natural Low Fuel Areas[3]	Burn 1 in 6 years (no treatment may be required)	Annual Brush cutting	Annual Brush cutting
Slopes > 20 degrees	Burn 1 in 6 years (no treatment may be required)	Annual Brush cutting	Burn every 1- 2 years
Slopes < 20 Degrees	Annual Slash	Annual Slash	Annual Slash
Pine Plantation	Annual Slash	Annual Slash	Annual Slash
Stringybark Forest	Burn every 5 – 7 years	Burn every 5 – 7 years	Burn every 5 – 7 years
Recreation Reserves	Routine maintenance of recreation reserve (not costed in this fire management strategy)	Routine maintenance of recreation reserve (not costed in this fire management strategy)	Routine maintenance of recreation reserve (not costed in this fire management strategy)
Detention Basins	Routine maintenance of detention basin (not costed in this fire management strategy)	Routine maintenance of detention basin (not costed in this fire management strategy)	Routine maintenance of detention basin (not costed in this fire management strategy)
Strategic Fire Fighting Advantage Zone			
Pine / Eucalypt Plantations	Thin / Prune every 8+ years	Thin / Prune every 8+ years	Thin / Prune every 8+ years
Stringybark Forest	Burn every 8 – 10 years	Burn every 8 – 10 years	Burn every 8 – 10 years
Grassland / Open Grassy Woodland	Graze	Graze	Graze
Recreation Reserves	Routine maintenance of recreation reserve (not costed in this fire management strategy)	Routine maintenance of recreation reserve (not costed in this fire management strategy)	Routine maintenance of recreation reserve (not costed in this fire management strategy)
Detention Basins	Routine maintenance of detention basin (not costed in this fire management strategy)	Routine maintenance of detention basin (not costed in this fire management strategy)	Routine maintenance of detention basin (not costed in this fire management strategy)

[1] *In certain circumstances treatments outside those identified in this table may have been identified based on expert knowledge.*

[3] *This strategy assumes the constraints that apply to Moderate and High quality habitat also applies to the 20m wide buffer.*

Table 4. The general[2] allocation of once-off fire management treatments under the three alternative treatment strategies. The main differences between the three strategies have been highlighted.

Site Characteristics	*Once Off Fire Management Treatments*		
	Alternative 1	*Alternative 2*	*Alternative 3*
Inner Asset Protection Zone			
All site characteristics	Constructed during development of suburbs (not costed as part of this fire management strategy)	Constructed during development of suburbs (not costed as part of this fire management strategy)	Constructed during development of suburbs (not costed as part of this fire management strategy)
Recreation Reserves	Construction of recreation reserve (not costed as part of this fire management strategy)	Construction of recreation reserve (not costed as part of this fire management strategy)	Construction of recreation reserve (not costed as part of this fire management strategy)
Detention Basins	Construction of detention basin (not costed as part of this fire management strategy)	Construction of detention basin (not costed as part of this fire management strategy)	Construction of detention basin (not costed as part of this fire management strategy)
Outer Asset Protection Zone			
Natural Low Fuel Area	None	None	None
Existing PTWL Habitat Restoration Areas	Habitat Restoration	Habitat Restoration	Habitat Restoration
High and Moderate Quality PTWL Habitat and 20m Buffer Outside of Natural Low Fuel Areas[4]	Habitat Restoration	None	None
Slopes > 20 degrees	Habitat Restoration[3]	None	None
Slopes < 20 Degrees	Rock pick/smoothing	Rock pick/smoothing	Rock pick/smoothing
Pine Plantation	Tree removal (2c) or thinning and pruning, rock pick, smoothing	Tree removal (2c) or thinning and pruning, rock pick, smoothing	Tree removal (2c) or thinning and pruning, rock pick, smoothing
Stringybark Forest	Trail establishment	Trail establishment	Trail establishment
Recreation Reserves	Construction of recreation reserve (not costed as part of this fire management strategy)	Construction of recreation reserve (not costed as part of this fire management strategy)	Construction of recreation reserve (not costed as part of this fire management strategy)
Detention Basins	Construction of detention basin (not costed as part of this fire management strategy)	Construction of detention basin (not costed as part of this fire management strategy)	Construction of detention basin (not costed as part of this fire management strategy)
Strategic Fire Fighting Advantage Zone			
Stringybark Forest	Trail establishment	Trail establishment	Trail establishment
Pine / Eucalypt Plantation	Tree removal (2c) or thinning and pruning, rock pick, smoothing	Tree removal (2c) or thinning and pruning, rock pick, smoothing	Tree removal (2c) or thinning and pruning, rock pick, smoothing
Grassland / Open Grassy Woodland	Fencing, troughs/dams	Fencing, troughs/dams	Fencing, troughs/dams
Recreation Reserves	Construction of recreation reserve (not costed as part of this fire management strategy)	Construction of recreation reserve (not costed as part of this fire management strategy)	Construction of recreation reserve (not costed as part of this fire management strategy)
Detention Basins	Construction of detention basin (not costed as part of this fire management strategy)	Construction of detention basin (not costed as part of this fire management strategy)	Construction of detention basin (not costed as part of this fire management strategy)

[1] *In certain circumstances treatments outside those identified in this table may have been identified based on expert knowledge.*

[3]. *Clarification is required if it is permitted to undertake habitat restoration in areas which are already mapped as High or Moderate quality PTWL habitat.*

[4] *This strategy assumes the constraints that apply to Moderate and High quality habitat also applies to the 20m wide buffer.*

All alternatives include restoration of PTWL habitat as a management treatment. This involves rock importation, removal of weeds (including introduced grasses) and replacement of high biomass grasses with low biomass grasses. It is expected that habitat restoration will effectively create fuel conditions similar to that in the Natural Low Fuel Accumulation Areas (Photo 2).

Table 5 provides a side by side comparison of the three alternatives.

The following sections provide maps and tables describing the recurrent as well as once – off fire management treatments under each alternative. Cost estimates are also provided for each alternative broken down by development stage.

Table 5. A side by side comparison of the three alternative fire management treatment strategies.

Element	*Alternative 1*	*Alternative 2*	*Alternative 3*
Protection of High Quality PTWL Habitat	High	High	High
Area of Moderate and High Quality PTWL habitat	Significantly increased (assuming habitat restoration is successful)	Increased	Increased
Likely Public Acceptance	High	High	Low
Reliability of Implementing Treatment	High	High	Low
Standard of Protection Assuming Fully Implemented	Unknown (habitat restoration is an experimental fuel management treatment)	High	Very High
Certainty/Reliability	Low (because of experimental nature of habitat restoration)	High	Low (because of unreliability of weather to conduct annual prescribed burns)
Estimated Annual Cost ($ 000)	348.2	597.9	445.9
Estimated Once – Off Cost ($ 000)	4255.5	3426.0	2522.9

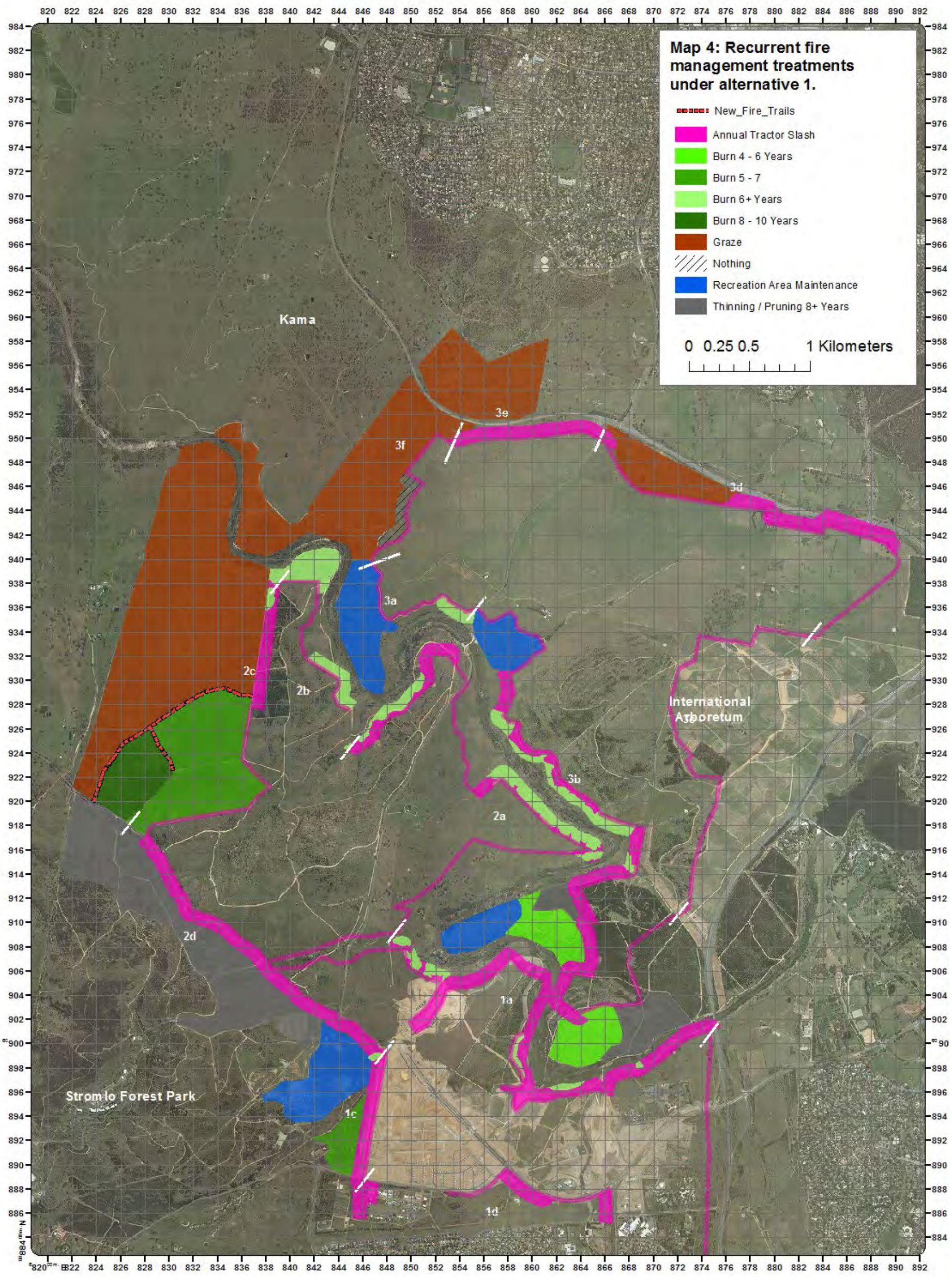
Photo 2. Habitat restoration area following the importation of rocks but before the replacement of high biomass grasses with low biomass grasses and the removal of weeds. It is expected that habitat restoration will create similar fuel conditions to that in the Natural Low Fuel Accumulation Areas.

Alternative 1

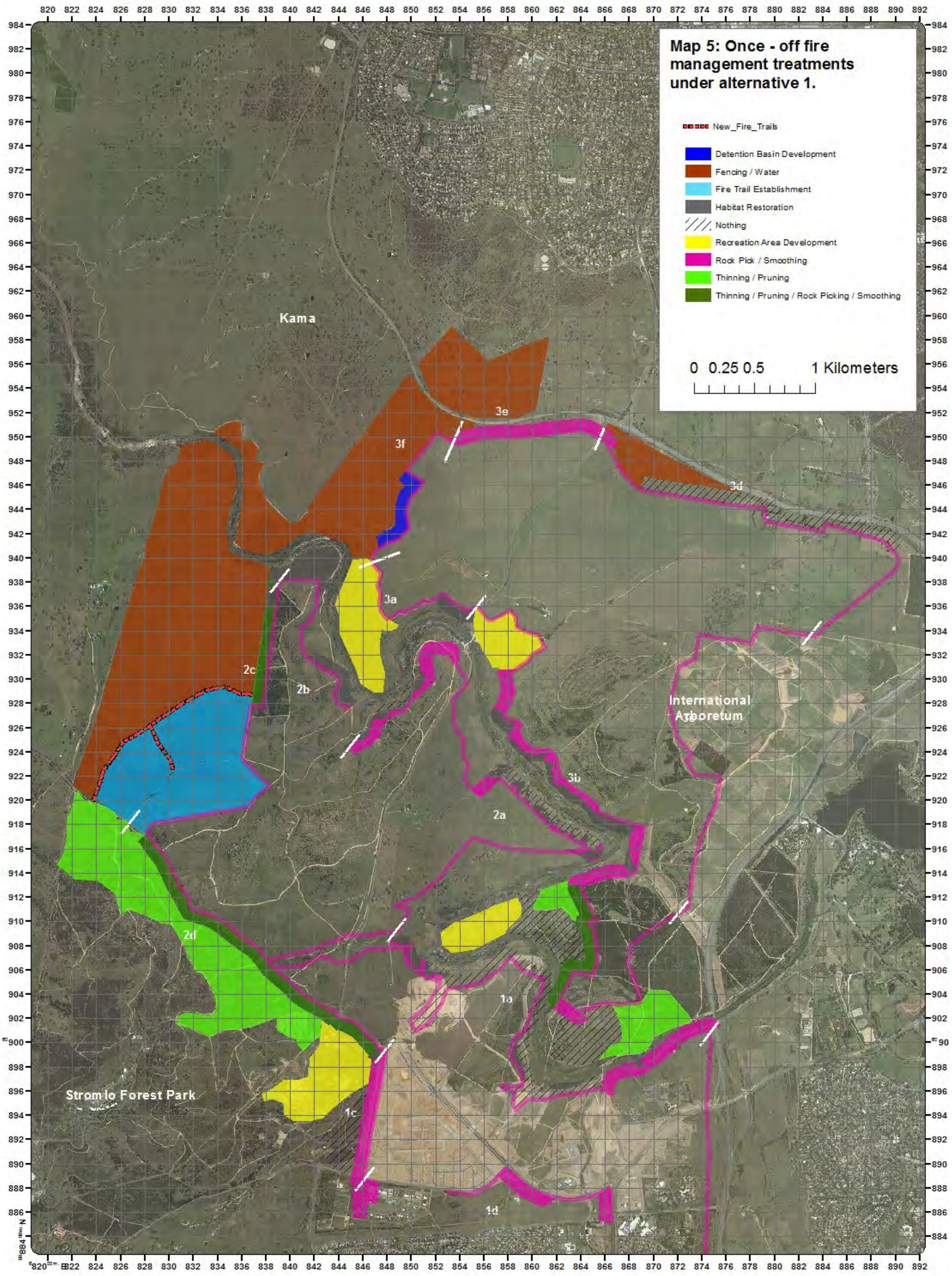
Under this alternative, restoration of High Quality PTWL habitat (which does not accumulate a large amount of bushfire fuels) is proposed as the main fuel management treatment in grassland areas which are too steep to slash (>20 degrees) and high and moderate quality PTWL habitat and 20m buffer in areas which do accumulate significant bushfire fuels. Map 4 illustrates the recurrent fire management treatments under this alternative while Map 5 illustrates the once – off fire management treatments. Table 5 summarises the treatments and provides a cost estimate under this alternative.

Table 5. Summary of fuel management treatments and costs under alternative 1.

Zone	Treatment	Ha/Km	$
Recurrent			
IAPZ	Slashing x 2 Annually	**112.2**	**112.2**
OAPZ	Annual brushcut	0.0	0.0
	Annual slashing	175.6	63.7
	Burn 1-2 years	0.0	0.0
	Burn 4 – 6 years	0.0	0.0
	Burn 5-7 years	76.6	32.0
	Burn 6+ years	53.7	22.4
	Burn 8-10 years	0.0	0.0
	Graze	16.8	0.0
	Recreation Area Maint	16.9	0.0
	Thinning/Pruning 8+ Years	0.0	0.0
	Nothing	7.6	0.0
	OAPZ Total	**347.2**	**118.0**
SFFAZ	Annual brushcut	0.0	0.0
	Annual slashing	0.0	0.0
	Burn 1-2 years	0.0	0.0
	Burn 4 – 6 years	39.4	19.7
	Burn 5-7 years	11.8	4.9
	Burn 6+ years	6.5	2.7
	Burn 8-10 years	28.4	7.1
	Graze	195.6	0.0
	Recreation Area Maint	96.3	0.0
	Thinning/Pruning 8+ Years	38.1	9.5
	Nothing	0.0	0.0
	SFFAZ Total	**416.1**	**118.0**
Recurrent Total			**348.2**
Once - Off			
IAPZ	IAPZ Development	**112.2**	**0.0**
OAPZ	Detention Basin Development	7.6	0.0
	Fencing/Water	8.4	8.4
	Fire Trail Establishment	1.8	45.0
	Habitat Restoration	52.8	1002.7
	Recreation Area Development	16.9	0.0
	Rock Pick/ Smoothing	81.3	1928.1
	Thinning/ Pruning	0.0	0.0
	Thinning/ Pruning/ Rock Pick/ Smoothing	48.1	865.3
	OAPZ Total	**217.0**	**3849.5**
SFFAZ	Detention Basin Development	0.0	0.0
	Fencing/Water	195.6	195.6
	Fire Trail Establishment	0.4	10.0
	Habitat Restoration	6.5	124.2
	Recreation Area Development	96.3	0.0
	Rock Pick/ Smoothing	0.0	0.0
	Thinning/ Pruning	38.1	76.2
	Thinning/ Pruning/ Rock Pick/ Smoothing	0.0	0.0
	SFFAZ Total	**336.9**	**405.9**
Once – Off Total			**4255.5**



You might want to cross reference this with the intentions in the draft Plan of Management for locations of recreation reserves. I don't think one is planned for Misery Point

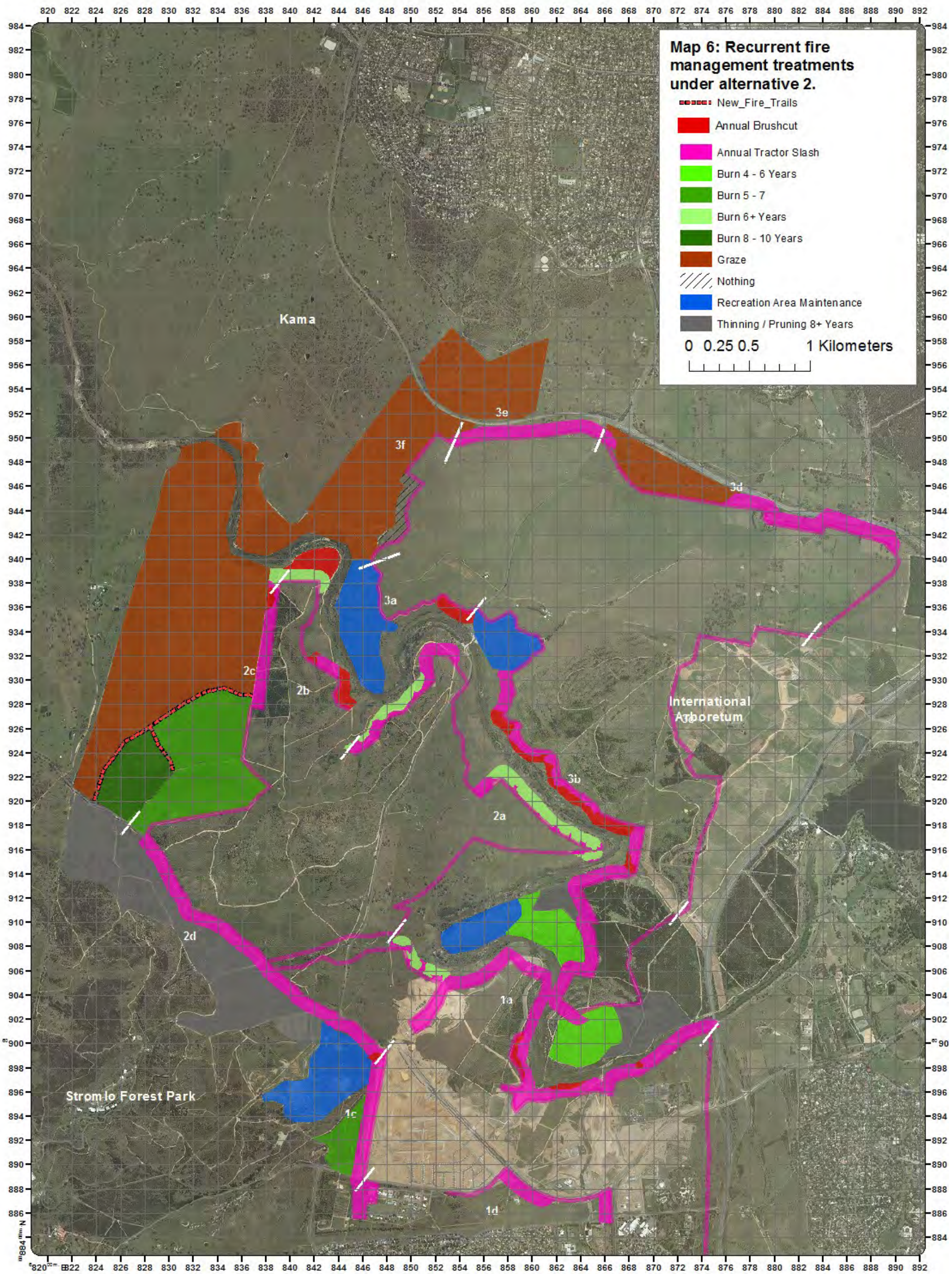

Map 5: Once - off fire management treatments under alternative 1.
New_Fire_Trails
Detention Basin Development
Fencing / Water
Fire Trail Establishment
Habitat Restoration
Nothing
Recreation Area Development
Rock Pick / Smoothing
Thinning / Pruning
Thinning / Pruning / Rock Picking / Smoothing
0 0.25 0.5 1 Kilometers
Kama
3e
3f
3d
3a
2c
2b
International Arboretum
3b
2a
2d
1a
Stromlo Forest Park
1c
1d

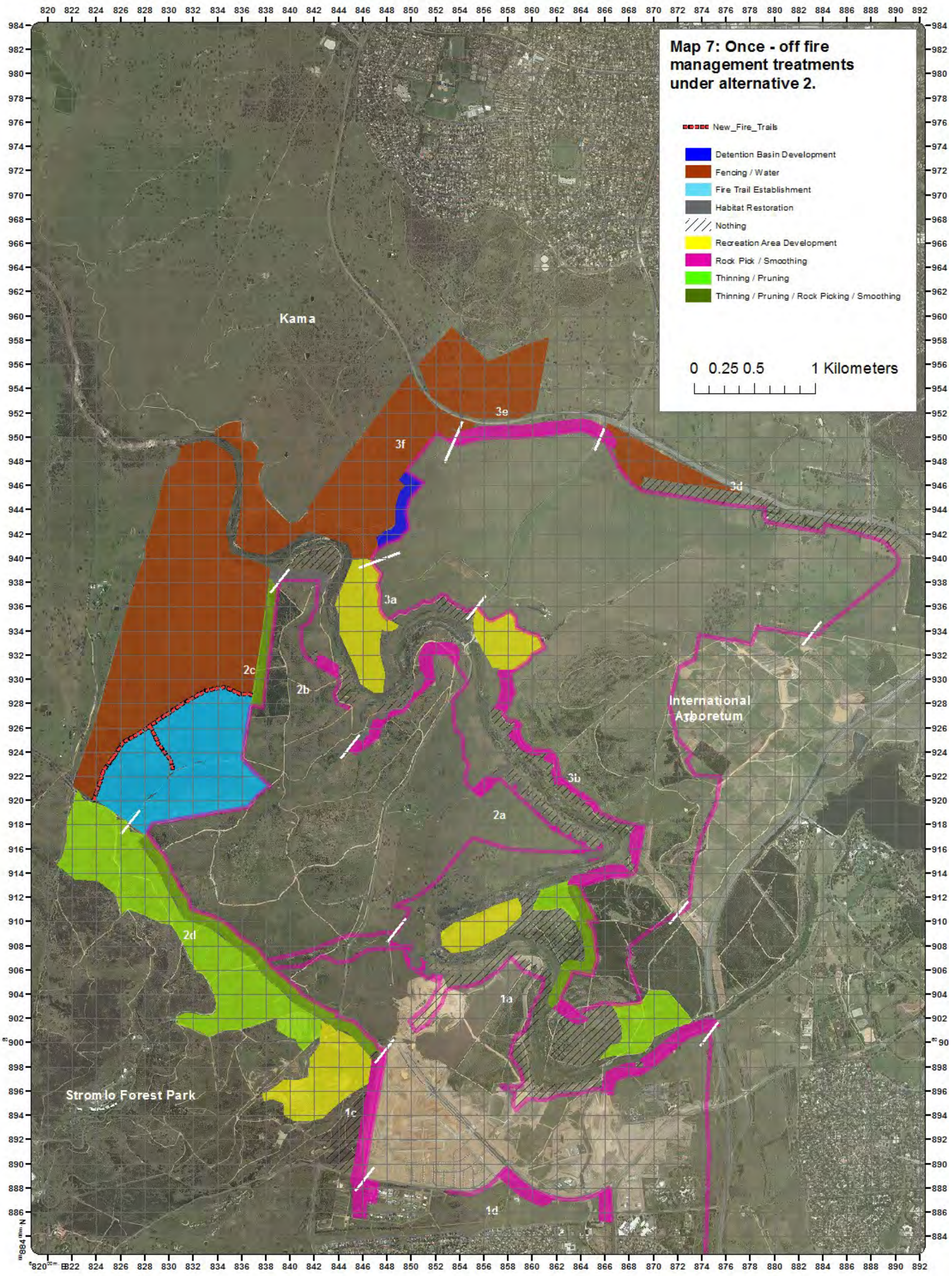
Alternative 2

Under this alternative, brush cutting is proposed as the main fuel management treatment in grassland areas which are too steep to slash (>20 degrees) and high and moderate quality PTWL habitat and 20m buffer in areas which do accumulate significant bushfire fuels. Map 6 illustrates the recurrent fire management treatments under this alternative while Map 7 and illustrates the once – off fire management treatments. Table 6 summarises the treatments and provides a cost estimate under this alternative.

Table 6. Summary of fuel management treatments and costs under alternative 2.

Zone	Treatment	Ha/Km	$
Recurrent			
IAPZ	Slashing x 2 Annually	**112.2**	**112.2**
OAPZ	Annual brushcut	24.5	120.6
	Annual slashing	185.1	78.9
	Burn 1-2 years	0.0	0.0
	Burn 4 – 6 years	0.0	0.0
	Burn 5-7 years	76.6	32.0
	Burn 6+ years	27.3	11.4
	Burn 8-10 years	0.0	0.0
	Graze	16.8	0.0
	Recreation Area Maint	16.9	0.0
	Thinning/Pruning 8+ Years	0.0	0.0
	Nothing	7.6	0.0
	OAPZ Total	**354.8**	**242.8**
SFFAZ	Annual brushcut	6.5	32.7
	Annual slashing	0.0	0.0
	Burn 1-2 years	0.0	0.0
	Burn 4 – 6 years	39.4	19.7
	Burn 5-7 years	11.8	4.9
	Burn 6+ years	0.0	0.0
	Burn 8-10 years	28.4	7.1
	Graze	195.6	0.0
	Recreation Area Maint	96.3	0.0
	Thinning/Pruning 8+ Years	38.1	9.5
	Nothing	0.0	0.0
	SFFAZ Total	**416.1**	**242.8**
Recurrent Total			**597.9**
Once - Off			
IAPZ	IAPZ Development	**112.2**	**0.0**
OAPZ	Detention Basin Development	7.6	0.0
	Fencing/Water	8.4	8.4
	Fire Trail Establishment	1.8	45.0
	Habitat Restoration	18.6	353.8
	Recreation Area Development	16.9	0.0
	Rock Pick/ Smoothing	83.3	909.3
	Thinning/ Pruning	0.0	0.0
	Thinning/ Pruning/ Rock Pick/ Smoothing	49.4	1827.7
	OAPZ Total	**186.0**	**3144.3**
SFFAZ	Detention Basin Development	0.0	0.0
	Fencing/Water	195.6	195.6
	Fire Trail Establishment	0.4	10.0
	Habitat Restoration	0.0	0.0
	Recreation Area Development	96.3	0.0
	Rock Pick/ Smoothing	0.0	0.0
	Thinning/ Pruning	38.1	76.2
	Thinning/ Pruning/ Rock Pick/ Smoothing	0.0	0.0
	SFFAZ Total	**330.3**	**281.8**
Once – Off Total			**3426.0**


Map 6: Recurrent fire management treatments under alternative 2.
New_Fire_Trails
Annual Brushcut
Annual Tractor Slash
Burn 4 - 6 Years
Burn 5 - 7
Burn 6+ Years
Burn 8 - 10 Years
Graze
Nothing
Recreation Area Maintenance
Thinning / Pruning 8+ Years
0 0.25 0.5 1 Kilometers
Kama
3e
3f
3d
3a
2c
2b
International Arboretum
3b
2a
2d
1a
Stromlo Forest Park
1c
1d

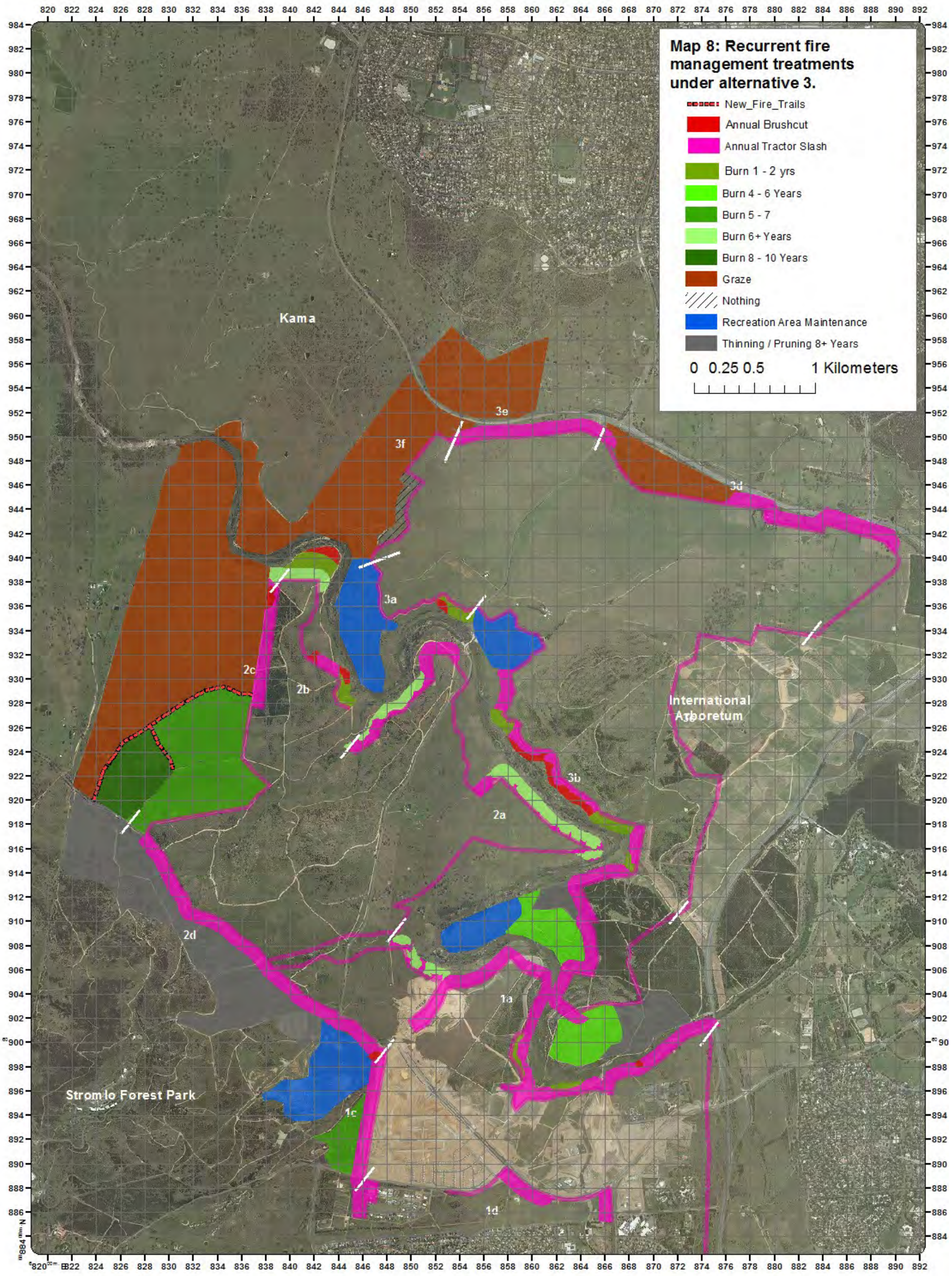

Map 7: Once - off fire management treatments under alternative 2.
New_Fire_Trails
Detention Basin Development
Fencing / Water
Fire Trail Establishment
Habitat Restoration
Nothing
Recreation Area Development
Rock Pick / Smoothing
Thinning / Pruning
Thinning / Pruning / Rock Picking / Smoothing
0 0.25 0.5 1 Kilometers
Kama
3e
3f
3d
3a
2c
2b
International Arboretum
3b
2a
2d
1a
Stromlo Forest Park
1c
1d

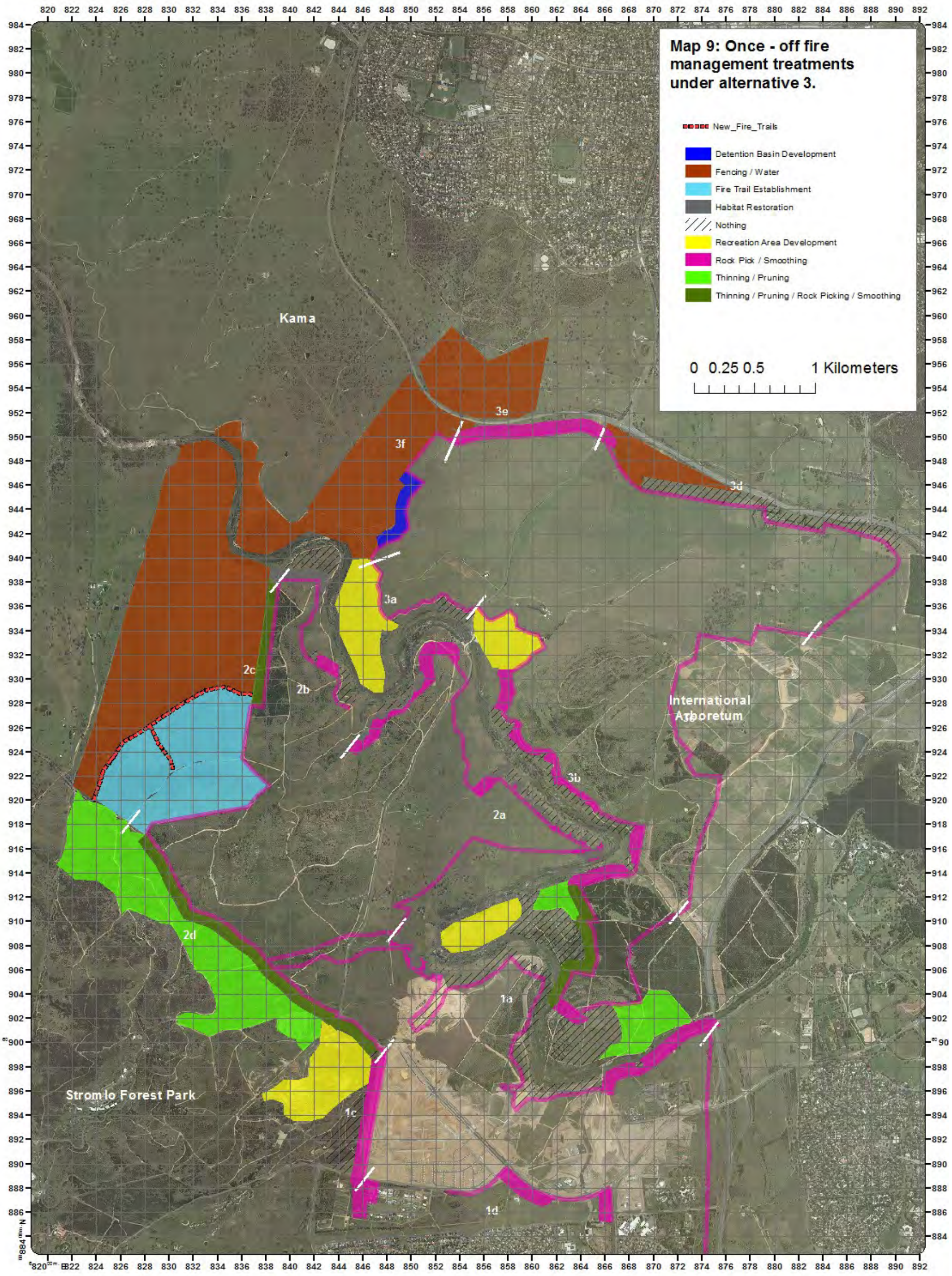
Alternative 3

Under this alternative, prescribed burning every 1 – 2 years is proposed as the main fuel management treatment in grassland areas which are too steep to slash (>20 degrees) while annual brush cutting is proposed as the main treatment in high and moderate quality PTWL habitat and 20m buffer in areas which do accumulate significant bushfire fuels. Map 8 illustrates the recurrent fire management treatments under this alternative while Map 9 and illustrates the once – off fire management treatments. Table 7 summarises the treatments and provides a cost estimate under this alternative.

Table 7. Summary of fuel management treatments and costs under alternative 3.

Zone	Treatment	Ha/Km	$
Recurrent			
IAPZ	Slashing x 2 Annually	**112.2**	**112.2**
OAPZ	Annual brushcut	4.1	20.4
	Annual slashing	171.8	64.7
	Burn 1-2 years	15.4	38.5
	Burn 4 – 6 years	0.0	0.0
	Burn 5-7 years	76.6	32.0
	Burn 6+ years	27.3	11.4
	Burn 8-10 years	0.0	0.0
	Graze	16.8	0.0
	Recreation Area Maint	16.9	0.0
	Thinning/Pruning 8+ Years	0.0	0.0
	Nothing	7.6	0.0
	OAPZ Total	**336.5**	**166.8**
SFFAZ	Annual brushcut	1.8	9.1
	Annual slashing	0.0	0.0
	Burn 1-2 years	4.7	11.8
	Burn 4 – 6 years	39.4	19.7
	Burn 5-7 years	11.8	4.9
	Burn 6+ years	0.0	0.0
	Burn 8-10 years	28.4	7.1
	Graze	195.6	0.0
	Recreation Area Maint	96.3	0.0
	Thinning/Pruning 8+ Years	38.1	9.5
	Nothing	0.0	0.0
	SFFAZ Total	**416.1**	**166.8**
Recurrent Total			**445.9**
Once - Off			
IAPZ	IAPZ Development	**112.2**	**0.0**
OAPZ	Detention Basin Development	7.6	0.0
	Fencing/Water	8.4	8.4
	Fire Trail Establishment	1.8	45.0
	Habitat Restoration	18.6	353.8
	Recreation Area Development	16.9	0.0
	Rock Pick/ Smoothing	77.6	911.3
	Thinning/ Pruning	0.0	0.0
	Thinning/ Pruning/ Rock Pick/ Smoothing	49.4	922.5
	OAPZ Total	**180.3**	**2241.1**
SFFAZ	Detention Basin Development	0.0	0.0
	Fencing/Water	195.6	195.6
	Fire Trail Establishment	0.4	10.0
	Habitat Restoration	0.0	0.0
	Recreation Area Development	96.3	0.0
	Rock Pick/ Smoothing	0.0	0.0
	Thinning/ Pruning	38.1	76.2
	Thinning/ Pruning/ Rock Pick/ Smoothing	0.0	0.0
	SFFAZ Total	**330.3**	**281.8**
Once – Off Total			**2522.9**


Map 8: Recurrent fire management treatments under alternative 3.
New_Fire_Trails
Annual Brushcut
Annual Tractor Slash
Burn 1 - 2 yrs
Burn 4 - 6 Years
Burn 5 - 7
Burn 6+ Years
Burn 8 - 10 Years
Graze
Nothing
Recreation Area Maintenance
Thinning / Pruning 8+ Years
0 0.25 0.5 1 Kilometers
Kama
3e
3f
3d
3a
2c
2b
International Arboretum
3b
2a
2d
1a
Stromlo Forest Park
1c
1d


Map 9: Once - off fire management treatments under alternative 3.
New_Fire_Trails
Detention Basin Development
Fencing / Water
Fire Trail Establishment
Habitat Restoration
Nothing
Recreation Area Development
Rock Pick / Smoothing
Thinning / Pruning
Thinning / Pruning / Rock Picking / Smoothing
0 0.25 0.5 1 Kilometers
Kama
3e
3f
3d
3a
2c
2b
International Arboretum
3b
2a
2d
1a
Stromlo Forest Park
1c
1d

Preferred Alternative

Alternative 2 is the preferred alternative in the short to medium term (Table 8) because the use of habitat restoration, which is heavily relied on under alternative 1, is an experimental and to date unproven fuel management treatment while prescribed burning, which is heavily relied on under alternative 3, is highly weather dependent with often the required weather conditions not occurring. For this reason, Alternative 2 is considered the most reliable/certain alternative for protecting houses, people and other assets in the Molonglo area from fire while also meeting the commitments made by the ACT Government in the MNES Plan.

In the longer term it is recommended that Alternative 1 be implemented if habitat restoration does prove to be an effective and reliable fuel management treatment (Table 8). The short – medium term implementation of alternative 2 will not prevent, inhibit or reduce the reliability of alternative 1 if it is subsequently implemented.

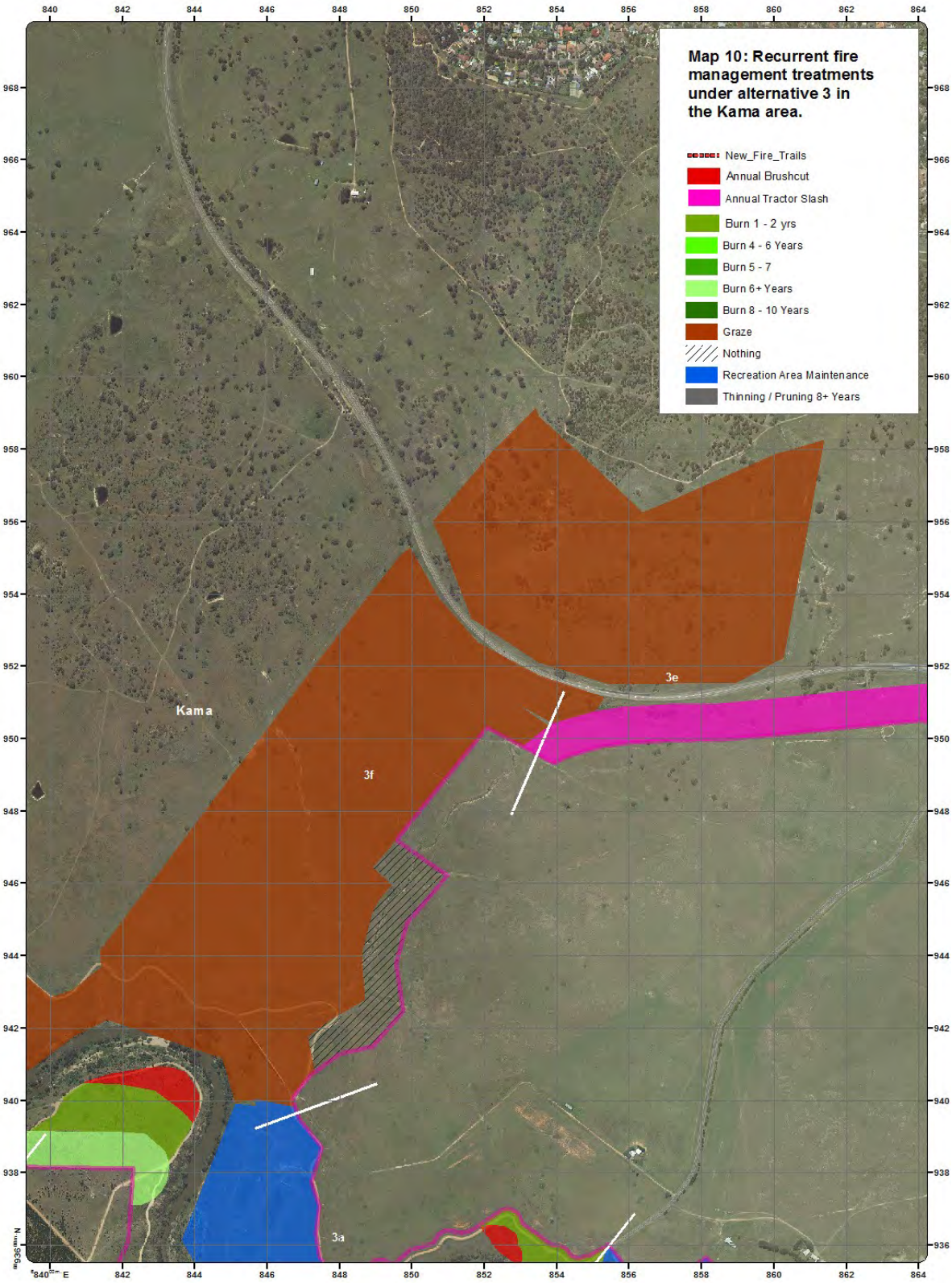
Table 8. The recommended alternative in the short – medium term and the longer term and the financial impact of moving between alternatives.

	Short – Medium Term	**Longer Term**
Recommended Alternative	Alternative 2	Alternative 1
Condition	-	habitat restoration proves to be an effective and reliable fuel management treatment
Recurrent Financial Impact	$597 900	-$ 249 700
Capital (once – off) Financial Impact	$3 426 000	+$829 500

Outstanding Issues

Kama

It has been agreed that the edge of the development be pulled back in the Kama area sufficient to allow the IAPZ and OAPZ to be located outside Kama Nature Reserve. Given a 30m wide IAPZ and 100m wide OAPZ that is, the edge of the development be located 130m from the boundary with Kama Nature Reserve. This fire management strategy proposes a 100m wide SFFAZ in this location and it is proposed that this also be located outside the boundaries of Kama Nature Reserve because the possible treatments to meet SFFAZ fuel standards are generally incompatible with the high quality woodland in the reserve. Thus, this fire management strategy proposes that the edge of the development be located approximately 130m + 100m = 230m from the edge of Kama Nature Reserve (Map 10).


Map 10: Recurrent fire management treatments under alternative 3 in the Kama area.
New_Fire_Trails
Annual Brushcut
Annual Tractor Slash
Burn 1 - 2 yrs
Burn 4 - 6 Years
Burn 5 - 7
Burn 6+ Years
Burn 8 - 10 Years
Graze
Nothing
Recreation Area Maintenance
Thinning / Pruning 8+ Years
Kama
3e
3f
3a
840
842
844
846
848
850
852
854
856
858
860
862
864
968
966
964
962
960
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950
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940
938
936
E
N

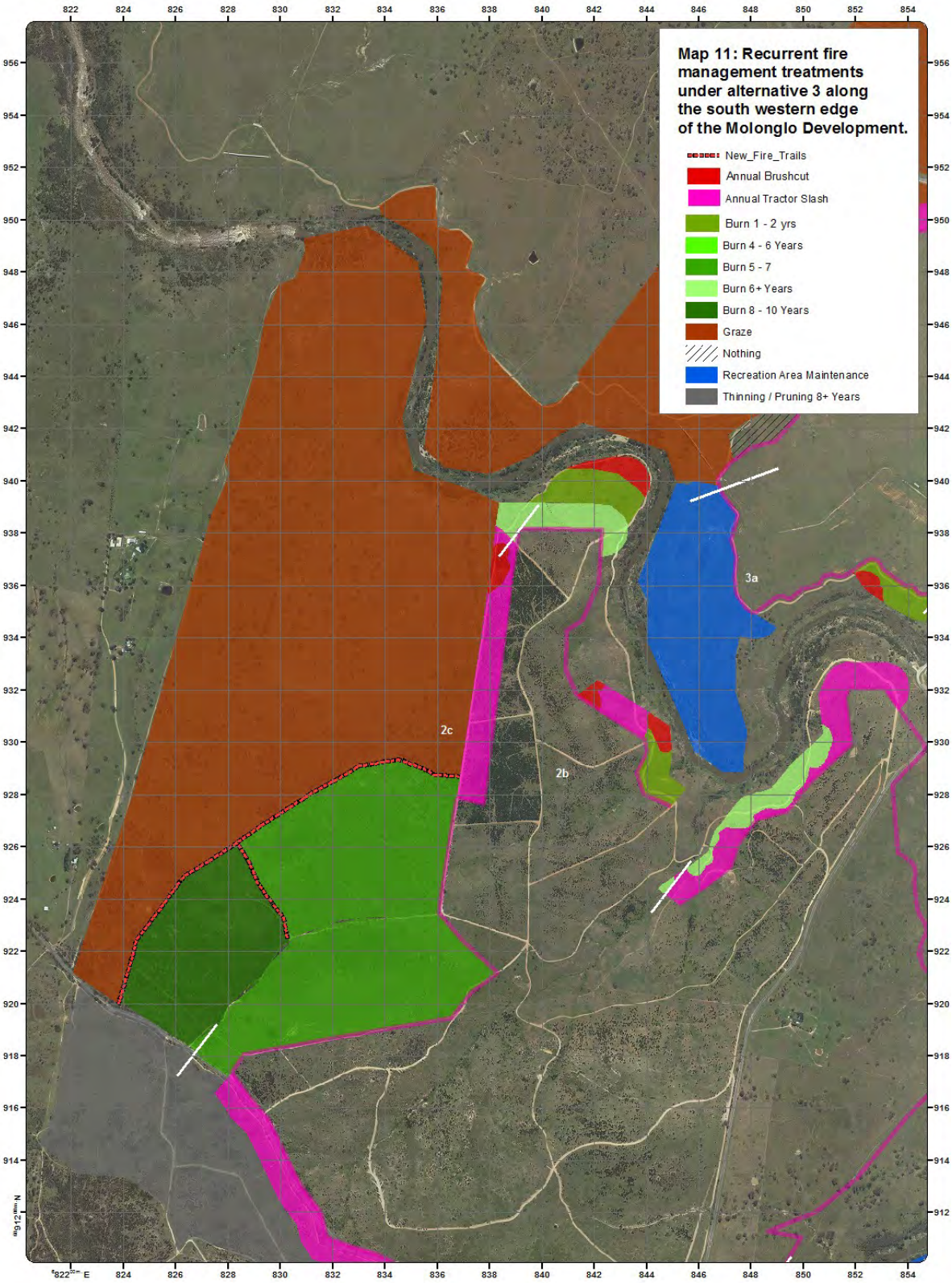
The South Western Edge

The western edge of the development south of the Molonglo River (2c) is located immediately adjacent to an area of Red Stringybark Forest (Map 11). It is estimated, based on experience of this forest elsewhere in the ACT, that maintaining SBMP OAPZ fuel standards will require undertaking prescribed burning every 5-7 years and SFFAZ standards every 8 – 10 years. The maximum frequency at which burning may be undertaken in this community without causing a reduction in biodiversity is once every 10-12 years. Therefore, the treatment identified for achieving SBMP OAPZ and SFFAZ fuel standards in this area is likely to result in a reduction in biodiversity in the long term. This community is not threatened and there is no other obvious means of achieving SBMP OAPZ and SFFAZ standards in this area.

In addition, the proposed treatment for achieving SFFAZ standards west of this area is by grazing. The area proposed for grazing contains a large area of moderate and high quality PTWL habitat.

Development Approval

Many of the activities identified in this fire management strategy are likely to require development approval under ACT and/or Commonwealth legislation. Fire management strategies to protect a development are an intrinsic part of the development and hence any development approvals required for fire protection activities should be sought as part of the approval for the development. Failure to do so may result in fire management activities not being approved which may result in parts of the development not being protected from fire.


Map 11: Recurrent fire management treatments under alternative 3 along the south western edge of the Molonglo Development.
New_Fire_Trails
Annual Brushcut
Annual Tractor Slash
Burn 1 - 2 yrs
Burn 4 - 6 Years
Burn 5 - 7
Burn 6+ Years
Burn 8 - 10 Years
Graze
Nothing
Recreation Area Maintenance
Thinning / Pruning 8+ Years
2c
2b
3a
822
824
826
828
830
832
834
836
838
840
842
844
846
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Document History

Incorporating comments from :

1) Conservation Planning and Research (Trish Bootes and Julian Seddon)
2) TAMS Design and Development (Richard Milner)

Aloisi, Angelina

From: Richardson, Dave
Sent: Monday, 6 July 2015 3:21 PM
To: [redacted]@coleng.com.au
Subject: FW: Bushfire Risk Strategy - Molonglo 3, Denman Prospect and the Molonglo River Corridor - Working Draft - CONFIDENTIAL
Attachments: B132154 - A3 - Molonglo Stage 3; Denman Prospect & Molonglo River Corridor ACT - Bushfire Risk Assessment - LDA - 29.5.docx; P00971-Molonglo Valley Bushfire Plan V2-M3_BFMP.PDF

[redacted]

Decided to sent you the draft report again which has the Umwelt material for Kama incorporated in one of the appendices. It is just on 9mb so hope it gets through.

Regards

Dave

From: Richardson, Dave
Sent: Tuesday, 23 June 2015 12:06 PM
To: Matesic, Ivo; Gordon, Tom; Watts, Michaela
Cc: Santosuosso, Daniel; Browning, Kerry
Subject: FW: Bushfire Risk Strategy - Molonglo 3, Denman Prospect and the Molonglo River Corridor - Working Draft - CONFIDENTIAL

Ivo, Tom and Michaela,

Attached is a copy of the working draft of the Bushfire risk assessment covering M2, M3 and the river corridor together with a copy of the plans at the moment. As you can see below, there is the loose end of funding that I'm trying to finish off before the doc could be considered near complete. Please see my comment about air photo etc.

On the funding, we have engaged [redacted] to provide an assessment of capital cost plus recurrent cost for the implementation of the 60m IAPZ and the SFAZ's over the fence. He will be liaising with Adam Leavesley from the TaMS Fire Management Unit to complete the task. Steve is expecting to get a report to us within 3 weeks.

Had some conversation with Nick and Adam but still waiting on comments back (especially after the last PoM steering group meeting!). Will follow this up today.

Regards

Dave

From: Richardson, Dave
Sent: Monday, 1 June 2015 12:51 PM
To: Lhuede, Nick; Leavesley, Adam; 'Rob Armstrong'
Cc: Santosuosso, Daniel
Subject: Bushfire Risk Strategy - Molonglo 3, Denman Prospect and the Molonglo River Corridor - Working Draft - CONFIDENTIAL

Hi Nick, Adam and Rob,

As promised this morning Nick, attached is the latest working draft report that I'm now happy to send to you, Adam and Rob for comment. I do apologise for the delay in getting this to you all.

Also attached is the draft set of plans as a separate file (even though they are included in the report) so you have a better idea of the detail. Suggest printing them out at A3 for best results.

There are changes that I intend our GIS guys to make to the plans including correcting the legend and adding probably an air photo/cadastre overlay which will make it easier to understand and locate things.

Mentioned I had some work to do on the funding section adding in the 'capital' cost to set the mitigation measures up (expected to be an LDA cost) and TaMS recurrent cost. Both of these will be estimates only but will add some certainty on what is needed and overall costs largely for Treasury's benefit. I'm work with Adam and our guys on that this week and will forward that over as soon as its reasonable.

Happy to discuss any aspects with you.

I'll send a copy to Tom Gordon and Ivo's area in the LDA and Office of Coordinator-General in EDD (Michaela) at this stage. Will take on board comments and amend if necessary before sending to others including TaMS etc.

Please treat this material as **CONFIDENTIAL** until I'm convinced we have the content right.

Regards

Dave

Aloisi, Angelina

From: Richardson, Dave
Sent: Tuesday, 11 August 2015 4:07 PM
To: ABPP
Cc: Santosuosso, Daniel; Browning, Kerry
Subject: Molonglo Bushfire RIsk Strategy - New Final Draft
Attachments: B132154 - A3 - Molonglo Stage 3; Denman Prospect & Molonglo River Corridor ACT - Bushfire Risk Assessment - LDA - 29.5 DR Add.docx

Importance: High

Afternoon Graham,

Attached is hopefully my final edit of the doc. It is in track changes so you can see all the changes I've made. A number are only a word here and there but I have added new slabs of text in a couple of places.

I probably need to walk you through this. Tomorrow I have meetings between 10 and 11am as well as between 2 and 3pm. Feel free to call otherwise.

I'm waiting on Nick to get back to us about a cross section we sent him last week clarifying the measurement of the IAPZ. Haven't heard anything back yet.

We will finalise the overall plan for you as well as putting in some detail plans with air photos so all and sundry can find themselves on the ground!

Let's talk tomorrow.

Regards

Dave

BUSHFIRE RISK STRATEGY

MOLONGLO STAGE 3;

DENMAN PROSPECT &

THE MOLONGLO RIVER CORRIDOR

AUSTRALIAN CAPITAL TERRITORY

PREPARED FOR THE LAND DEVELOPMENT AGENCY

Australian Bushfire Protection Planners Pty Limited

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SOMERSBY 2250 NSW
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BUSHFIRE RISK STRATEGY

MOLONGLO STAGE 3;

DENMAN PROSPECT &

THE MOLONGLO RIVER CORRIDOR

AUSTRALIAN CAPITAL TERRITORY

PREPARED FOR THE LAND DEVELOPMENT AGENCY

Assessment Number	Document	Preparation Date	Issue Date	Directors Approval
B132154 – A3	Final Draft	15.5.2015	31.5.2015	*G.L.Swain*

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Analysis of Vegetation Structure & Fire Risk, West Denman Prospect – Umwelt April 2015 74

ATTACHMENT C
Plans in Detail and Cross sections

ATTACHMENT D
Setting up the western edge for fire mitigation
(Steve Coleman paper on costs)

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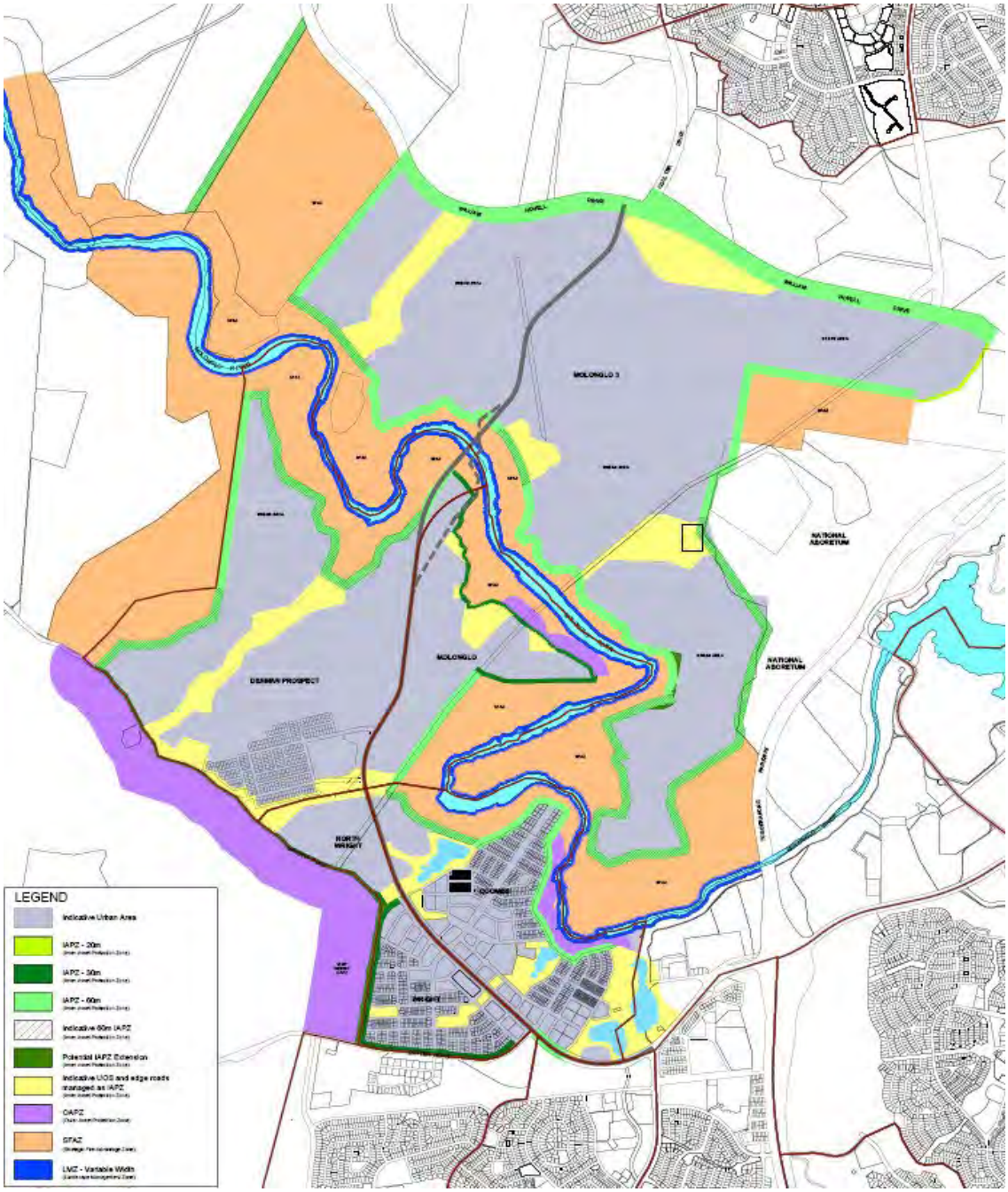
SECTION 1

INTRODUCTION

1.1 Background.

Australian Bushfire Protection Planners Pty Limited has been commissioned by the Land Development Agency [LDA] to undertake a Bushfire Study for Molonglo Stage 2, Stage 3 and the Molonglo River Corridor. Figure 1 shows the study area.

Figure 1 – Plan of Study Area. (Replace Plan?)



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The objective of the brief is to guide the development of the Land Development Agency Masterplan for the Molonglo Stage 3 study area, review the bushfire protection measures to Molonglo Stage 2 [Denman Prospect] and the Molonglo River Corridor and prepare a report on the findings of the study detailing the recommended bushfire protection measures identified by the study group.

Scope of Work – Molonglo Stage 2/3 and Molonglo River Corridor Study:

1. Review existing literature/reports & studies;

2. Review the study undertaken by Umwelt to determine the ecological constraints and opportunities for fuel hazard reduction management;

3. Attend pre-workshop site familiarisation;

4. Attend and participate in a workshop between LDA, Umwelt, TaMS Fire Management Unit and EPD to discuss all issues related to the protection of the north-western edge of Molonglo Stage 3; the western edge of Molonglo Stage 2 and the Molonglo River corridor;

5. Examine the results of the workshop, liaise with LDA & Umwelt and others [as required] to identify the measures which are required to be implemented to mitigate the potential bushfire risk;

6. Attend and participate in a follow-up workshop between LDA, Umwelt, TaMS Fire Management Unit, EPD, ESA, ACTRFS, Fire & Rescue ACT and other selected Stakeholders to present the findings/results of the initial workshop and the recommendations determined in the review of these findings/results;

7. Review the results of the follow-up workshop, liaise with LDA & Umwelt and others as required, to finalise the measures which are required to be implemented to mitigate the potential bushfire risk;

8. Prepare, in co-operation with Umwelt, a report which details the findings of the studies undertaken, the results of the workshops and the final recommendations on those measures required to be implemented to mitigate the bushfire risk to the western, north-eastern urban edge and the Molonglo River corridor;

9. Attend and participate in a final workshop between LDA, Umwelt, TaMS Fire Management Unit, EPD, ESA, ACTRFS, Fire & Rescue ACT and other selected Stakeholders to present the final report;

10. Generally, liaise with LDA, Umwelt, TaMS, ESA, ACTRFS, Fire & Rescue ACT and other ACT Government Departments as required.

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1.2 Information Reviewed.

The following report/studies were reviewed as part of the scope of works:

- The Molonglo River Park – Concept Plan prepared by Hassell – September 2011;
- The Molonglo Valley Plan for the Protection of Matters of National Environmental Significance [NES Plan] September 2011;
- Molonglo Vegetation Survey – Baseline Condition Assessment prepared by Ecological Australia – July 2013;
- Molonglo Stage 3 Slope Analysis – LDA;
- Bushfire Risk Assessment Report – Molonglo Structure Plan – prepared for ACTPLA, 19.7.2005;
- Updated Bushfire Risk Assessment Report – Molonglo Structure Plan – prepared for ACTPLA – 26.4.2006;
- Bushfire Risk Assessment Report – Molonglo Stage 2 Group Centre prepared for Indesco 23.8.2012;
- Territory Plan - ACTMAPi;
- Molonglo Stage 2 Vegetation Conservation Assessment prepared by Openlines, February 2014;
- Indicative Fire Management Strategy – Urban Area – TaMS – 2015;
- Indicative Fire Management Strategy – Molonglo Valley – TaMS – 2015;
- Analysis of Vegetation Structure and Fire Risk – Umwelt – April 2015;
- Molonglo River Reserve [Kama] Operational Plan 2014 – 2017 – TaMS;
- ACT Strategic Bushfire Management Plan – Version 3 – 2014;
- ACT Bushfire Management Standards – Strategic Bushfire Management Plan – Version 3 – 2014;
- Briefing Note on the Ecological Values of the Kama Nature Reserve – Molonglo Stage 3 Outer Asset Protection Zone – Umwelt – October 2013;
- Bushfire Risk Assessment for the north-western edge of Denman Prospect [Aurecon Australia Pty Ltd – 25.2.2014] - Incomplete.

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1.3 Review of Documents.

Appendix A provides a summary of the findings/recommendations of the following documents reviewed:

1. Bushfire Risk Assessment Reports prepared by Australian Bushfire Protection Planners Pty Ltd [ABPP] for the Molonglo Structure Plan [August 2005 & April 2006];

2. The Molonglo River Park Concept Plan;

3. The NES Plan;

4. The Draft Indicative Fire Management Strategy – Urban Area – TaMS – 2015; and

5. The Draft Indicative Fire Management Strategy – Molonglo Valley – TaMS – 2015.

1.4 Summary of the review of Reports.

The following is a summary of the findings/recommendations of the documents reviewed:

1. **Bushfire Risk Assessment Reports prepared by ABBP – 2005 & 2006:**

The Bushfire Risk Assessment Report 2005 prepared by ABPP stated:

"The long exposure of the north-western edge of the precinct to uphill burning fires, influenced by hot, dry, strong north-westerly winds, will result in significant fire impact either directly or indirectly from ember attack, depending on the level of protection provided by active management of the fuels within the river corridor.

Similar impacts may also occur to the western / south western edge from westerly and south-westerly wind-driven fires and the influence of wind turbulence in the Mount Stromlo area.

The northern edge will be impacted by fires burning within the habitat corridor, north of William Hovell Drive.

Due to the level of risk and to address the potential impacts of future bushfires to the exposed urban edge and the concerns over the long-term viability of minimising fuel loads within the abatement zone, a Critical Management Zone should be provided to a minimum width of 300 metres.

The objective of land uses within the Critical Management Zone should be to provide permanent management of the hazardous fuels to levels which prevent the spread of fire into the urban edge.

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The Molonglo River Corridor will separate the eastern development node from the western development node and therefore provide a direct fire path into the suburbs adjoining the corridor and to the International Arboretum to the south east.

The river corridor separating the north-eastern and south-western nodes of the East Precinct should be activity managed as a recreation reserve/public park to mitigate the effects of fire runs along the river".

The Bushfire Risk Assessment Report 2006 prepared by ABPP retained the recommendation for the provision of a Critical Management Zone to the north-western edge of Molonglo and notes that the Draft Structure Plan had introduced 'Lake Molonglo' with the construction of a new dam on the Molonglo River.

For the Critical Management Zone [CMZ] the report states:

- ***Purpose.***

To provide a permanently managed fuel reduced zone, wide enough to mitigate the impact of radiant heat and ember transfer to the urban edge during major bushfire events.

- ***Location.***

The Critical Management Zone shall be located beyond the edge of the Inner Asset Protection Zone on the north-western and northern edge of the western "node" and the south-western edge of the East Molonglo precinct; the northern, north-western, western and south-western edge of the Central Molonglo.

- ***Depth.***

A minimum width of 300 metres shall be provided. (Minimum 100 metres width provided to the north-western edge of the East Molonglo precinct).

- ***Establishment & Maintenance.***

The Critical Management Zone shall be established on the hazard side of the Inner Asset Protection Zone and shall extend to the widths nominated.

The zone may contain agricultural pursuits which permanently minimise combustible fuel ground litter, (vineyards, orchards); or land uses that utilize irrigation supply drawn from grey water recycling, or irrigation from the new lake created by the damming of the Molonglo River. Such land uses may include the cultivation of summer crops/Lucerne.

The Critical Management Zone may also include recreation and open space facilities such as Golf Courses, Sports Fields, Carparks etc.

Where these land uses are not utilized to provide the Critical Management Zone and the zone consists of Habitat Corridors/Rural Land, a stock proof fence with access gates shall be provided on the outer edge of the zone. A 30 metre wide wind break shall be established by planting smooth barked trees on the outer edge of the zone. A second wind break shall be established to a width of 10 metres, 10 metres from the Inner Asset Protection Zone/Critical Management Zone boundary.

A four (4) metre wide fire trail shall be established on the centre line of the Critical Management Zone, with link roads provided to the edge road at approximately 500 metre intervals.

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Management of the combustible fuels within the CMZ shall be undertaken to maintain a Low – Moderate Overall Fuel Hazard, in accordance with the methodology provided by the NRE Overall Fuel Hazard Guide. Management shall be implemented by regular stocking of the zone, or by a combination of mechanical slashing/stocking/hazard reduction burning. A Fuel Management Plan shall be prepared for the maintenance of the Critical Management Zone, irrespective of land use".

The final Structure Plan for Molonglo removed the damming of the Molonglo River, primarily due to the results of ecological studies, and replaced the lake with the Molonglo River Park [Nature Reserve] and established the Kama Nature Reserve to the northwest of Molonglo Stage 3.

These changes to the Draft Structure Plan – i.e. establishment of a Nature Reserve to the northwest of Molonglo Stage 3 and within the Molonglo River corridor, increase the bushfire risk to future development located adjacent to the north-western edge and to both sides of the river corridor.

The examination of the mitigation measures required to provide a reduction of this risk forms the core objective of the Working Group established by the Land Development Agency.

2. Molonglo River Park Concept Plan – Hassell – 2011

The Molonglo River Park Concept Plan prepared by Hassell supports the recommendation of the provision of the 300 metre wide 'Critical Management Zone' to the north-western edge.

The Concept Plan also recommended that the river corridor should be managed for ecological values with the corridor being broken into precincts to prevent the 'wick' effect and in particular the management of the western entrance to the river park and the area around the sludge ponds to mitigate the passage of fire along the river.

It calls for strategic discontinuity zones within the riparian corridor which aim to reduce the ability of a fire to move continuously up the corridor and into the urban areas, and provide access for defence and fuel management. One of those areas would be located around and to the west of Coppins Crossing, from the proposed sewer line crossing to the proposed John Gorton Drive crossing the river. Another one would be a Misery Point.

The Hassell report goes on to describe the vegetation in the recreation areas would contain large areas of groomed grassland maintained to a height of less than 100mm with scattered tree planting as well as formal parks and gardens with irrigated plantings.

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3. The NES Plan – 2011:

The NES Plan provided, under Section 2.3 – Bushfire Management Framework a 'motherhood' statement about bushfire management which reads:
"Within the strategic assessment area fire management will be aimed at protection of both built assets and MNES values. This will be achieved through the identification of appropriate asset protection zones and application of hazard reduction techniques that will both:

- *Ensure that the standards for fuel loads in the SBMP are met; and*

Protect MNES values through the use of sympathetic management techniques".

*The aim of this document does not address the recommendation that the vegetation i*n the river corridor or on the land to the west of Molonglo 3 [Kama] and Denman Prospect be managed to mitigate the impact of fire on the north-western edge of the future urban development and from a fire spreading along the river corridor.

The document does not address the potential bushfire risk to the future development adjacent to the north-western edge or the river corridor.

4. Indicative Fire Management Strategy – TaMS 2015:

TaMS have prepared a draft Indicative Fire Management Strategy – Urban Area and the Indicative Fire Management Strategy – Molonglo Valley. The review of these documents has found that few of the recommended bushfire management strategies contained within the Molonglo River Concept Plan have been incorporated into the management strategies proposed by TaMS.

The recommendation provided in the Australian Bushfire Protection Planners reports and the Molonglo River Concept Plan that a 'Critical Management Zone [CMZ] be provided to the northwest of the urban development [and river park] was not adopted in favour of ecological and habitat values.

Similarly, the Molonglo River Concept Plans' recommendation that the river corridor be broken into precincts to prevent the 'wick' effect and in particular the management of the western entrance to the river park and the area around the sludge ponds to mitigate the passage of fire along the river was not adopted.

These items are critical to the prevention of fire spread along the river corridor and should be reinstated or at least given proper consideration.

1.5 Working Group.

In late 2013 the LDA identified the need to establish a working group to examine

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the outstanding issues relating to the bushfire risk to the north-western edge of Molonglo 3; Molonglo Stage 2 [Denman Prospect] and the Molonglo River Corridor.

The brief of the Working Group was to bring together all Government Agencies involved in the development of the Molonglo East precinct to enable examination of previous studies, undertake site inspections and consider all options available so as to develop a report that establishes the principles, processes and funding required to address the bushfire risk.

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Representatives of Government Agencies included:

- Dave Richardson [LDA];
- Kerry Browning [LDA];
- Adam Carmody [LDA];
- Dylan Kendall [TaMS];
- Adam Leavesley [TaMS];
- Nick Lhuede [ESA];
- Greg Potts [ACT RFS];
- Conrad Barr [Acting Chief Officer] ACT Fire & Rescue;
- Andrew Starke – Commissioner ACT Rural Fire Service;
- Ros Ransome [TaMS];
- Steven Gianakis [EPD];
- Daniel Iglesias [TaMS];
- Tony Corrigan [TaMS]; and
- Stuart McKenzie [EPD]

Two external companies were commissioned to provide assistance to the Working Group, Umwelt to undertake a peer review of the previous ecological studies and additional ecological investigations and ABBP to provide advice on bushfire risk, fire protection strategies and the preparation of a Bushfire Report.

These companies were represented by;

- Peter Cowper Armstrong [Umwelt];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

Appendix B provides details on the Working Group, including meeting and site inspection dates, attendees and decisions/resolutions determined.

1.6 Studies Undertaken by Umwelt.

Stemming from the second meeting of the Working Group the LDA commissioned Umwelt to undertake a study into the ecological values of the Kama Nature Reserve – Molonglo Stage 3 Outer Asset Protection Zone.

A copy of the Briefing Note prepared by Umwelt [15th October 2013] is attached as Attachment A.

The purpose of the study was to provide LDA with a comparison of the ecological values of the 200 metre zone either side of the interface between Kama Nature Reserve and the Molonglo Stage 3 development.

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The findings of the study identified that the condition of the 200 metre wide area inside the eastern boundary of Kama Nature Reserve is variable, comprised of a mosaic of high condition box-gum woodland, low condition natural temperate grassland and low condition Scribbly Gum woodland.

The ecological condition of the 300 metre wide area of the western boundary of Molonglo Stage 3 [adjoining Kama Nature Reserve] is generally low, consisting of degraded exotic pasture, and an area containing scattered Blakely's red gum with an exotic understorey and is not the Box-gum Woodland community.

The report confirms that the area is dominated by exotic pasture grasses and the only feature of ecological significance is the presence of five potential pink-tailed worm lizard habitat areas. One of these [location PTWL1] is within a patch of diverse native grasses, whereas the others are of moderate to low value due to a higher abundance of Phalaris and wild oats. These areas are mapped as moderate habitat quality by Osborne & Wong [2010].

Refer to Figure 2 on Page 13 – Ecological Assets of the Outer Asset Protection Zone including potential Pink-tailed Worm Lizard habitat.

Figure 3 on Page 14 provides a copy of the project area studied by Umwelt, the location of the Outer Asset Protection Zone within the urban boundary of Denman Prospect; the Strategic Fire Advantage Zones and the 'Interface Zone' to the west of Denman Prospect.

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Figure 2 - Ecological Assets of the Outer Asset Protection Zone including potential Pink-tailed Worm Lizard habitat – Umwelt Briefing Note 15th October 2013 – Kama and Molonglo 3.

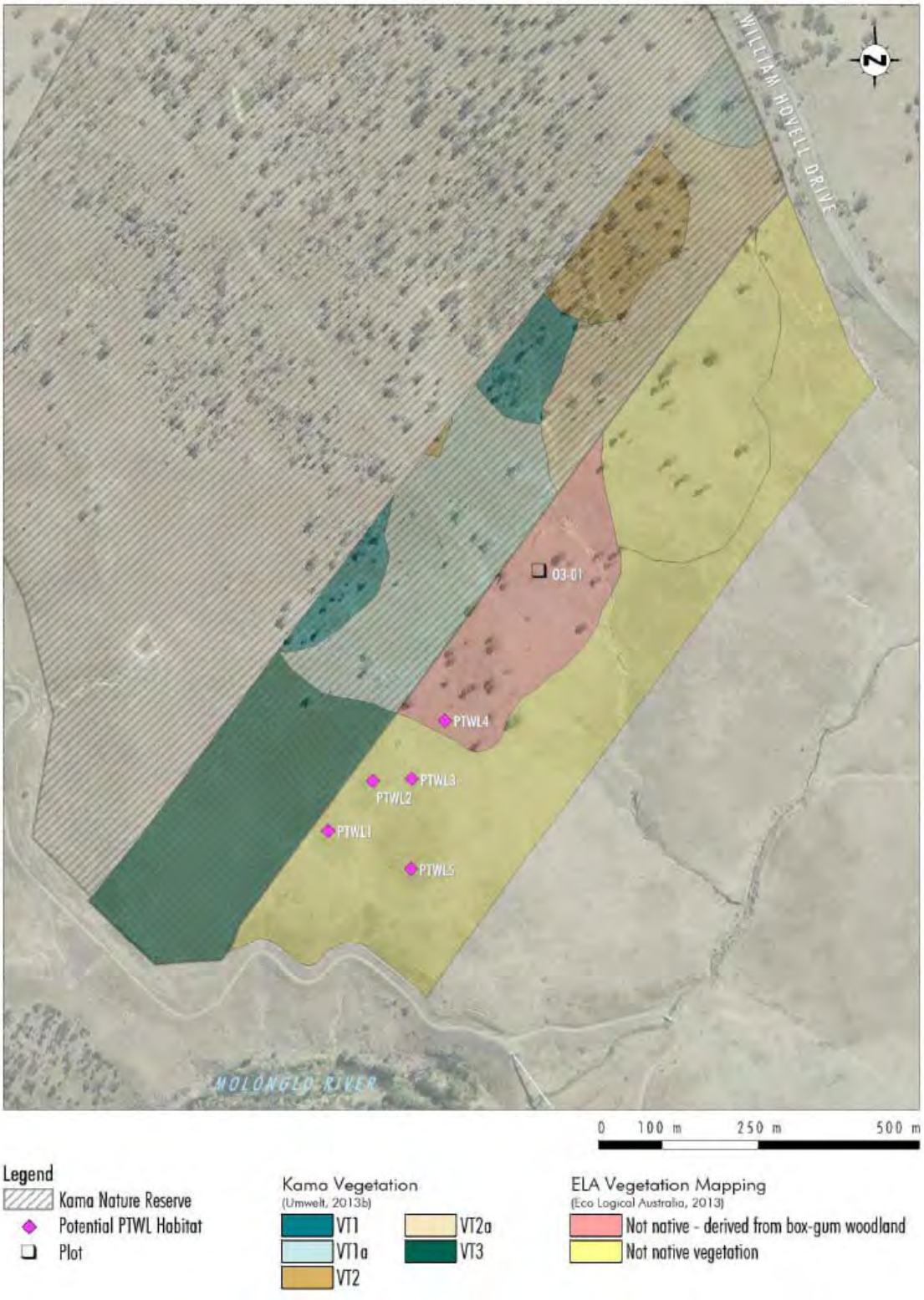

Figure 3.1 - Ecological assets of the outer asset protection zone including potential pink-tailed worm lizard habitat.

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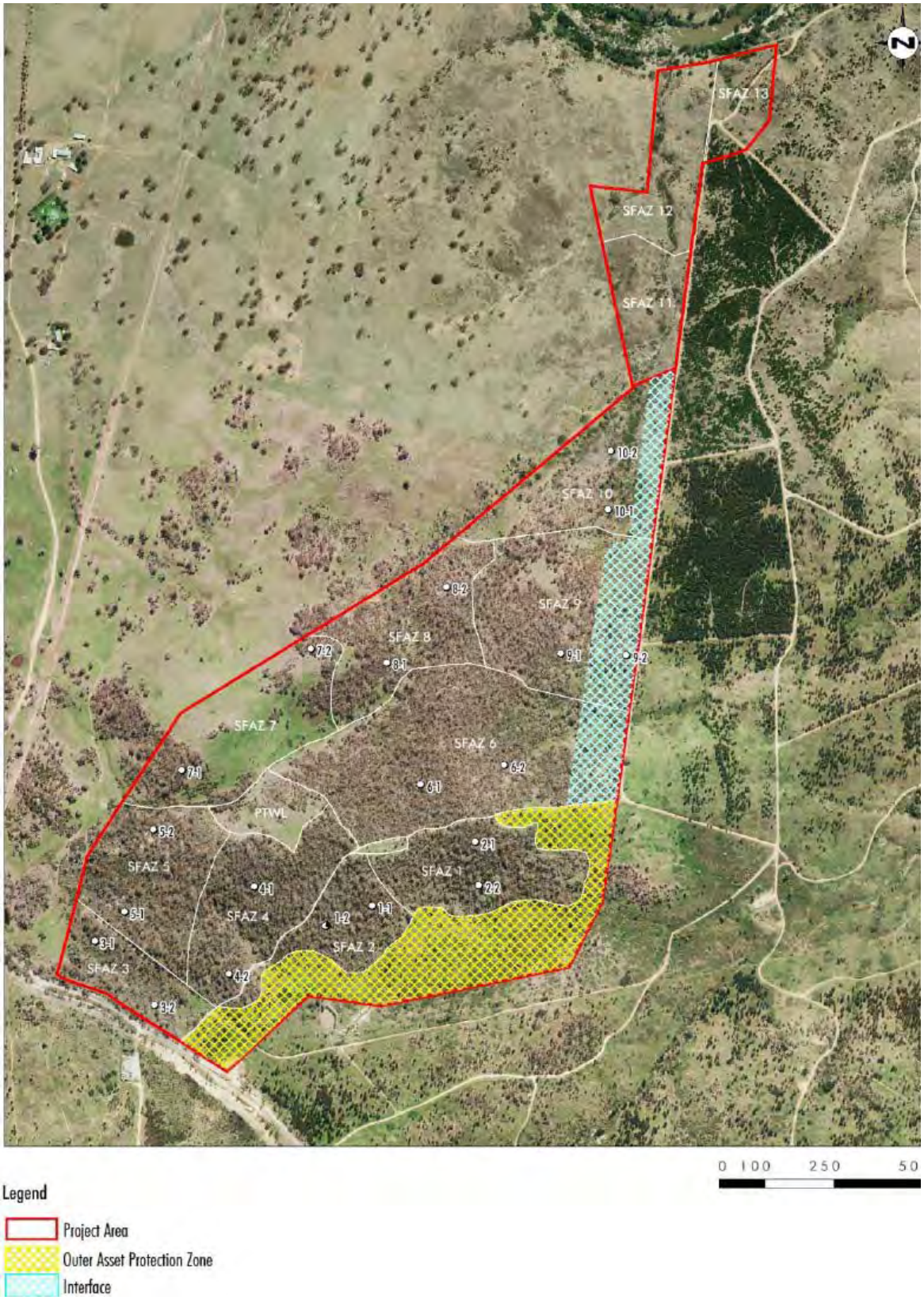
Figure 3 – Plan showing the study area, the location of the Outer Asset Protection Zone; Strategic Fire Advantage Zones and Interface Zone – Denman Prospect, prepared by Umwelt April 2015



SFAZ – Add to Figure.

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The LDA commissioned Umwelt to undertake an analysis of vegetation values in areas west of Denman Prospect and identify practical solutions to meet joint objectives of fuel hazard management and biodiversity conservation.

A copy of the final report dated April 2015 is attached as Attachment B.

The key messages of the report include:

1. Much of the vegetation within the Project Area is in a regenerating thicket state from the 2003 wildfires;

2. Vegetation in a regenerating thicket state will benefit from active management to promote restoration of the remnant to a state which accelerates the provision of structural diversity important for both fauna and flora diversity. This is demonstrated through discussion of the state and transition model concept;

3. Active management of regenerating thicket vegetation will provide greater opportunity for fire management and suppression, reducing the likelihood of a major fire event compromising biodiversity values in the future;

4. Research outlined in the report suggests that reducing the density of smaller stems that compete strongly for resources leads to greater structural and floristic diversity and subsequent greater conservation values. The use of hazard reduction burning as a tool to achieve this is unlikely to reduce understory vegetation diversity provided burn intervals are set at the lower limits by maturity of smaller plants and non-breeding periods of poorly dispersed or rare birds, and at the upper limits by the longevity of plants which usually required fire as part of the reproductive cycle;

5. Hazard reduction burns in Red Stringybark Dry Sclerophyll Forest within the project area should be initially undertaken in a mosaic every five to ten years. For Box-Gum Woodland burns should not occur in periods of less than 10 years and longer should fuel levels remain naturally low or other fuel management techniques be used.

   Practical implementation of this measure should be done in consultation with ACT Government Conservation Planning and Research officers to determine the most appropriate interval between burns, particularly to each Strategic Fire Advantage Zone [SFAZ];

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6. Management should be undertaken with adaptive management principles in mind. This will ensure an iterative process of robust decision making in the face of uncertainty, with uncertainty reduced over time as determined by monitoring;

7. Hazard reduction burning should be avoided in areas of known Pink-tailed Worm Lizard habitat; if hazard reduction burning occurs this should happen between late winter and mid spring [preferably in August to September].

Section 6 – 'Conclusion' of the Umwelt report provides recommendations for the management of the Strategic Fire Advantage Zones, including by hazard reduction burning; Silvicultural Thinning; combined approach and the management of areas known to contain Pink-tailed Worm Lizards.

Section 6 also provided recommendations on the management of the Outer Asset Protection Zone, including hazard reduction burning and Silviculture within the 'Box-Gum Woodland' along the eastern boundary.

Section 6.3 covers the management of the 'Urban Interface' along the eastern edge of the project area [to the western edge of Denman Prospect]. This zone consists of a 100 metre wide corridor adjacent to the urban interface and is considered to be a primary fire threat to the proposed Denman Prospect development. It also contains natural assets including 'Box-Gum Woodland' in an advanced regeneration state. This vegetation is likely to regenerate into an open forest structure without management.

The report states:

"In order to protect important values within the 'Box-Gum Woodland' area and to mitigate bushfire risk to the adjacent urban development, it is recommended to use silviculture thinning to accelerate an open woodland structure as a primary management tool in this area. This treatment is only required for SFAZ6 and SFAZ 7.

Ongoing management of grassy sward fuel may be required in the event of grassland fire hazard exceeds 35 when grass curing is > 70% [refer to Table 21.5 and Table 21.8 in the ACT Strategic Fire Management Plan – 2014 – Version 3'.

Refer to Figure 4 – Maximum 'Overall Fuel Hazard Assessment' ratings for each SFAZ on Page 17.

Refer to Figure 5 – Distribution of Box-Gum Woodland within the Project Area on Page 18.

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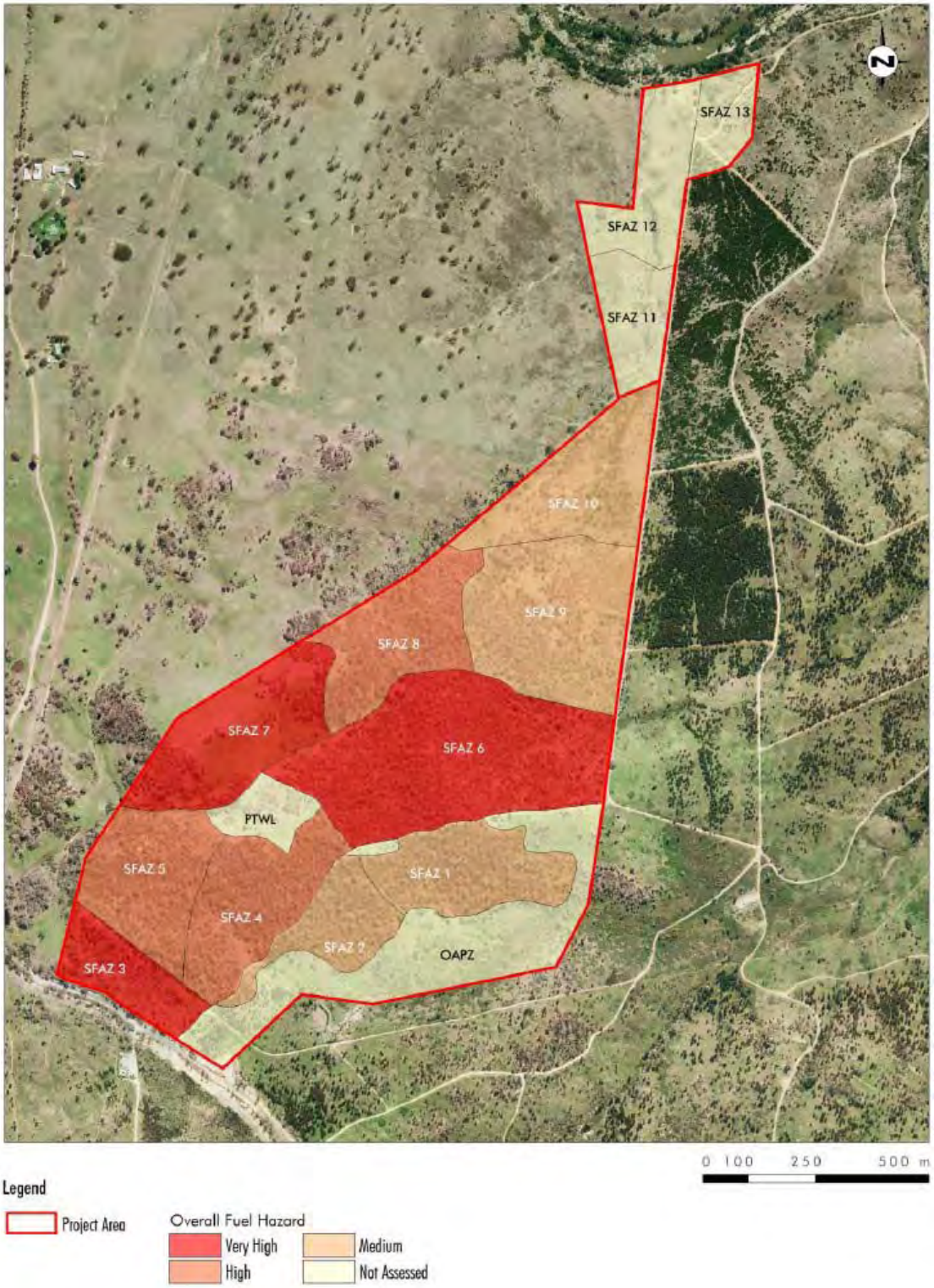
Figure 4 – Denman Prospect maximum 'Overall Fuel Hazard Assessment' ratings for each Strategic Fire Advantage Zone – Umwelt April 2015



Note: due to subjectivity in the assessment method, areas with a 'Medium' hazard may in fact be 'High', or tending to 'High' i the near future as stringybark bark matures, stem charring is reduced and leaf litter accumulates.

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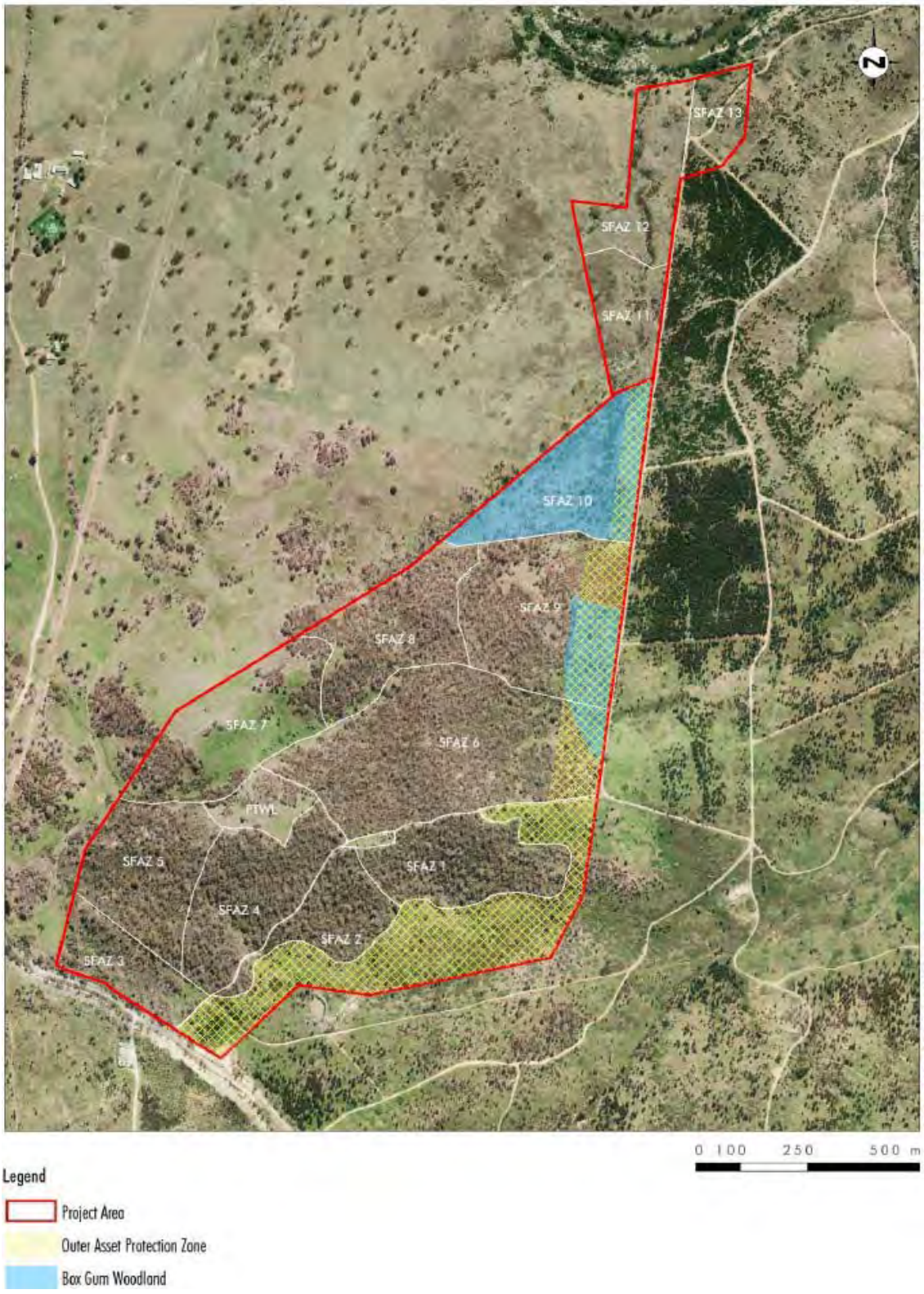
Figure 5 – Denman Prospect distribution of Box-Gum Woodland within the Project Area – Umwelt April 2015



Confusing as it shows OAPZ over SFAZ along western edge. This could be the "interface area" and is a "special" SFAZ requirement.

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SECTION 2

BUSHFIRE RISK ASSESSMENT

2.1 Introduction.

The Australian Standard AS/NZS ISO 31000:2009, the ACT Government Enterprise-wide risk management framework and the Emergency Management Australia (EMA) emergency risk management process provide the framework for establishing the context, analysis, evaluation, treatment, monitoring and communication of risk.

Risk has two elements: Likelihood, the chances of a bushfire occurring and consequence, the impact of a bushfire when it occurs.

Bushfire risk is defined as the chance of a bushfire occurring that will have harmful consequences to human communities and the environment. Bushfire risk is usually assessed through consideration of the likelihood of ignition and consequences of a bushfire occurring. Risk reduction can be achieved by reducing the likelihood of a bushfire, the opportunity for a bushfire to spread or the consequence of a bushfire (on natural and built assets).

Bushfire management should have a clear objective to reduce both the likelihood of bushfires and reduce the negative impacts of bushfires. It should also consider the costs, inconvenience and dangers of measures taken to reduce the risk of bushfires.

The consequences of bushfire management activities and the failure to implement programs also need to be considered. A range of factors influence bushfire risk – these include:

- The likelihood of human and natural fire ignitions, as influenced by time, space and demographics;
- The potential spread and severity of a bushfire, as determined by fuel, topography and weather conditions;
- The proximity of assets vulnerable to bushfire fuels, and likely bushfire paths; and
- The vulnerability of assets including natural assets, or their capacity to cope with, and recover from bushfire.

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An assessment of bushfire risk must firstly define the problem. This involves the identification of the nature and scope of issues to be addressed and defining the possible boundaries for the assessment *(Emergency Risk Management – Applications Guide. (EMA Echo Press, 2000), and AS/NZS* ISO 31000:2009*).*

For the purpose of analysing fire risks that might emerge in the ACT, a dangerous and damaging fire has the potential to occur when the following conditions prevail:

- Continuous available fuel – fuel at moisture content sufficiently low to enable rapid combustion, arising from drought effects or the maturing and drying, of grasslands;

- Exposure of vulnerable assets. The 'catchment' for such fires may be within several hundred metres or many (60-70) kilometres from the asset/s;

- A combination of weather conditions that generate a forest or grass fire danger index of Very High (24) or greater. Typically in the ACT, prevailing adverse fire weather will have a strong northerly, through south-westerly wind influence;

- Fire in the landscape not effectively suppressed.

2.2 Risk Assessment.

Australian Bushfire Protection Planners Pty Limited prepared a Bushfire Risk Assessment Report in 2005 for the Molonglo Structure Plan.

The findings of this report, in respect to the bushfire risk, fire paths and potential fire scenarios are applicable for the Molonglo Stage 3, Denman Prospect and the Molonglo River Corridor – refer to Attachment A.

An extract from this report states under 'Summary of Bushfire Risk':

"Major bushfires have occurred in the Molonglo Valley in 1926, 1939, 1952, 1991, 1994, 2001 and 2003.

The topography and landform of the valley predisposes the valley to impacts of fires burning under north-westerly and westerly wind influences and to a slightly lesser extent, south-westerly wind influences.

The slope of the valley to the north-west and the ridgelines/ gullies will influence the spread of fire from the northwest, west and south west and result in sporadic fire runs.

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Fuel loads within the retained Habitat Corridors and Parklands, Nature Reserves and Lease Holdings, unless managed, will promulgate future bushfires up to the urban edge and into the vegetated corridors within the urban precinct.

Whilst the Overall Fuel Hazard for the vegetation within the valley is Very High there is, due to the fire history, topography, aspect, wind influence and climatic conditions within the valley, an extreme risk of damaging bushfires impacting the north western edge of the East Precinct [Molonglo Stage 3 and Denman Prospect].

The 'Conclusion' of the 2005 Bushfire Risk Assessment Report stated:

"The orientation of the Molonglo Valley and the ability for northwest, west and south-west wind-driven fires to impact the proposed development edge will continue the extreme level of risk to any development proposed in the valley with the potential to cause major damage to buildings and infrastructure.

Subsequent to the preparation of the original Bushfire Risk Assessment Report [19.7.2005] an updated report was prepared by ABPP, dated 26.4.2006. The Executive Summary of this report stated:

The Molonglo Stage 2 Bushfire Risk Assessment quantifies the current level of risk to future development within the Molonglo Valley, prior to the implementation of mitigation measures as ***Extreme.***

Mitigation measures which have been identified within the report as necessary to reduce the level of potential risk to future development include the creation and permanent management of a Critical Management Zone to the north-western edge of the East Molonglo Precinct and to the western and south-western edge of the Central Molonglo Precinct.

The provision of the Critical Management Zone (CMZ) replaces the Outer Asset Protection Zone, as defined in the Strategic Bushfire Management Plan for the ACT and the management of this zone, in accordance with the performance standards defined in this report, are considered to be a mandatory requirement in the reduction of the bushfire risk to the future development within the Molonglo Valley.

In addition to the provision of a Critical Management Zone to the north-western edge of East Molonglo Precinct, this report recommends, due to the risk of fire over-run along the Molonglo River corridor and into the future suburb, the damming of the Molonglo River below Coppins Crossing and the creation of Lake Molonglo".

This recommendation was not adopted in the final Molonglo Structure Plan.

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SECTION 3
PROTECTION MEASURES TO BE IMPLEMENTED TO REDUCE THE BUSHFIRE RISK TO THE NORTH-WESTERN EDGE OF MOLONGLO STAGE 3 & DENMAN PROSPECT AND THE MOLONGLO RIVER CORRIDOR.

3.1 Introduction.

The primary purpose of the LDA established Working Group was to establish solutions to the problem of providing bushfire protection measures to the north-western edge of Molonglo Stage 3 and Denman Prospect and to the Molonglo River Corridor which would not only mitigate the bushfire risk but also be acceptable to ACT Government Agencies.

The solutions also had to be achievable, ecologically and economically sustainable and able to be funded in the long term – in perpetuity.

Consideration was also given to the 'alternate solutions' provided by the updated ACT Strategic Bushfire Management Plan – Version 3, particularly in respect to the ability to increase the width of the Inner Asset Protection Zone so as to remove to need to provide and manage an Outer Asset Protection Zone on ecologically sensitive land.

Having considered the total removal of the Outer Asset Protection Zone and the potential for catastrophic bushfire events to impact the north-western edge of Molonglo Stage 3 and Denman Prospect and development adjacent to the Molonglo River corridor, the Working Group has adopted a policy of implementing a bushfire protection zone to future development. This contains an Inner Asset Protection Zone supported on the outside by a Strategic Fire Advantage Zone [SFAZ] – within Kama to the northwest of Molonglo Stage 3 as well as within the land to the northwest and west of Denman Prospect and broadly within the Molonglo River Park.

The study undertaken by Umwelt, in concert with TaMS Fire Management Unit (FMU) has formed the basis upon which the decision has been taken to implement the establishment of a SFAZ within Kama Nature Reserve. It is noted that consensus has been reached that the performance criteria of a SFAZ, as required by the ACT Strategic Bushfire Management Plan – 2014 – Version 3 can be achieved whilst maintaining the ecological biodiversity of the reserve.

Similarly, the study undertaken by Umwelt, in concert with TaMS FMU has formed the basis upon which the decision has been taken to implement the establishment of a SFAZ on the land to the northwest and west of Denman Prospect – refer to Attachment B – Analysis of Vegetation Structure and Fire Risk.

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Discussions with TaMS FMU and the need to manage the vegetation within the Molonglo River corridor to mitigate the spread of fire have also formed the basis upon which the establishment of the SFAZ has been recommended within the Molonglo River Park.

This report also recommends the inclusion of the community facility located at the former Sludge Ponds and the western end of the River Park as detailed in the Molonglo River Park Concept Plan prepared by Hassell.

For completeness, this report also provides recommendations on the bushfire protection zones to the northern and eastern edge of Molonglo Stage 3.

The ESA and TaMS measure the IAPZ width from the back of kerb on the block side to the IAPZ/SFAZ interface where an edge road is provided. The LDA on the other hand measures the width to the block boundary which is easy to define on the ground whereas roads and road verges can be of variable widths and variable distances from the block boundaries.

Note that TaMS does not consider the road verge on the block side of an edge road in the IAPZ to be part of their management responsibility. Note however, that lessees are not responsible for the management of road verges as they are unleased Territory land. Hence, for example, a 60m IAPZ from the ACT Bushfire Management Standards would result in an distance of 67 to 70m to the block boundary.

However, the LDA through discussion in the Working Group have support from the ESA for consideration of a 50m IAPZ (measured from back of kerb where an edge road will be provided). So, a 50m IAPZ would result in a total width of 60m to the block boundary.

Where no edge road will be provided, there is a possibility that the width of the IAPZ will be unaltered at 50m and this corresponds to the block boundary with those blocks are serviced from the side or rear.

The reference to an IAPZ width of 60m in the remaining parts of this document is the ESA suggested 50m plus 7.5 to 10m of verge to the block boundary.

Plans outlining the urban edge outcome are at Appendix C. A smaller scale version of each plan is inserted in the appropriate location in the Working Group discussion of the recommendations set out below. Note that they contain an airphoto image including contours and the agreed position of the urban edge boundary.

The following section details the Working Groups' recommendations.

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3.2. North-western edge to Molonglo Stage 3:

1) There shall be established and maintained a minimum 60.0 metre wide Inner Asset Protection Zone to the north-western edge of the urban development, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. This zone shall contain an edge road and also a gravel fire trail located adjacent to the eastern boundary of Kama and shall include stormwater treatment ponds, cycleway/pedestrian access and electrical power lines, as required.

2) There shall be established and maintained, over the whole of Kama Nature Reserve, a Strategic Fire Advantage Zone, cyclically managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3;

3) There shall be established and maintained a six [6] metre wide fire break located inside the eastern boundary of Kama Nature Reserve;

4) The existing access/fire trails within Kama Nature Reserve shall be upgraded and maintained to provide access for management works and fire-fighting operations.

Refer to Figure 6 – Fire Protection Strategies – North-western edge to Molonglo Stage 3 on Page 24.

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Figure 6 – Fire Protection Strategies – North-western edge of Molonglo Stage 3 (Legend – grey – Indicative residential block boundaries)

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3.3 North-western/Western edge to Denman Prospect:

1) There shall be established and maintained a minimum 60.0 metre wide Inner Asset Protection Zone to the north-western and western edge of the urban development within Denman Prospect, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. This zone shall include an edge road and where provided, stormwater treatment ponds and shall also include cycleway/ pedestrian access as required – refer to Denman Prospect Figure 7 on Page 25.

2) There shall be established and maintained, to the location as shown on the Denman Prospect Figure 7 on Page 25, an Outer Asset Protection Zone of varying widths, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3;

3) There shall be established and maintained, to the area as shown on Denman Prospect Figure 7 on Page 25, a series of Strategic Fire Advantage Zones, cyclically managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3 and in accordance with the recommendations contained in the *Analysis of Vegetation Structure and Fire Risk* report prepared by Umwelt - 2015;

4) There shall be established a series of Fire Trails, generally as located as shown on Figure 5 on Page 18 – also refer to the *Analysis of Vegetation Structure and Fire Risk* report prepared by Umwelt - 2015. These trails shall be maintained to provide access for management works and fire-fighting operations.

Refer to Figure 7 – Fire Protection Strategies – North-western/Western edge to Denman Prospect on Page 26.

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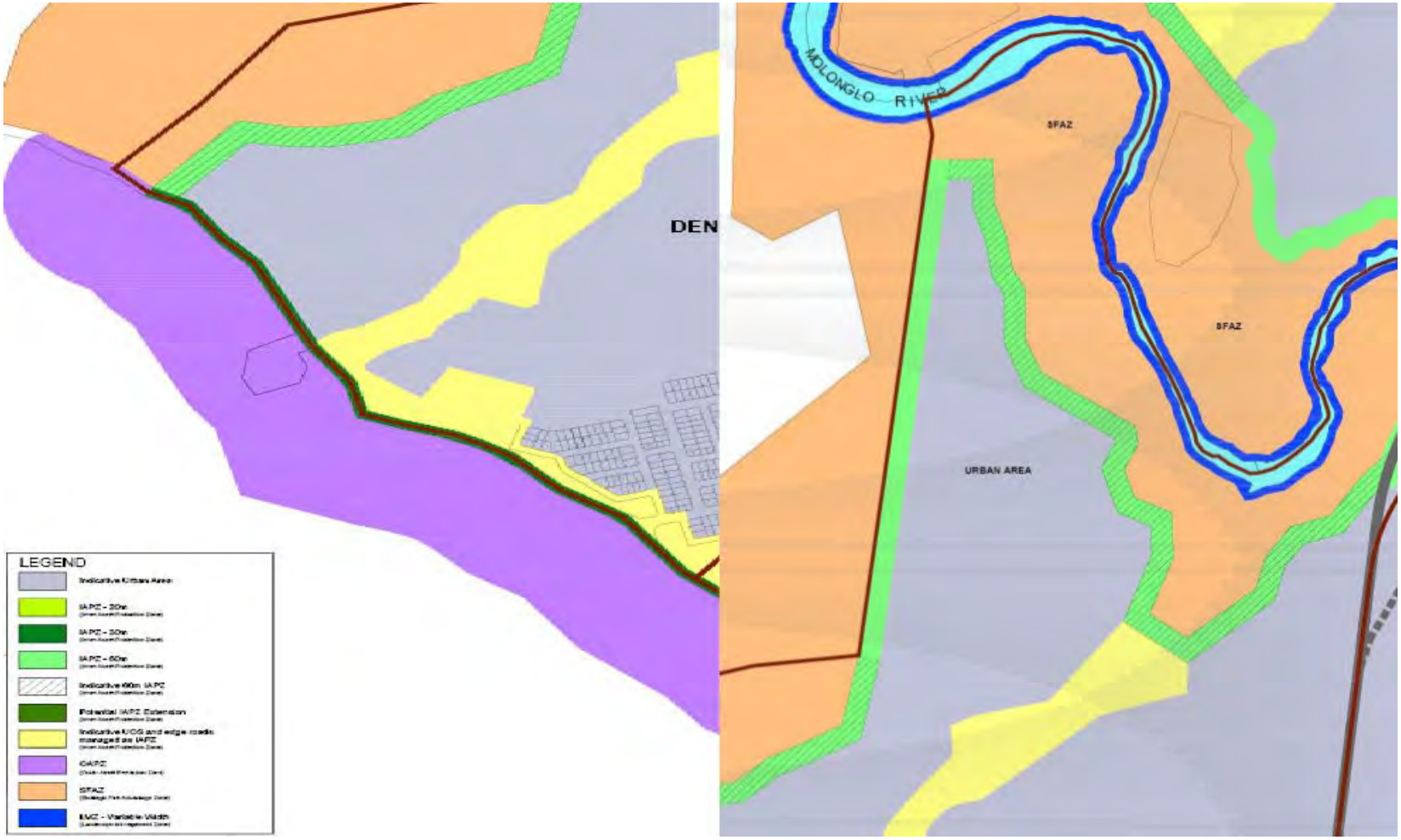
Figure 7 – Fire Protection Strategies – North-western/Western edge to Denman Prospect (Legend)



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3.4 Molonglo River Park:

1) There shall be established and maintained a minimum 60.0 metre wide Inner Asset Protection Zone to the north and south of the Molonglo River Park, to the extent detailed on Figure 8 on Page 27, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. This zone shall include an edge road and where provided the managed easement for services [sewer / water / electricity], stormwater treatment ponds and shall also include cycleway/pedestrian access as required. Note on the south side of the river the locations of the IAPZs will be determined at the EDP stages;

2) There shall be established and maintained, to the area as shown on Figure 8 on Page 27, a series of Strategic Fire Advantage Zones, cyclically managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. Note on the south side of the river, the locations of the SFAZs will be determined at the EDP stages;

3) There shall be provided, to the locations as shown on Figure 8 on Page 27, a Landscape Fire Management Zone of varying width to each side of the Molonglo River.

Fuel management standards do not apply to this zone;

4) The existing fire trail/access roads within the river corridor shall be maintained to provide access for management works and fire-fighting operations.

5) There shall be established and maintained access for management works and fire-fighting operations within the Group Centre precinct.

6) The recommendations provided in the Molonglo River Concept Plan report prepared by Hassell, in respect to the establishment of a community facility in the location of the Sludge Ponds and the western end of the Molonglo River Park shall be included in the Park Management Plan.

Refer to Figure 8 – Fire Protection Strategies – Molonglo River Corridor – West on Page 28.

Refer to Figure 9 – Fire Protection Strategies – Molonglo River Corridor – East and Molonglo Stage 3 – East on Page 29.

Refer to Figure 10 – Fire Protection Strategies – Molonglo River Corridor – Southeast and Molonglo Stage 3 Southeast on Page 30.

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Figure 8 – Fire Protection Strategies – Molonglo River Corridor – West (Legend)

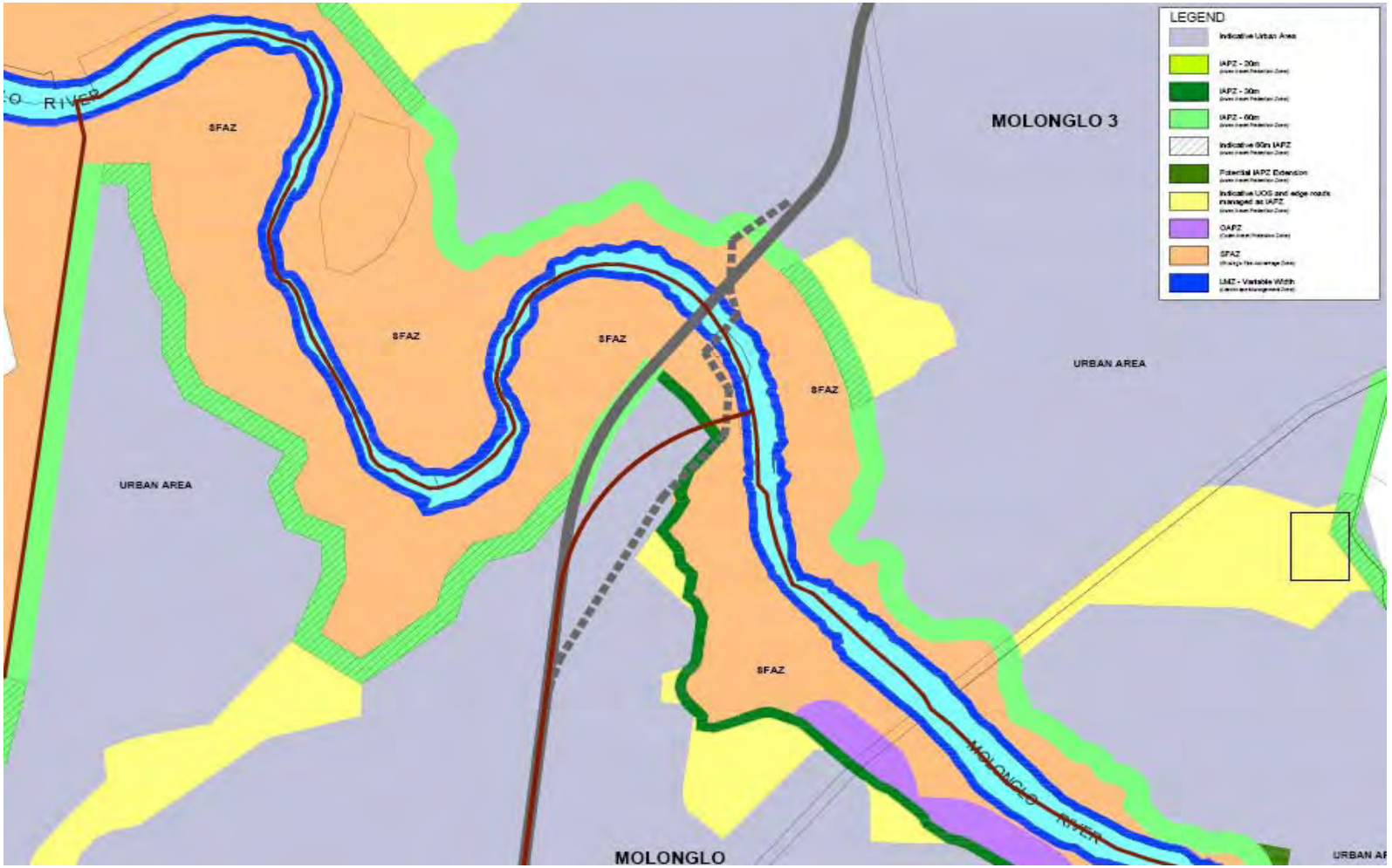

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Figure 9 – Fire Protection Strategies – Molonglo River Corridor – East & Molonglo Stage 3 – East (Add Legend)

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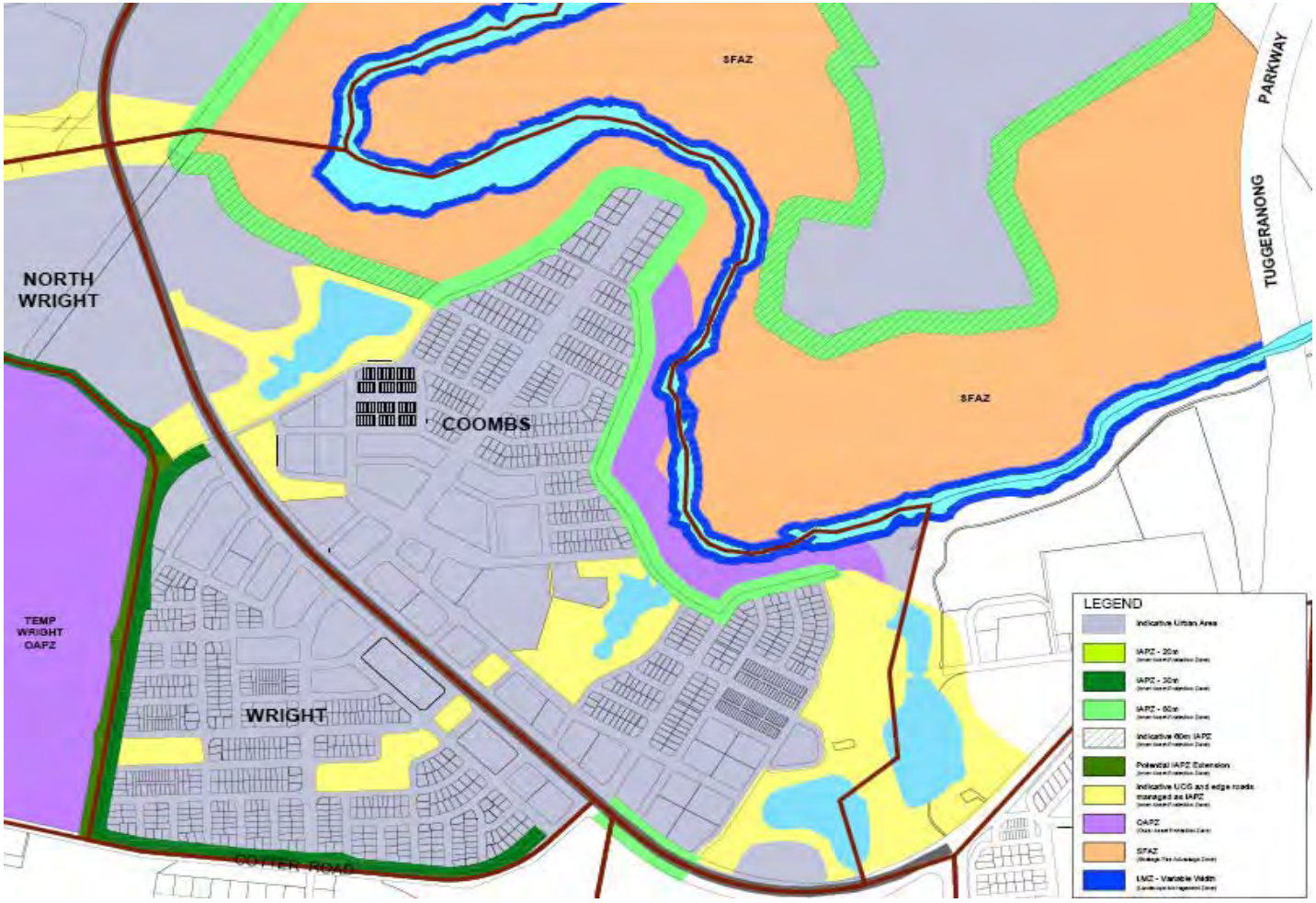
Figure 10 – Fire Protection Strategies – Molonglo River Corridor – Southeast & Molonglo Stage 3 – Southeast (Legend)



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3.5 Molonglo Stage 3 – Northern and Eastern Edges:

1) To the northern edge of the Molonglo Stage 3 precinct the full width of the William Hovell Drive carriageway shall be maintained as an Inner Asset Protection Zone, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3;

2) To the eastern edge of the Molonglo Stage 3 precinct, adjacent to the National Arboretum, there shall be provided an Inner Asset Protection Zone having a minimum width of 40 metres, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. This zone shall include an edge road and where provided, the managed easement for services [sewer/water/electricity], stormwater treatment ponds and shall also include cycleway/pedestrian access as required.

Refer to Figure 11 – Fire Protection Strategies – Molonglo Stage 3 – Northern & North-eastern Edges on Page 32.

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Figure 11 – Fire Protection Strategies – Molonglo Stage 3 – Northern and North-eastern Edge

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3.6 Bushfire Construction Standards to Buildings.

Except for the future buildings within Denman Prospect, all buildings located within 100 metres of land that is subject to, or likely to be subject to, bushfire attack [bushfire prone land] shall be constructed to comply with the standards required by Australian Standard A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.*

Note: Refer to the ACT Strategic Bushfire Management Plan for the location of Bushfire Prone Land.

The minimum level of construction for buildings located adjacent to the Inner Asset Protection Zone shall be BAL 29. The minimum construction standard of all other buildings located within 100 metres of bushfire prone land shall be BAL 12.5. (**Graham – where does the BAL 29 finish and BAL 12.5 take over??????)**

For Denman Prospect, all buildings located within 400 metres of the forest/woodland vegetation on the land to the northwest and west of Denman Prospect shall be constructed to comply with the standards required by Australian Standard A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.* The minimum level of construction for buildings located adjacent to the Inner Asset Protection Zone shall be BAL 29. The minimum construction standard of all other buildings located within 400 metres of bushfire prone land shall be BAL 12.5. (**Again Graham, where does the BAL 29 finish and BAL 12.5 take over???????)**

3.7 Support Infrastructure.

3.7.1 Access for fire-fighting Operations:

Edge roads shall be designed to comply with the access code for heavy rigid and articulated vehicles and the ACT Bushfire Management Standards under SBMP Version 3.

3.7.2 Water Supplies for Fire Fighting Operations:

A fire-fighting water supply shall be installed to comply with F4 and the standards agreed by ACTEW and ACT Fire & Rescue.

Type F5 standard 45 l/s single hydrants at 60 metre intervals shall be installed within the Edge Road.

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SECTION 4

FUNDING FOR BUSHFIRE MANAGEMENT WORKS

4.1 General

Residential and infrastructure development in the Molonglo Valley is proceeding in accordance with the Government's Indicative Land Release Programs and associated budget appropriations for capital works funding to support land release.

Subdivision construction is continuing in Molonglo Stage 1 (Coombs) over the life of the Program with the first releases in Molonglo Stage 2 (Denman Prospect) in 2014-15. Molonglo Stage 3 on the north side of the Molonglo River is programmed to commence in 2018-19.

The LDA/EDD are undertaking due diligence assessment investigations based on the approved Molonglo Valley Structure Plan and other documentation across a range of significant issues in Molonglo Stage 2 and Stage 3 including but not limited to ecological, contamination, infrastructure provision, UXO and bushfire risk. These assessments, especially bushfire in conjunction with TaMS, can materially influence the location of land use boundaries due to impacts and responsibilities for cost efficient land management.

Multiple directorates/agencies are involved with overseeing different parts of the Molonglo Valley. It could be argued that this has led to less than adequate decision-making and a lack of understanding of past and present processes and Government expectations.

This in turn leads to developing less than a whole-of-Government position to achieve the perceived outcomes. Other directorates however may have other parameters to meet while including the need to implement Government policies.

TaMS has a management parameter to manage all the Government's assets. This includes managing the ever increasing asset base such as new roads, urban open space associated with Greenfield development.

Bushfire risk and the associated mitigation measures can have a significant impact on ecological, economic and social parameters. Since the 2003 Canberra bushfire, there has been a significant shift in the increase of the awareness and delivery of bushfire mitigation measures across Government. This commenced immediately after the bushfire with changes to subdivision design and the introduction of edge roads and specific controls within asset protection zones both within the urban area and outside it.

This in turn has led to revisions of standards, guidelines, expectations and responsibilities both public and private.

It has also increased the responsibility of TaMS to manage a large proportion of the asset protection zones possibly to higher standards than was necessary before the bushfire.

4.2 Typical Cross Section of Zones at the Urban/Non-urban Interface:

A typical cross section at the urban/non-urban interface today would include:

- House asset protection zone – extending from the front of the residential block boundary into the suburb for distances up to 100m or more depending on risk and mitigating against ember attack. This requires housing design and construction (and landscaping) to meet specific Bushfire Attack Levels (BALs) under the Australian Standard. Management of this area lies partly with TaMS (public open space and roads including verges) and individual block owners.

- Inner asset protection zone – extends from the front of the residential block boundary to the edge of the urban/non-urban interface. Distances vary depending on risk and management requirements. A usual width would be a minimum of 30 to 40m and include significant infrastructure such as subdivision edge road, fire trail, stock proof fencing at the urban/non-urban interface, stormwater cut-off drains, hydraulic services for fire fighting, and street trees on the block side of the edge road. Management includes control of fuel loads by slashing. Management of this area lies with TaMS.

- Outer asset protection zone or Strategic fire fighting advantage zone – extends into the non-urban area for some distance depending on risk and management requirements. These could be 100m to around 300m in width and contain fire trails to aid management. Management methods depend on fuel loads and may include thinning of existing inappropriate vegetation, weed management, grazing or other ecological controls that ensures fuel loads are not exceeded during the fire season. Management of this area lies with TaMS and may be on a private lease.

4.3 Current Process of Conversion of Rural Land to Urban Land:

The development/management process that transforms rural land to urban land is typically set out below:

- Rural land and Canberra Nature Parks including Nature Reserves are managed by TaMS as the land custodian.

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- LDA/EDD undertakes due diligence assessments to gain necessary approvals to clear the way to proceed to preparation of individual Estate Development Plans (EDPs) and gain budget approvals for the delivery of infrastructure associated with land delivery.

- LDA/EDD prepares EDP and capital works program. Note capital works may have started ahead of the EDP preparation by as much as a couple of years but may not be required to deliver some items for years after land development and block occupation is complete - i.e. staged infrastructure.

- Land custodianship transferred from TaMS to LDA usually prior to lodging EDP for approval.

- EDP lodged for final circulation and approval as a DA. Note EDP usually contains site specific Bushfire risk assessment. Note however that in the case of Molonglo Stages 2 and 3, the western edge and river corridor bushfire risk assessment is designed to cover the whole of the remaining development. In the meantime detailed design has commenced and readied for submitting to TaMS for design approval.

- DA approved by EPD followed by design approval by TaMS.

- Construction commences and includes the provision of bushfire mitigation measures.

- Blocks sold by the LDA but settlement is delayed until after consolidation is complete.

- Construction finishes and consolidation period commences.

- Consolidation period ends.

- Blocks in private ownership after settlement.

- Other areas handed back to Government (usually TaMS) for continuation of approved management including bushfire risk mitigation measures and management of public open space, roads and other land.

- TaMS prepares budget bids to maintain management on a year-by-year basis within the constraints of the ACT Government budget parameters.

4.4 Issues with the Current Process:

There are a significant number of issues with the current process. In the case of development in the Molonglo Valley, these include:

- There is a need for a whole-of-Government outcome for the delivery of Molonglo 2 and 3 and the Molonglo River Corridor.
- The NES Plan and Adaptive Management Strategy, while agreed with

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the Commonwealth, were not “road tested” to prove data or feasibility of implementation ahead of gaining approval from the Commonwealth.

- Competing budget bids delaying or diluting funding for management of assets including bushfire mitigation obligations including the provision of resources.

- Diversion of budget funding to other competing priorities at both Treasury and TaMS levels.

- A partial solution could be that initial funding be provided by the LDA or a private developer for a period associated with construction timing for the implementation of management regimes but with a sunset clause on when TaMS would be required to take over responsibility including funding.

  For example, LDA or a private developer could construct and implement bushfire mitigation management regimes while land development is proceeding generally adjacent to the non-urban edge. The issue is how long a time period would LDA or a private developer be practically required to fund and manage such an arrangement and when TaMS would be expected to take over. While this could be a set period of time, there is an issue when or if there is a slowdown in the private sector development or there is a reduction in the demand for new housing. This could mean that the LDA or a private developer would need to be involved for a longer period of time.

- Remember the issue of requiring bushfire mitigation management measures is not restricted to the Molonglo Valley – it encompasses on-going management at the edges of all development areas at the interface with the rural or broadacre land use zones in Canberra. As the urban area expands, so too does the bushfire mitigation management issue requiring increases in funding.

4.5 Funding Options:

A number of funding options were discussed in the preparation of this assessment. However, it was agreed the existing arrangements met the overall strategies and objectives of Government.

A difficulty with this funding method is that it leaves Treasury in final control of management funding of bushfire mitigation measures. Funding is therefore dependent on dividing up the budget and competing against other bids on a year by year basis.

It does not allow the guarantee of prioritising critical management to protect residents and assets from bushfire risk on a season by season basis.

Even when yearly funding is made available to directorates with management

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responsibilities, there is no guarantee in return to Treasury that all the available funding will be used against bushfire mitigation purposes.

Where the allocated guaranteed funding is not all used (because perhaps a lessening of bushfire risk did not require as much management work to be undertaken) any excess would be expected to be returned to Treasury.

However, there is a distinct risk that the subsequent year or years may require extra funding which would have to be guaranteed by Treasury regardless.

As part of the guarantee mentioned above, a solution is suggested that Treasury may require, at a minimum, an agreed rolling bushfire mitigation management document for say a 5 year period to plan ahead for Budget predictions. This may allow for expenditure variations such as changing seasonal needs and the reaction to catastrophic events. This could be "signed off" by the responsible directorate after agreement at Directors-General level and Treasury.

Public land management agencies are continuously pressed and express public concern that they are expected to do more with fewer resources.

A funding framework, or tweaking of the existing funding arrangements, may be needed that ensures ongoing protection to the public given that Government agencies may be reluctant to shoulder the ongoing cost responsibility.

The ubiquitous and often-stated challenge is securing funding for the long-term, 'in perpetuity' costs to maintain and in some cases enhance the biodiversity values for which the asset was originally protected.

After consultation with other members of the Working Group, it was agreed that the existing funding arrangements based on annual budget bids to Treasury would continue to be the method to fund recurrent bushfire risk mitigation work.

These arrangements do not stop the possibility of adding the 'flexibility' mentioned above to the existing funding methodology.

4.6 Costs

In line with the discussion in this chapter, the LDA would expect to put in place and fund bushfire mitigation measures including management regimes while land development is proceeding. This includes:

- the use and management of temporary asset protection zones while stages of estates are gradually advancing to the final edge of development.

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- the development of the IAPZs, OAPZs and more recently, SFAZs to the point of handover to TaMS for continued management after asset acceptance.

- OAPZs on privately leased land such as at Bonner in Gungahlin where on-going management is required to be undertaken by the lessee in accordance with a Land Management Agreement after asset acceptance.

In the case of Molonglo Stage 3 western edge, the LDA, or a developer in the case of an englobo sale, will put in place and fund the development infrastructure associated within the IAPZ adjacent to Kama Nature Reserve and the boundary of Denman Prospect. This will include to the requirements of the ACT Bushfire Management Standards:

- The public edge road to the estates

- Fire trails along the entire western edge of the development areas

- Utility services infrastructure including water supply for fire fighting purposes

- Storm water cut-off drains

- Fencing the IAPZ at the outer edge of the zone.

- Establishing and initially managing the IAPZ to the required fuel management standards

- Providing opportunities for the location of other infrastructure services as required.

Once the estates are accepted at asset acceptance stage, the entire IAPZ will become the management responsibility of TaMS including recurrent funding.

In the case of Kama Nature Reserve, the area is being managed already to the standard required for an SFAZ and this has been occurring for a number of years and is acknowledged on the ESA website. The LDA, or a developer in the case of an englobo sale for the land opposite Kama, will not fund any management within Kama Nature Reserve and that responsibility remains with TaMS.

In the case of Denman Prospect, the area immediately to the west of the urban boundary on TaMS land, has been assessed as being capable of being managed as a series of SFAZs. Here the LDA or a developer in the case of an englobo sale, will assist TaMS in setting up the SFAZs by funding for a two year period their initial development to the requirements of the ACT Bushfire Management Standards. This is expected to include:

- Fire trails around and separating each of the SFAZs

- Establishing the initial management of the SFAZ.

Again, after that period of time the ongoing management of the SFAZs will pass to TaMS.

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4.7 Costs of Implementing the 60m IAPZ

The LDA has investigated the costs of setting blocks back from the edge of Kama Nature Reserve and the western edge of Denman Prospect in order to comply with the Strategic Bushfire Management Plan version 3 where OAPZs are not supported in the non-urban land.

In order to identify the quantum of costs associated with implementing the bushfire risk strategy recommendations, the LDA engaged Coleman Engineering Services. The investigation specifically targeted the bushfire mitigation measures and developing urban infrastructure along the boundaries of Kama Nature Reserve and the suburb of Denman Prospect over and above the costs to service other comparable subdivisions in the ACT.

to investigate the

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SECTION 5

CONCLUSION

The bushfire protection measures detailed in Section 3 of this report have been determined by the Working Group with the aim of mitigating the potential bushfire risk to the future development within Molonglo Stage 3, Denman Prospect and the development precincts which adjoin the Molonglo River Park.

However, a level of residual risk will remain as not all of the bushfire threat can be completely removed – only managed to reduce fuel loads.

Another matter that will influence the level of risk reduction, and therefore residual risk, is the commitment for ongoing management of the recommended bushfire protection zones and funding of these works in perpetuity.

Bushfire Operations Plans [BOPs] will be required to be prepared annually, by TaMS, for the works and there will be an expectation that Government will meet the funding requirements to enable the BOPs to be undertaken.

For Molonglo 3, Denman Prospect and the Molonglo River corridor, the initial establishment of the recommended fire protection measures shall be funded by the developer of the land – i.e. LDA or private developer or joint venture partners with LDA.

The initial funding shall be made available for the construction and maintenance of fire trails and fire breaks, the provision of fencing and access gates and initial clearing and establishment of the Asset Protection Zones.

LDA, or the private developer, shall provide initial seed funding to TaMS for hazard reduction and land management activities such as the establishment of the Strategic Fire Advantage Zones.

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Australian Bushfire Protection Planners Pty Limited.
29.5.2015

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APPENDIX A – PRECISE OF REPORTS REVIEWED

Bushfire Risk Assessments prepared by ABPP [2005 & 2006]:

Australian Bushfire Protection Planners Pty Limited was commissioned to undertake a study of bushfire risk for the preparation of the Molonglo Structure Plan and produced a Bushfire Risk Assessment, dated 19.07.2005, for the ACT Planning Authority [ACTPLA].

An extract from this report states under 'Summary of Bushfire Risk' – [Page 28]:

"Major bushfires have occurred in the Molonglo Valley in 1926, 1939, 1952, 1991, 1994, 2001 and 2003.

The topography and landform of the valley predisposes the valley to impacts of fires burning under north-westerly and westerly wind influences and to a slightly lesser extent, south-westerly wind influences.

The slope of the valley to the north-west and the ridgelines/ gullies will influence the spread of fire from the northwest, west and south west and result in sporadic fire runs.

Fuel loads within the retained Habitat Corridors and Parklands, Nature Reserves and Lease Holdings, unless managed, will promulgate future bushfires up to the urban edge and into the vegetated corridors within the urban precinct.

Whilst the Overall Fuel Hazard for the vegetation within the valley is Very High there is, due to the fire history, topography, aspect, wind influence and climatic conditions within the valley, an extreme risk of damaging bushfires impacting the north western, western and south western edges of the West 1 and West 2 Precincts, the north western edge of the East Precinct and a high risk of damaging bushfires impacting the south western edge of the East Precinct".

Figure 12 on Page 42 provides an extract from the Molonglo Concept Plan Bushfire Risk Assessment Report 2005 identifying the Study Area;

Figure 13 on Page 43 provides an extract from the Molonglo Concept Plan Bushfire Risk Assessment Report 2005 identifying the potential north-westerly fire path;

Figure 14 on Page 44 provides an extract from the Molonglo Concept Plan Bushfire Risk Assessment Report 2005 identifying the potential westerly fire path; and

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Figure 12 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report 2005 showing the study areas

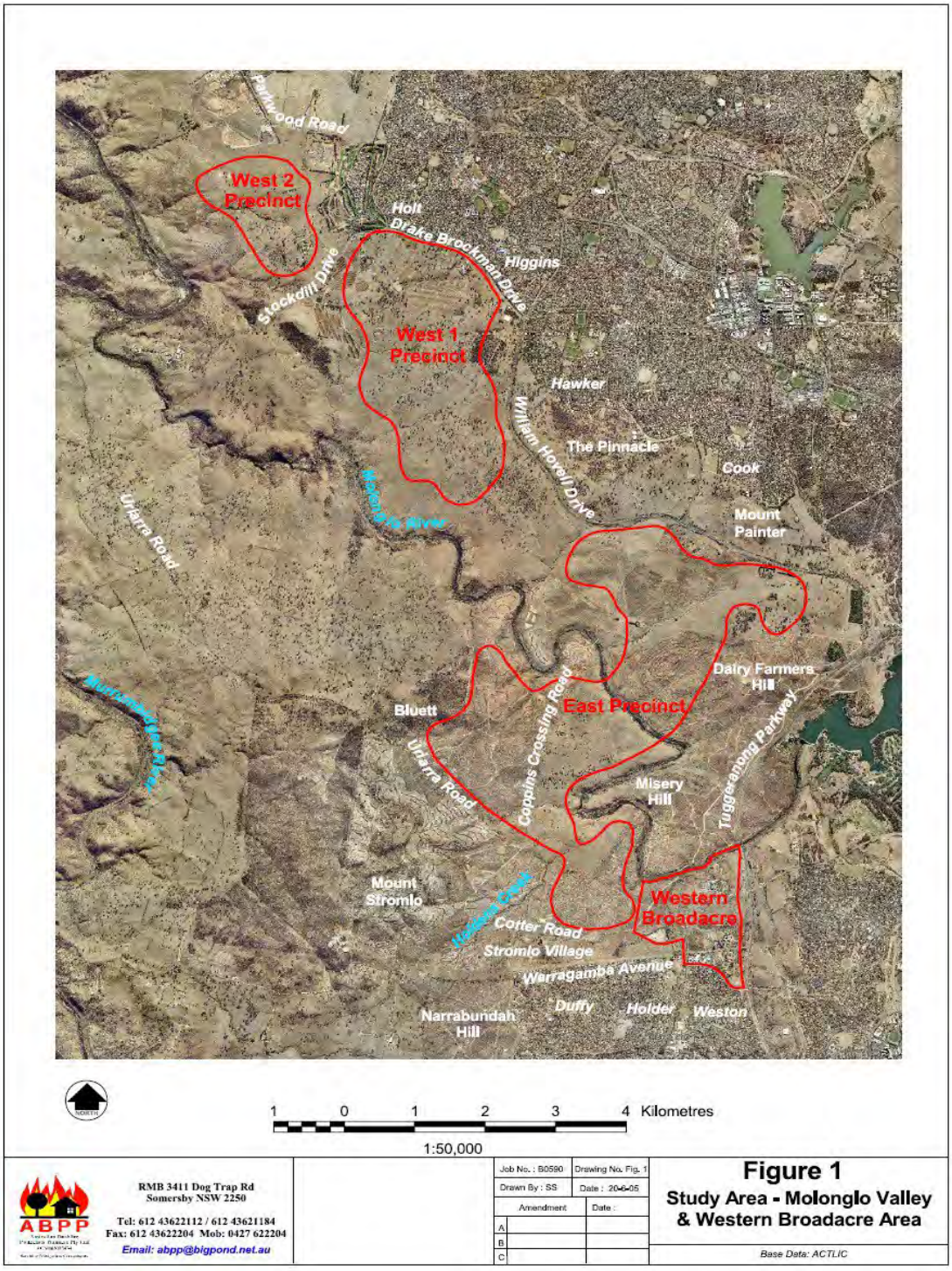


Figure 13 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report 2005 showing the Diagrammatic Northwest fire run

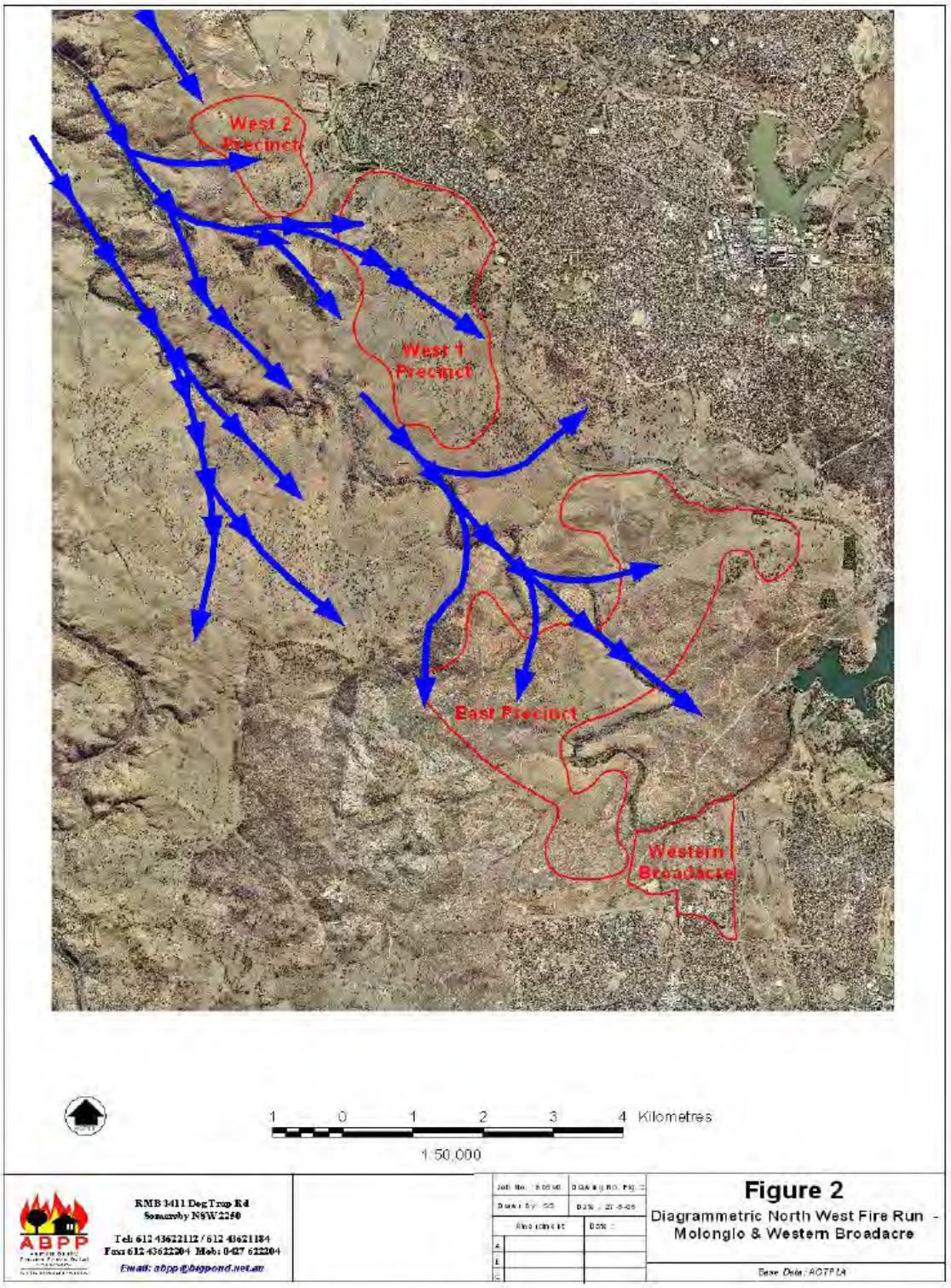
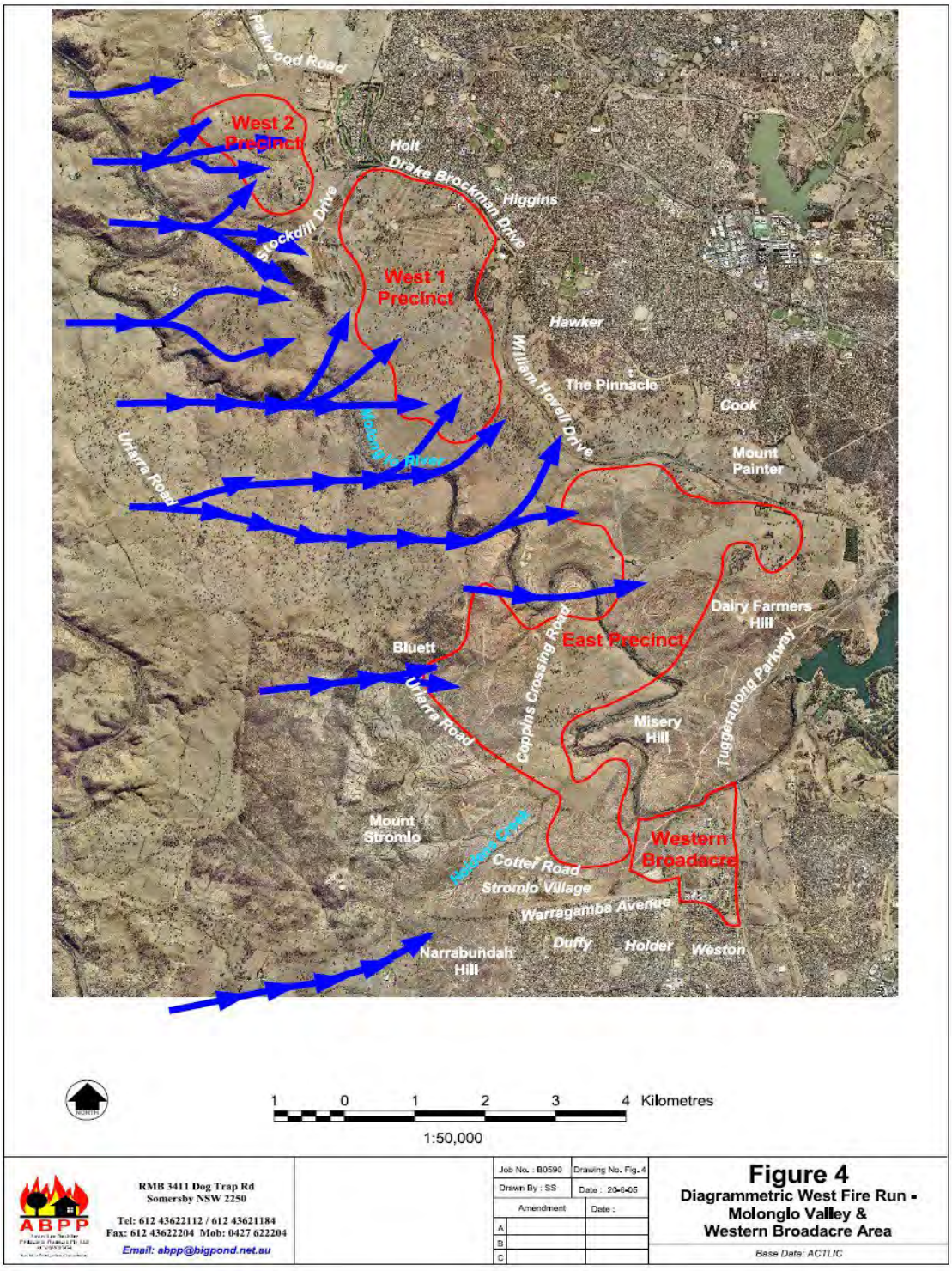


Figure 14 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report 2005 showing the Diagrammatic West fire run



Under Section 6.1 Management of the Vegetation beyond the Urban Interface the ABPP report states:

"The Strategic Bushfire Management Plan for the ACT (Version1) states:

"Under the Emergencies Act 2004 the ESA has declared an area of the ACT to be a Bushfire Abatement Zone. The purpose of the Bushfire Abatement Zone is to reduce the impact of bushfires on the built up areas within the ACT.

Bushfire preparation within the BAZ requires collaborative development of fuel management guidelines and the provision of advice to land managers consistent with land use. Guidelines for bushfire management must achieve a reasonable balance between the increasing community demands on ACT lands for recreation and existing use for farming, forestry and conservation".

"Bushfire fuel hazard is the only factor of bushfire behaviour that can be influenced by land managers and residents. However, fuel management alone is not the panacea for bushfire protection and it ***will not eliminate future severe bushfires.***

"The use of fire in land management requires land managers to make decisions about complex balances and trade-offs between bushfire protection and often-divergent social, environmental and economic requirements".

Heavy emphasis has been placed on the effectiveness of hazard reduction burning as the most cost effective means of management within the Abatement – Zone, however the Strategic Bushfire Management Plan states :

"The opportunity to schedule and implement prescribed burning within a desirable window of favourable conditions is relatively limited".

"Land managers and owners must take into account the potentially limited number of days and the possible interaction with air quality guidelines in the development, costing and implementation of prescribed burning programs".

Therefore the viability of maintaining the urban edge protection by hazard reduction burning and / or mechanical means needs to be established to guarantee the integrity of the Molonglo and Western Broadacre urban edge against damaging fire impact.

Under 6.2 – Shape of the Development Precincts [Page 32] the ABPP reports states:

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East Precinct.

"The long exposure of the north-western edge of the precinct to uphill burning fires, influenced by hot, dry, strong north-westerly winds, will result in significant fire impact either directly or indirectly from ember attack, depending on the level of protection provided by active management of the fuels within the river corridor.

Similar impacts may also occur to the western / south western edge from westerly and south-westerly wind-driven fires and the influence of wind turbulence in the Mount Stromlo area.

The northern edge will be impacted by fires burning within the habitat corridor, north of William Hovell Drive.

The Molonglo River Corridor will separate the eastern development node from the western development node and therefore provide a direct fire path into the suburbs adjoining the corridor and to the International Arboretum to the south east".

Under Section 6.4 – Habitat Corridors – Gazetted Nature Parks the ABPP report states:

"The Landscape and Environmental Analysis Plan in the Molonglo Valley Suitability Study identifies habitat connectivity for wildlife movement corridors from The Pinnacle to the north-west and alternate and /or additional Habitat Corridors between the three development precincts.

If the Habitat Corridor identified extending to the north-west of The Pinnacle remains it will allow fire to enter the West 1 Precinct and expose the adjoining urban development to fire impact.

The alternative Habitat Corridors will allow fires to penetrate between the development precincts. Management of these corridors for Habitat Protection and ecological protection will conflict with the need to provide active management of fuel hazards within the abatement zones to the perimeters of the urban precincts.

The Lower Molonglo River Nature Reserve will provide a direct northwest fire path for future bushfires to impact the central portion of the north western edge of the East Precinct and the return edges to the north east and south west of the Reserve".

Section 10.1 – Conclusion – Molonglo Valley [Page 43] of the ABPP report states:

"The orientation of the Molonglo Valley and the ability for northwest, west and south-west wind-driven fires to impact the proposed development edge will continue the extreme level of risk to any development proposed in the valley with the potential to cause major damage to buildings and infrastructure.

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Whilst the McLeod Report recommendation was for implementation of an Abatement Zone to the west and south-west of the City, the extent of the zone and the management abilities of those responsible for the fuel maintenance measures recommended, may not provide a level of defence which will remove the risk of devastating fires impacting to the north-western edge of the Molonglo East Precinct and the north-western, western and south-western edge of the Molonglo West 1 and West 2 Precincts".

It is therefore recommended that for development to proceed, the primary protection against the impact of fires to the north-western edge of Molonglo East and the north-western, western and south-western edge of Molonglo West 1 should be provided by the provision of a land use that creates a Critical Management Zone which is permanently fuel-managed by the nature of the land use. (i.e. vineyards / sporting grounds).

"The Molonglo River Corridor through the East Precinct should be actively managed as a Village Park to prevent fire extension into the precinct".

Figure 15 on Page 47 provides an extract from the Molonglo Concept Plan Bushfire Risk Assessment Report 2005 identifying the recommended bushfire protection measures.

Subsequent to the preparation of the original Bushfire Risk Assessment Report [19.7.2005] an updated report was prepared by ABPP, dated 26.4.2006. The Executive Summary of this report states:

The Molonglo Stage 2 Bushfire Risk Assessment quantifies the current level of risk to future development within the Molonglo Valley, prior to the implementation of mitigation measures as ***Extreme.***

Mitigation measures which have been identified within the report as necessary to reduce the level of potential risk to future development include the creation and permanent management of a Critical Management Zone to the north-western edge of the East Molonglo Precinct and to the western and south-western edge of the Central Molonglo Precinct.

The provision of the Critical Management Zone (CMZ) replaces the Outer Asset Protection Zone, as defined in the Strategic Bushfire Management Plan for the ACT and the management of this zone, in accordance with the performance standards defined in this report, are considered to be a mandatory requirement in the reduction of the bushfire risk to the future development within the Molonglo Valley.

In addition to the provision of a Critical Management Zone to the north-western edge of East Molonglo Precinct, this report recommends, due to the risk of fire over-run along the Molonglo River corridor and into the future suburb, the damming of the Molonglo River below Coppins Crossing and the creation of Lake Molonglo".

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Figure 15 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report 2005 showing the recommended Bushfire Protection Strategies.

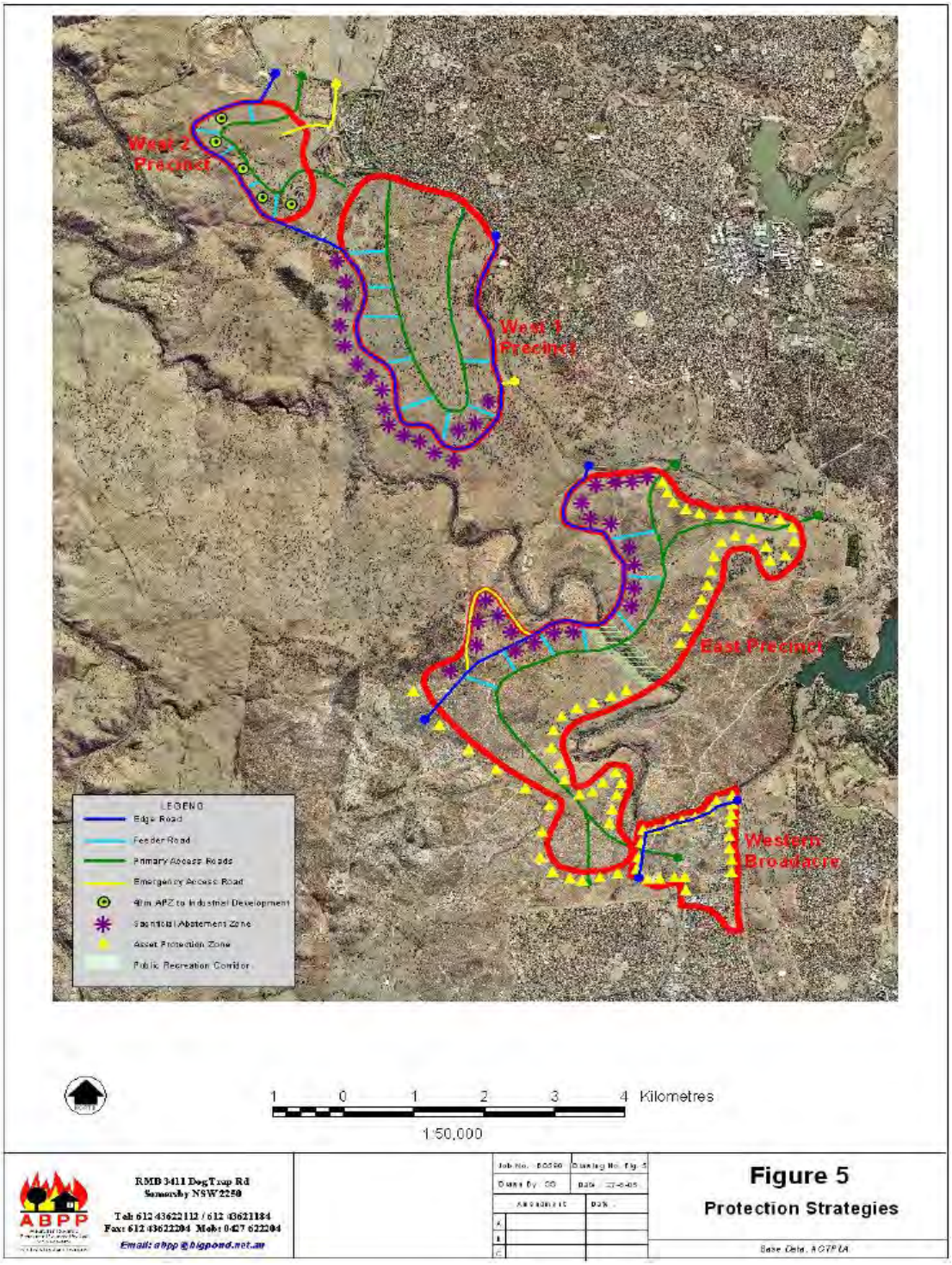
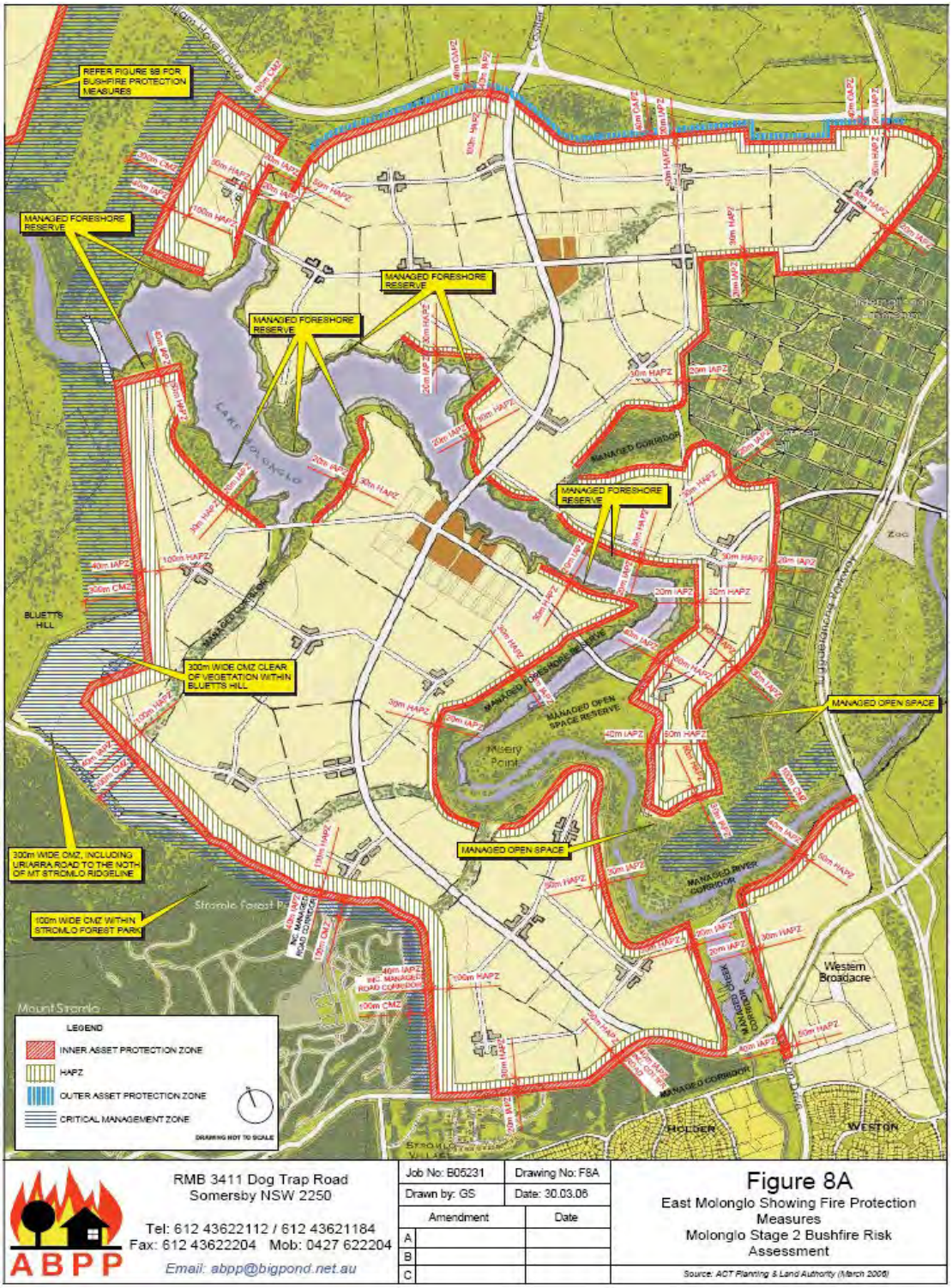


Figure 16 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report Stage 2 - 2006 showing the recommended Bushfire Protection Strategies



The recommendation contained within the latter report that damming of the Molonglo River below Coppins Crossing should occur to remove the bushfire risk along the river corridor was originally implemented in the Strategic Planning process, however is now not included in the Territory Plan.

The comments about the level of risk to the north-western edge and the risk posed by the retention of vegetation within the river corridor therefore defaults back to the original Bushfire Risk Assessment [19.7.2005] [refer to Figure 4 on Page 10] which recommended the implementation and management of a Critical Management Zone of at least 300 metres to the north-western edge of the new suburb and that the *"Molonglo River Corridor through the East Precinct should be actively managed as a Village Park to prevent fire extension into the precinct".*

Molonglo Valley Plan for Protection of Matters of National Environmental Significance – NES Plan:

A review of the Molonglo Valley Plan for Protection of Matters of National Environmental Significance – NES Plan – September 2011 prepared by ACT Planning & Land Authority has identified that the aim of this document is to enhance the areas of Box Gum Woodland not only within the Molonglo River corridor but also within the Kama Nature Reserve and pockets of retained vegetation within the Molonglo Stage 3 precinct.

The document provides, under Section 2.3 – Bushfire Management Framework a 'motherhood' statement about bushfire management which reads:

"Within the strategic assessment area fire management will be aimed at protection of both built assets and MNES values. This will be achieved through the identification of appropriate asset protection zones and application of hazard reduction techniques that will both:

- *Ensure that the standards for fuel loads in the SBMP are met; and*
- *Protection MNES values through the use of sympathetic management techniques".*

The aim of this document does not address the recommendation that the river corridor is managed as a *'Village Park'* or the land to the west of Molonglo 3 and Denman Prospect is managed to mitigate the impact of fire on the north-western edge of the future urban development and from a fire spreading along the river corridor.

The NES Plan recommends that the following reports be prepared:

1. ‘Molonglo River Park Concept Plan’;

2. Kama Management Plan;

3. Management Plan for Patch GG; and

4. Management Plans for High and Moderate PTWL habitat.

Molonglo River Park – Concept Plan prepared by Hassall [September 2011]:

This document was prepared by Hassell in 2011 and states that one of the primary objectives of the plan is to manage bushfire risk and details the need to provide Inner and Outer Asset Protection Zones as required by the *Strategic Bushfire Management Plan for the ACT 2009* with the Inner Asset Protection Zone located within the urban envelope and the Outer Asset Protection Zone and Strategic Fire Advantage Zone [SFAZ] located within the park.

Section 3 – Investigation Summary of the Concept Plan states:

“Risk assessments completed for Coombs and Stage 2 urban development areas identified a high to extreme bushfire risk for future urban areas. The most significant risk is that of a fire moving from the west or northwest, from which it would not only threaten the peripheral urban development in these areas but also potentially penetrate deeper onto the development area by moving up the Molonglo River corridor”.

Under ‘Additional Strategies’ the report suggests that relevant group(s) further investigate the establishment of a 300 metre wide ‘Critical Management Zone’ to the northwest of the site – extending in a downstream direction from the north west limit of the park.

The table on Page 52 is an extract from the Concept Plan identifying the Fire Management Objectives and Strategies.

Figure 17 on Page 54 shows the Molonglo River Park Illustrative Concept Plan prepared by Hassell.

Figure 18 on Page 55 shows the Molonglo River Park Illustrative Landscape setting Plan prepared by Hassell.

Figure 19 on Page 56 shows the Molonglo River Park Fire Management Plan concept prepared by Hassell.

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Objectives and strategies

Objectives of fire management	Strategies
Mitigate bush fire hazard.	Active management of fuels associated with vegetation within the park.
Mitigate the potential for the riparian area to have a 'wicking' effect that could carry a fire deep into the urban area.	Creation of a mosaic landscape in which the potential for long runs of fire fuels are minimised.
Afford the occupants of the urban areas adjacent to the park protection from exposure to a bushfire.	Development and maintenance of an outer APZ that complies with ACT Emergency Services Agency (ESA) standards. (ACT SBMP)
Provide defendable space and adequate separation to minimise the chance of direct flame contact and material ignition, for any assets that could be vulnerable to a fire, which would be located within the park lands.	
Provide for the ongoing maintenance of fuel loads and vegetation continuity within the outer APZ and parklands.	
Ensure that emergency service personnel and parkland users have access to adequate access and egress in the event of a bush fire.	Development and maintenance of a network of roads and fire trails that meet emergency services access requirements.
Ensure that utility services, particularly water supplies, are adequate to meet the needs of fire fighters.	Provide water supplies suitable for use during fire and fuel management exercises.

The Molonglo River Park Concept Plan Report's focus of the 'Fire Management Theme' is on strategies for the control of vegetative fuels within the following specific areas:

- Critical Management Zone [CMZ] to the west of the park;

- Strategic discontinuity zones within the riparian corridor which aim to reduce the ability of a fire to move continuously up the corridor and into the urban areas, and provide access for defence and fuel management;

- Outer APZ adjacent to the urban interface [Inner APZ within the statutory urban area, not in the riparian parkland].

The Molonglo River Park Concept Plan Report states that the Critical Management Zone forms a key component of the overall strategy to reduce the potential for a fire to move up the riparian parkland and into the urban areas.

"The Critical Management Zone is a 300 metre wide zone extending from the western boundary of the proposed urban areas and the riparian parkland, in a downstream direction. This area would be managed to provide a strategic fire break or control line to reduce the impact of a fire moving from the west/northwest, towards the urban areas".

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The report continues with advice on the strategic discontinuity zones and states that these zones "would be located at intervals within the parkland to reduce the potential for a fire to move continuously along the riparian corridor and potentially fuel an intense fire that could have catastrophic effects on the adjacent urban areas".

"The development of strategic discontinuities within the riparian parkland responds to the significant hazard potentially affecting this area, which is located on the north-west fringe of Canberra and is therefore directly exposed to extreme fire weather and the potential fire hazard associated".

"This strategy also responds to the potential of the riparian corridor itself to act as a 'wick', funnelling a fire, driven by hot, dry, north-westerly winds, onto the heart of the urban area. This risk is a function of the physical location and the orientation of the river corridor itself".

"The discontinuity areas would be located:

- At the northwest extreme of the riparian area;
- Around, and to the west of Coppins Crossing, from the proposed sewer line crossing to the proposed extension of John Gordon Drive crossing the river;
- At Misery Point.

These areas would be characterised by more concentrated vehicle access and intense location of recreational facilities such as playing fields, parking areas, irrigated gardens and picnic areas. Alternatively, they would comprise open woodland/grassland habitat".

"Vegetation in the recreation areas would have the following characteristics:

- Large areas of groomed grassland maintained to a height of less than 100mm;
- Scattered tree planting;
- Formal parks and gardens with irrigated plantings.

"Generally fuels in these areas would be maintained by mechanical mowing/slashing. Where areas of PTWL habitat occur, fuels would be managed in accordance with the TAMS *Pinked Tail Worm Lizard Fuel & Fire Suppression Guidelines [TAMS 2011]".*

"Outer Asset Protection Zones would be developed in accordance with ESA standards and the following OAPZ are required: Primary asset interface classification – 100m; Secondary asset interface classification – 0 metres.

All vegetation within the riparian zone would be maintained as grassland or open woodland.

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Figure 17 – Molonglo River Park Illustrative Concept Plan – Hassell.

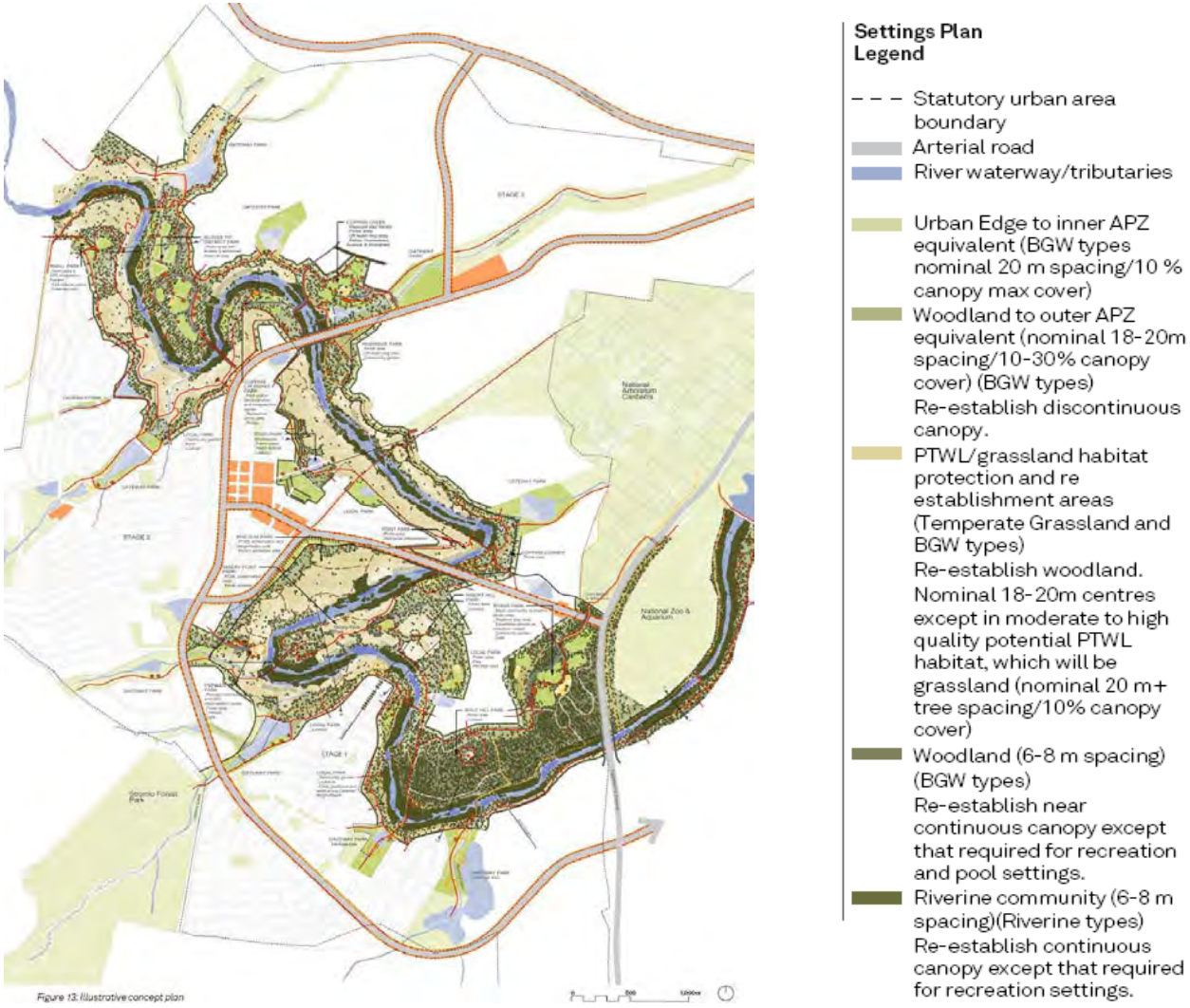

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Figure 18 – Molonglo River Park Illustrative Landscape settings Plan – Hassell.

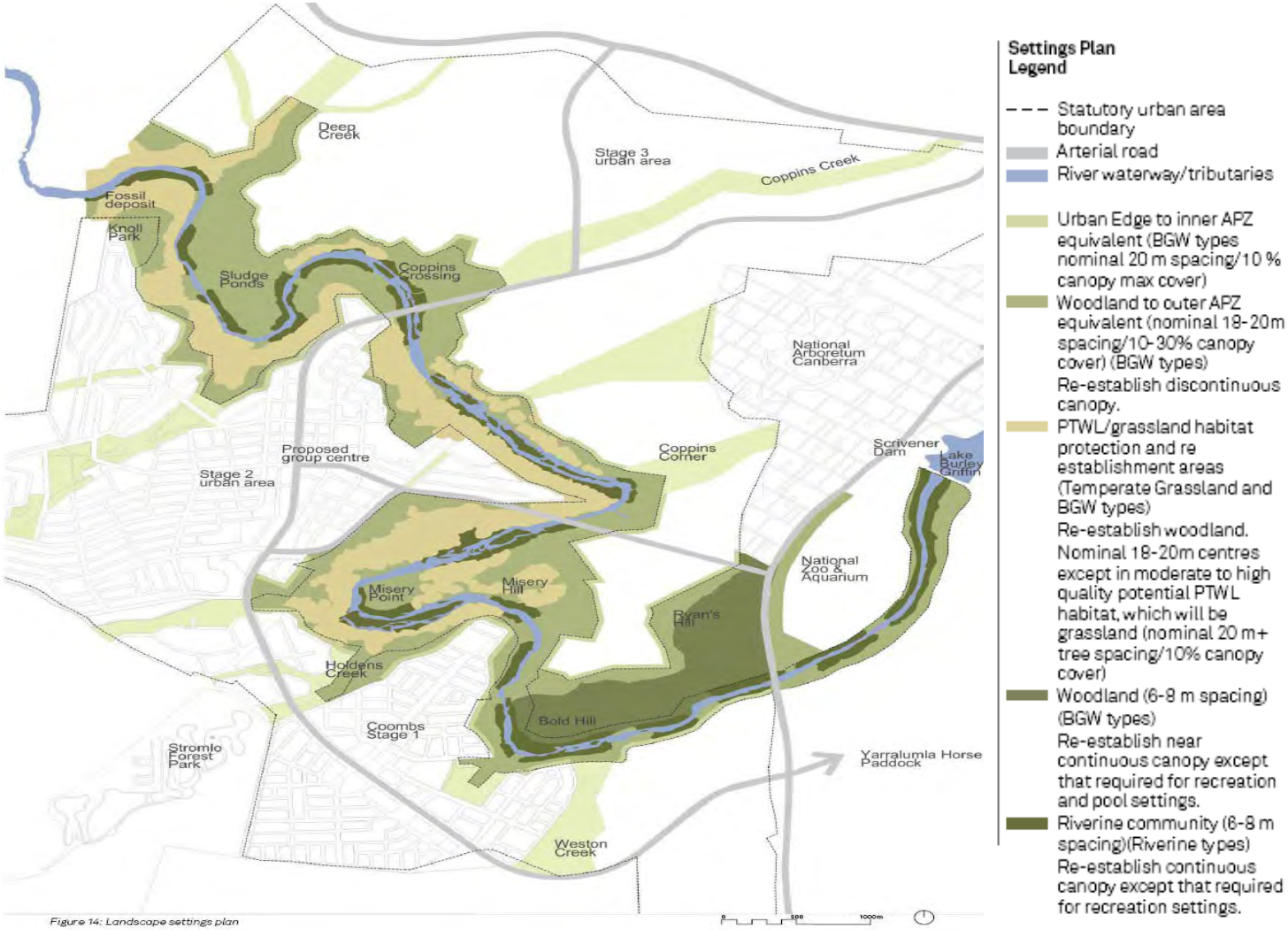

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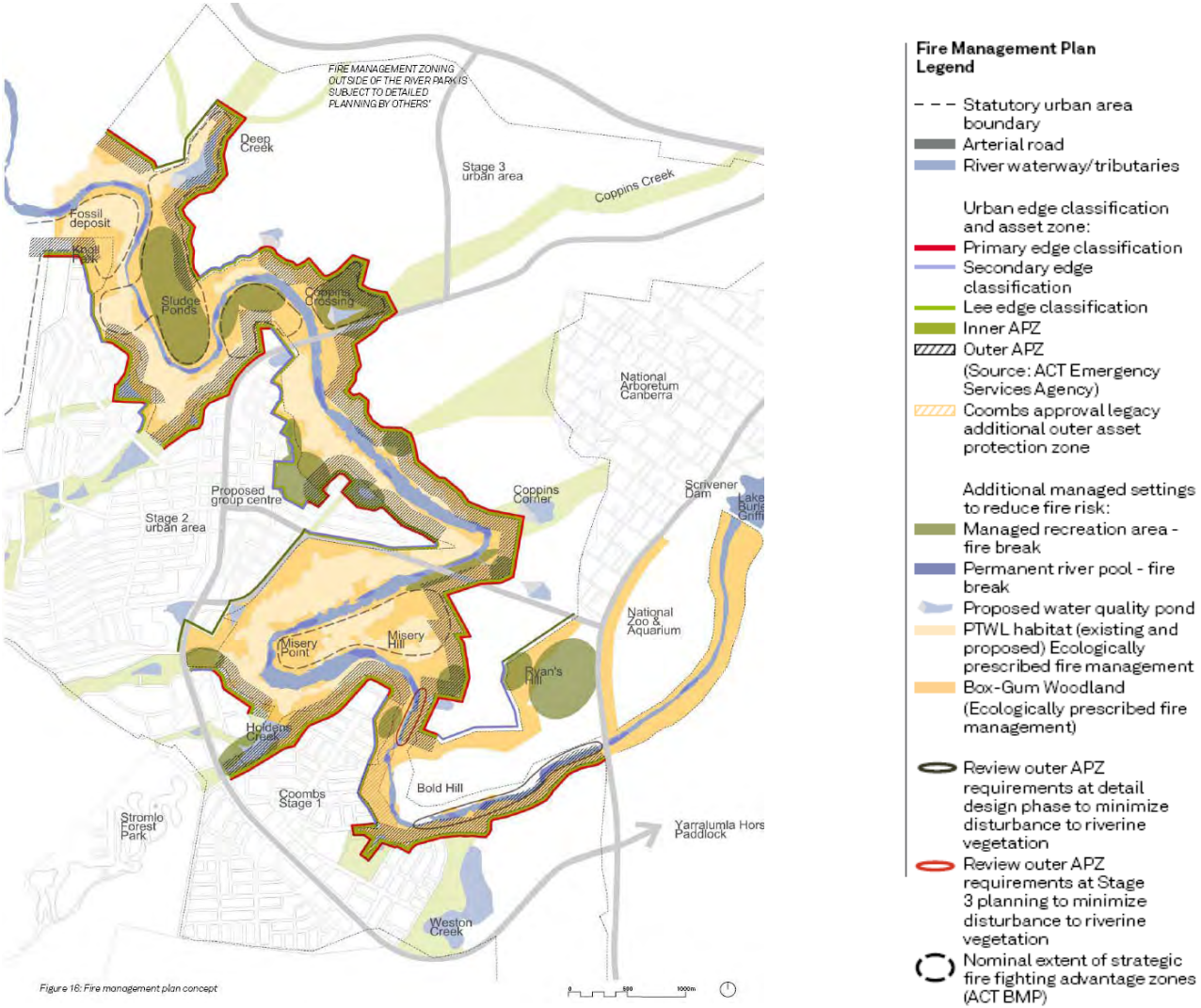
Figure 19 – Molonglo River Park Fire Management Plan Concept – Hassell.



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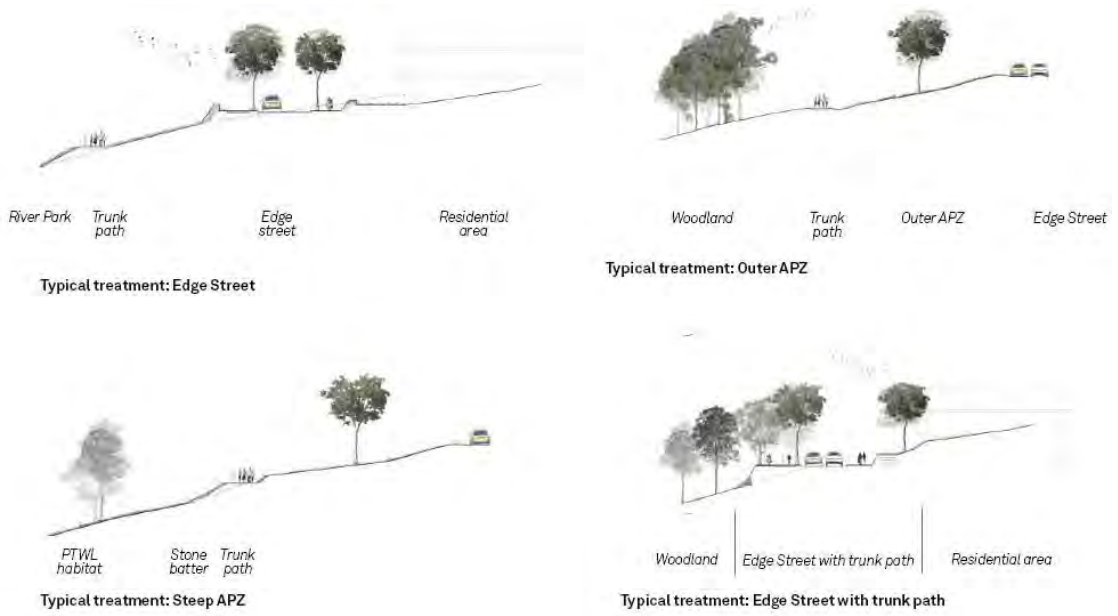
Section 7 of the Concept Plan also provides recommendations on the provision of access and egress and states:

'In addition to recreational access, where required within the park area, access and egress would be provided for emergency purposes and the maintenance of fire protection infrastructure. Road and trail standards would be designed in consultation with local emergency services to enable the traffic of emergency service vehicles and their access to adjacent, more natural areas of vegetation".

Figure 20 below provides sectional details of the location of Trunk Paths/Emergency Service access.

Figure 20 – Molonglo River Park – access – Hassell.



Section 7 – Concept Plan – Fire Management Theme states:

"Under the ACT Strategic Bushfire Management Plan, a Fire Management Plan would be developed for the Molonglo Valley in accordance with Emergency Services Agency [ESA] standards. The plan would take into account consideration of the recommendations of the existing bushfire hazard assessments for the proposed adjacent urban areas. The Molonglo Valley Fire Management Plan would provide the basis for the development of an overarching Plan of Management for the riparian area and annual Operations Plan [BOP]".

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Figure 21, below, is a copy of the 'Indicative Fire Management Strategy – Urban Area prepared by TaMS.

Figure 21 – Indicative Fire Management Strategy – Urban Area [TaMS 2015]

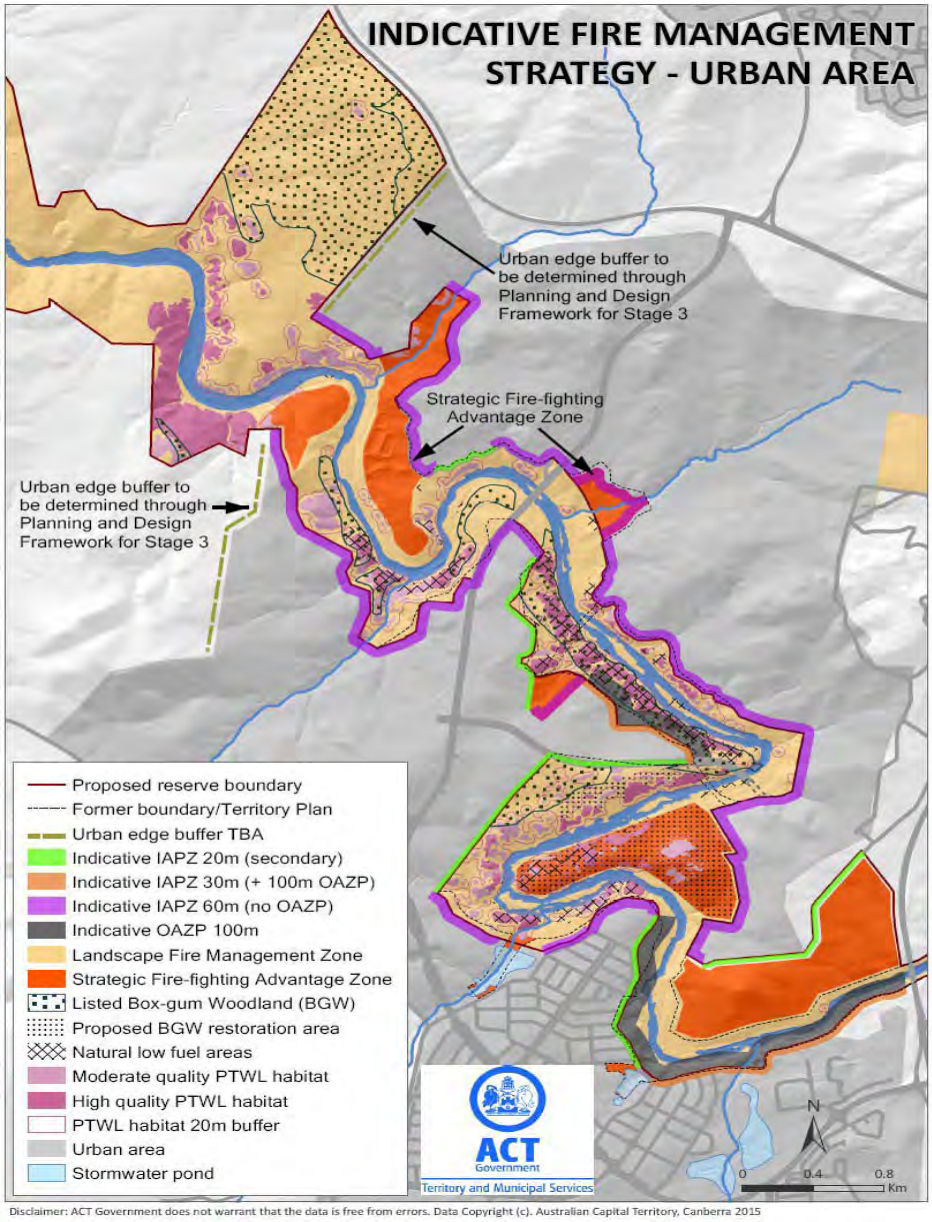

Figure 22 provides a copy of the Indicative Fire Management Strategy – Molonglo Valley prepared by TaMS.

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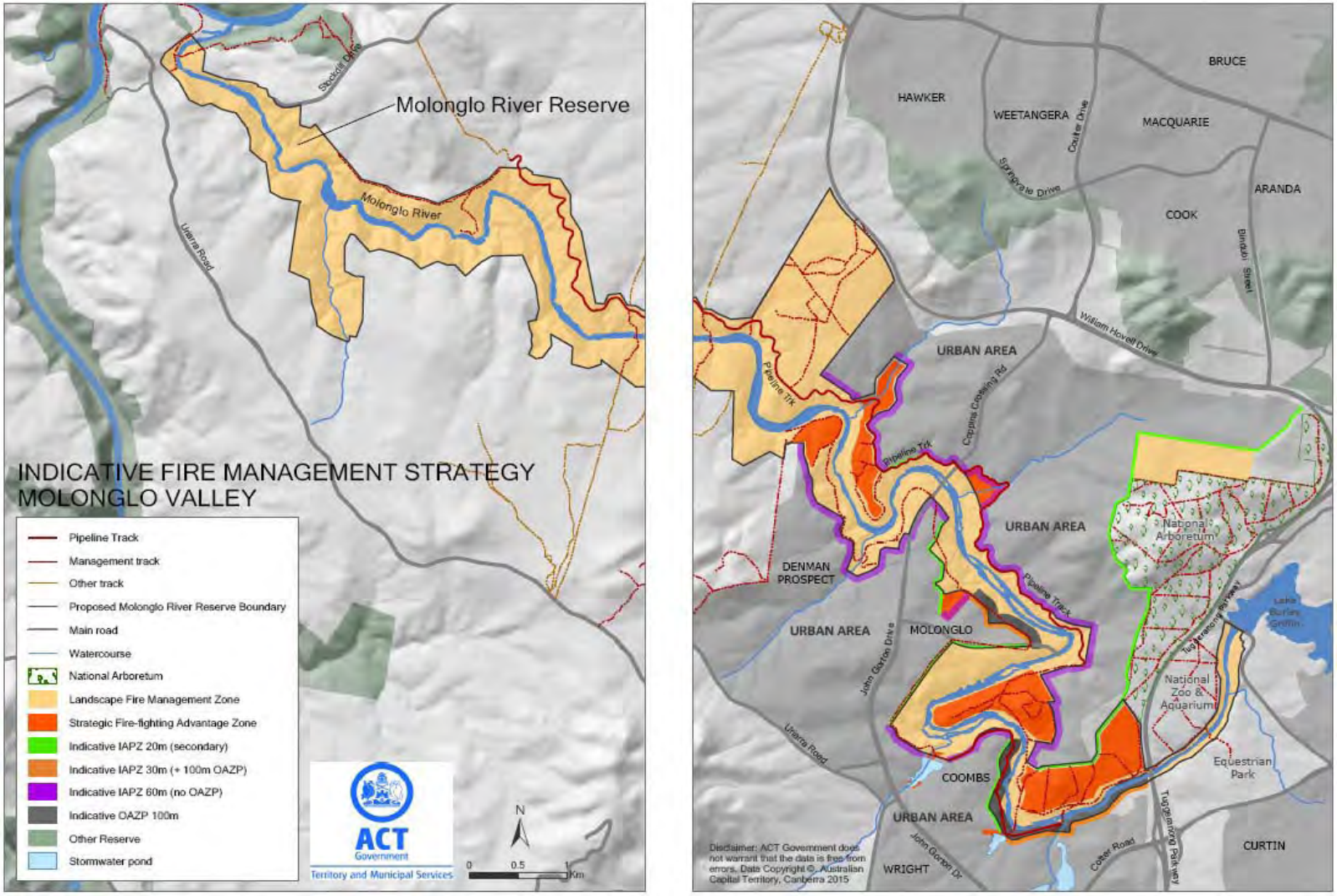
Figure 22 – Indicative Fire Management Strategy – Molonglo Valley [TaMS 2015]



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APPENDIX B – WORKING GROUP - MEETING DATES, LIST OF ATTENDEES & RESOLUTIONS

In late 2013 – early 2014, the Land Development Agency [LDA] identified the need to bring together a working group to examine the outstanding issues relating to the bushfire risk to the north- western edge of Molonglo 3; Denman Prospect and the Molonglo River Corridor.

Initially the Working Group consisted of representatives of LDA, ABPP and Umwelt to discuss issues and the way forward.

The brief of the Working Group was widened to bring together all Government Agencies involved in the development of the Molonglo East precinct to enable examination of previous studies, undertake site inspections and consider all options available so as to develop a report that establishes the principles, processes and funding required to address the bushfire risk.

Representatives of Government Agencies included:

- Dave Richardson [LDA];
- Kerry Browning [LDA];
- Adam Carmody [LDA];
- Dylan Kendall [TaMS];
- Adam Leavesley [TaMS];
- Nick Lhuede [ESA];
- Greg Potts [ACT RFS];
- Conrad Barr [Acting Chief Officer] ACT Fire & Rescue;
- Andrew Starke – Commissioner ACT Rural Fire Service;
- Ros Ransome [TaMS];
- Steven Gianakis [EPD];
- Daniel Iglesias [TaMS];
- Tony Corrigan [TaMS]; and
- Stuart McKenzie [EPD]

Two external companies were commissioned to provide assistance to the Working Group, Umwelt to undertake a peer review of the previous ecological studies and additional ecological investigations and ABBP to provide advice on bushfire risk, fire protection strategies and the preparation of a Bushfire Mitigation Strategy Report.

These companies were represented by;

- Peter Cowper Armstrong [Umwelt];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

TaMS was invited to a second workshop on the 28th May 2014 with the aim to establish initial understanding of ecological values and management requirements and development of feasible options to manage bushfire risk. Attendees included:

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- Dave Richardson [LDA];
- Kerry Browning [LDA];
- Adam Carmody [LDA];
- Dylan Kendall [TaMS];
- Peter Cowper Armstrong [Umwelt];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

Umwelt was commissioned to review the existing reports/studies and undertake field surveys and investigation into the vegetation and ecological values in Kama.

The results of this study are contained in the separate document attached as Attachment A.

Initial findings on the extent of the ecological value of the vegetation within Kama varied from the previous studies.

A third workshop was held on the 29th July 2014 with the aim to undertake a wider consultation with key fire planners within TaMS and ESA; establish a broader understanding of ecological values and management requirements and further development of feasible options to manage fire risk. Attendees were:

- Dave Richardson [LDA];
- Daniel Santosuosso [LDA];
- Adam Carmody [LDA];
- Dylan Kendall [TaMS];
- Adam Leavesley [TaMS];
- Nick Lhuede [ESA],
- Greg Potts [ACT RFS];
- Conrad Barr [Acting Chief Officer] ACT Fire & Rescue;
- Peter Cowper [Umwelt];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

Various options were considered in the methods of providing protection to the north-western edge of Molonglo 3 including support for the provision of an Asset Protection Zone within Molonglo 3 with the vegetation within Kama managed as a Strategic Fire Advantage Zone [SFAZ], provided that adequate on-going funding was available to support the management works in perpetuity.

Following discussions on the protection measures for Denman Prospect, Umwelt were commissioned to review the existing reports/studies and undertake field surveys and investigation into the vegetation and ecological values of the vegetation within the north-western portion of Denman Prospect and the adjoining land to the northwest.

A fourth workshop was held on the 21st October 2014 with the aim of confirming the proposed management of the north-western edge of Molonglo 3 and examining options for fire management of the western edge to Denman Prospect and the Molonglo River Corridor.

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Attendees were:

- Dave Richardson [LDA];
- Daniel Santosuosso [LDA];
- Adam Carmody [LDA];
- Adam Leavesley [TaMS];
- Greg Potts [ACT RFS] & Conrad Barr [Acting Chief Officer ACT Fire & Rescue];
- Peter Cowper & Rob Armstrong [Umwelt];
- Ros Ransome [TaMS]; and
- Graham Swain [ABPP].

At this meeting it was agreed that to the north-western edge of Molonglo 3 the proposed fire management zones would consist of:

1. A 60 metre wide Inner Asset Protection Zone, located inside the western edge to the Molonglo Stage 3 precinct;

2. A Fire Trail would be constructed along the boundary with Kama – inside the Molonglo Stage 3 precinct;

3. A managed fire break would be provided in Kama, adjacent to the boundary with Molonglo Stage 3;

4. That the vegetation within Kama would be managed in a series of Strategic Fire Advantage Zones, in accordance with the prescriptions provided by the *Strategic Bushfire Management Plan for the ACT* – 2009 – refer to Appendix C – Plan of proposed Bushfire Management Strategies – Kama/Molonglo 3 Western Edge.

   Existing access trails would be maintained and managed to provide edges to the Strategic Fire Advantage Zones – refer to Appendix C – Plan of proposed Bushfire Management Strategies – Kama/Molonglo 3 western edge.

5. The proposed management strategies were supported by ESA provided adequate on-going funding was available to support the works in perpetuity.

The meeting also resolved to examine the fire management options for Denman Prospect provided by ABPP and to assess these options in the field.

It was also agreed to inspect the line of the Asset Protection Zone to the north of the river corridor, as determined by TaMS. This inspection was attended by Dave Richardson; Nick Lhuede; Adam Leavesley and Daniel Santosuosso and agreement reached that a 60 metre wide Inner Asset Protection Zone [IAPZ] be provided to the full length of the river corridor, measured from the outside (or riverside) of the existing Sewer Access Track.

Where stormwater management ponds occurred, the IAPZ will include these facilities.

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The acceptance by ESA of the 60 metre wide IAPZ was predicated on the vegetation within the river corridor being managed as a Strategic Fire Advantage Zone which is to be maintained to the standards prescribed by the *Strategic Bushfire Management Plan for the ACT – 2014 – Version 3.*

An inspection of the western edge of Denman Prospect and adjoining land to the northwest was undertaken on the 28th November 2014. Attendees were:

- Dave Richardson [LDA];
- Daniel Santosuosso [LDA];
- Adam Leavesley [TaMS];
- Nick Lhuede [ESA],
- Greg Potts [ACT RFS];
- Conrad Barr [ESA][Acting Chief Officer ACT Fire & Rescue],
- Andrew Starke – Commissioner ACT Rural Fire Service;
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

General consensus was reached on the location of the proposed fire protection measures which include the provision of a 60 metre wide IAPZ to the full length of the urban edge; management of a varying width Outer Asset Protection Zone [OAPZ] between the IAPZ and the retained forest vegetation within Denman Prospect and the management of the Territory Land to the northwest and west of the fire protection zones as a series of Strategic Fire Advantage Zones.

Whilst this consensus was broadly spread across the group concern was raised by ESA over the Strategic Fire Advantage Zone extending beyond the boundary of the Denman Prospect precinct and that this issue needed to be addressed before the final support of ESA would be considered.

Another matter raised by ESA related to the environmental consequences of the management of the proposed Outer Asset Protection Zones and SFAZs and the cost of the ongoing management and the long term funding of the management program.

To address the matter of possible environmental consequences of the management of the proposed SFAZs, Umwelt were commissioned to undertake further studies to determine the location of vegetation communities, threatened species and the viability of management of the vegetation to achieve the fuel loads required in a SFAZ.

The results of the study are contained in the Umwelt Report attached as Attachment B.

The Umwelt report identifies an increase in the extent of Box Woodland, confirms the location of Pink Tailed Worm Lizard habitat and also confirms that the management of the SFAZs by hazard reduction burning is ecologically sustainable.

The Umwelt report was reviewed by Adam Leavesley from the Fire Management Unit of TaMS.

An inspection of the southern side of the Molonglo River corridor was undertaken on the 19th March 2015.

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Attendees were:

- Dave Richardson [LDA];
- Daniel Santosuosso [LDA];
- Adam Leavesley [TaMS];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

This inspection examined the bushfire risk to the western edge of the Molonglo River Park and the fire paths/vegetation along the river corridor to the bend in the river, east of the Group Centre precinct.

Consensus was reached that the fire protection principle developed for the northern edge of the corridor [60 metre wide IAPZ within the urban development and management of the river corridor as a SFAZ] would be applied along the southern edge of river corridor.

It was noted that the position of the interface between any IAPZ and SFAZ would be identified at the time of developing EDPs for the length of this corridor in Denman Prospect.

It should be noted that the LDA is undertaking a review of the EPD Group Centre Concept Plan east of John Gorton Drive and south of the river. The review is examining the layout and dwelling densities against rational market expectations.

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ATTACHMENT A – BRIEFING NOTE

UMWELT – 15th October 2013.

KAMA NATURE RESERVE INTERFACE

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umwelt

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Briefing Note

To: Daniel Santosuosso, ACT Land Development Agency
cc: Dave Richardson, ACT Land Development Agency
From: Peter Cowper, Umwelt (Australia) Pty. Limited
Author: Rob Armstrong, Umwelt (Australia) Pty. Limited
Date: 15th October 2013
Subject: Ecological values of the Kama Nature Reserve – Molonglo Stage 3 outer asset protection zone

Purpose

The purpose of this briefing note is to inform the ACT land development agency of the ecological values of the outer asset protection zone for the interface between Kama Nature Reserve and the Molonglo Stage 3 development.

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2.0 Methods 2
3.0 Findings 2
3.1 Area within Kama Nature Reserve 2
3.2 Area within the Molonglo stage 3 development 4
4.0 Conclusions & Recommendations 6
5.0 Site Photographs 7
6.0 References 9

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1.0 Site location

Based on advice from the ACT Land development Agency, the areas which may be managed as part of the outer asset protection zone may include an area of 200 metres either side of the eastern boundary of Kama Nature Reserve. The location of this area is shown in **Figure 3.1**.

2.0 Methods

While undertaking a broader ecological assessment of Kama Nature Reserve and the Molonglo stage 3 development area on 24 September 2013 as part of the review of the draft Environmental Offsets Calculator (Umwelt 2013)[1], Umwelt ecologists undertook a meandering search to verify the ecological assessment undertaken as part of the Molonglo NES plan. Meandering searches considered general condition, the presence of a native understorey, the potential presence and condition of threatened ecological communities and potential habitat for threatened species.

Additionally, one 20x20 full-floristic quadrat which was assessed as part of subsequent condition assessment undertaken by Eco Logical Australia (2013)[2] was surveyed in order to validate findings of this report.

Vegetation survey

Meandering search: Unsystematic wandering across the entire block to supplement floristic information from plot assessment, gain an understanding of species distribution, characterise vegetation communities and determine habitat values.

Full-floristic quadrat sampling: Plot survey to recording cover and abundance of each plant within a defined area. To ensure assessment is in line with ACT Government (2013)[3], a 20x20 metre (0.04 hectare) plot size was chosen to collect species richness data, with habitat variables and cover variables assessed within a 20x50 metre plot and along a 50 metre line-intersect transect respectively.

3.0 Findings

3.1 Area within Kama Nature Reserve

The ecological condition of the 200 metre area inside the eastern boundary of Kama Nature Reserve is variable, comprised of a mosaic of high condition box-gum woodland, low condition natural temperate grassland and low condition scribbly gum woodland. The ecological condition of each vegetation type is outlined in **Table 3.1** and shown in **Figure 3.1**.

Table 3.1 – Ecological condition of vegetation within the eastern 200 metre strip of Kama Nature Reserve

Vegetation zone	Ecological condition
Natural temperate grassland (VT3)	The natural temperate grassland area is characterised by a high cover of kangaroo grass (*Themeda triandra*) and tall speargrass (*Austrostipa bigeniculata*), with few inter-tussock spaces and a low diversity of native forbs. There are few uncommon native species and some disturbance tolerant species in addition to a high cover of the invasive St John's wort (**Hypericum perforatum*). The area has been subjected to moderate alteration through historic grazing management. The area was assessed in line with the Botanical Significance Rating (BSR) for natural temperate grassland as defined by the ACT lowland native grassland conservation strategy (ACT Government 2005)[4]. At present, the area is considered to be a mosaic of moderate (BSR 3) and low (BSR 4) condition. With an appropriate level of active

[1] Umwelt (2013a) Review of ACT Environmental Offsets Calculator. Stage 2. Draft July 2013. Prepared by Umwelt (Australia) Pty Limited on behalf of ACT Land Development Agency.

[2] Eco Logical Australia (2013) Molonglo valley vegetation survey: baseline condition assessment. Prepared for Design & Development, Territory & Municipal Services Directorate (ACT Government), 1 July 2013.

[3] ACT Government (2013) Environmental Offsets Calculator Operational Manual. ACT Environment and Sustainable Development Directorate. Version 20130301.

[4] ACT Government (2005) A vision splendid of the grassy plains extended: ACT lowland native grassland conservation strategy. Action Plan No. 28 (Arts, Heritage and Environment, Canberra).

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	management to reduce biomass and maintain inter-tussock spaces, the area is likely to be of moderate (BSR 3) value. The area is considered to be part of the 'natural temperate grassland of the Southern Tablelands of NSW and the Australian Capital Territory' endangered ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and 'natural temperate grassland' endangered ecological community under the ACT *Nature Conservation Act 1980*. Using condition criteria of ACT Government (2013), this area is in 'moderate/good' condition on the basis that if vegetation is not typified by the presence of paddock trees or native pasture (low condition) then it is in moderate to good condition.
Blakely's red gum - yellow box grassy woodland (box-gum) (partially cleared) (VT1a)	The partially cleared box-gum woodland area is characterised by an open woodland overstorey of Blakely's red gum (*Eucalyptus blakelyi*) which is likely to be have been historically thinned for grazing or other agricultural and land management purposes. The understorey is a mosaic of a moderate to high cover of tussock grasses as per the natural temperate grassland, with approximately 30-40% of the area dominated by exotic pasture patches including wild oats (**Avena* spp.), barley grass (**Hordeum* spp.) and rat's-tail fescue (**Vulpia myuros*), as well as St John's wort and sweet briar (**Rosa rubiginosa*). In native areas there are species which indicate high condition such as blue devil (*Eryngium ovinum*) and early nancy (*Wurmbea dioica* subsp. *dioica*). However, the understorey is not as diverse as box-gum remnants in the central and western portions of Kama Nature Reserve. The area was assessed in line with condition categories in the ACT lowland woodland conservation strategy (ACT Government 2004)[5]. The area is considered to be 'moderately modified lowland woodland'. The area is considered to be part of the 'white box-yellow box-Blakely's red gum grassy woodland and derived native grassland' critically endangered ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and 'yellow box – red gum grassy woodland' endangered ecological community under the ACT *Nature Conservation Act 1980*. Using condition criteria of ACT Government (2013), this area is in 'paddock trees' condition. Native over-storey percent foliage cover is less than 25% of the lower value of the overstorey percent foliage cover benchmark for the relevant vegetation type and less than 50% of ground cover perennial vegetation is indigenous species.
Blakely's red gum - yellow box grassy woodland (box-gum) (VT1)	The box-gum woodland area is characterised by a woodland overstorey of Blakely's red gum and yellow box (*E. melliodora*). The understorey is considered to be in high condition, with a suite of native grasses such as kangaroo grass (*Themeda triandra*), wallaby grasses (*Rytidosperma* spp.) weeping grass (*Microlaena stipoides* var. *stipoides*) and *Aristida vagans*, and forbs including blue devil, early nancy, common sunray (*Triptilodiscus pygmaeus*), scaly buttons (*Leptorhynchos squamatus*), and the native small St John's wort (*Hypericum gramineum*). The area was assessed in line with condition categories in the ACT lowland woodland conservation strategy (ACT Government 2004). The area is considered to be 'partially modified lowland woodland'. As a result of the ground layer vegetation diversity and floristic composition, the area is considered to be relatively good quality example of the 'white box-yellow box-Blakely's red gum grassy woodland and derived native grassland' critically endangered ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and 'yellow box – red gum grassy woodland' endangered ecological community under the ACT *Nature Conservation Act 1980*. Using condition criteria of ACT Government (2013), this area is in 'moderate/good'

[5] ACT Government (2004) Woodlands for wildlife: ACT lowland woodland conservation strategy. Action Plan No. 27 (Environment ACT, Canberra).

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	condition. If vegetation is not in low condition on the basis that if vegetation is not typified by the presence of paddock trees or native pasture (low condition) then it is in moderate to good condition.
Scribbly gum grassy open forest (partially cleared) (VT2a)	The scribbly gum grassy open forest area is characterised by isolated scribbly gum (*Eucalyptus rossii*) and less frequently, red stringybark (*E. macrorhyncha*), broad-leaved peppermint (*E. dives*) and Blakely's red gum. Like VT2 below, the dominance of scribbly gum is possibly due to reduced fertility and soil depth associated with areas at higher elevations within the reserve. The understorey is highly degraded, and dominated by wild oats (*Avena* spp.), brome (*Bromus* spp.) and ryegrass (*Lolium* spp.). Some patches are dominated by native grasses including tall speargrass, wallaby grasses (*Rytidosperma* spp.) and red-leg grass (*Bothriochloa macra*). Exotic forbs such as Paterson's curse (*Echium plantagineum*) and St John's wort are common. The area was assessed in line with condition categories in the ACT lowland woodland conservation strategy (ACT Government 2004). The area is considered to be 'substantially modified lowland woodland'. Using condition criteria of ACT Government (2013), this area is in 'paddock trees' condition. Native over-storey percent foliage cover is less than 25% of the lower value of the overstorey percent foliage cover benchmark for the relevant vegetation type and less than 50% of ground cover perennial vegetation is indigenous species
Scribbly gum grassy open forest (VT2)	The scribbly gum grassy open forest area is characterised by scribbly gum (*Eucalyptus rossii*) and occasional Blakely's red gum. The dominance of scribbly gum is possibly due to reduced fertility and soil depth associated with areas at higher elevations within the reserve. The understorey is in reasonable condition and is floristically similar to VT1. Dominant species include rough speargrass (*Austrostipa scabra* subsp. *falcata*), short wallaby grass (*Rytidosperma carphoides*), ringed wallaby grass (*R. caespitosum*), kangaroo grass and a range of forbs including scaly buttons, stinking pennywort (*Hydrocotyle laxiflora*), spoon cudweed (*Stuartina muelleri*), wood sorrel (*Oxalis perennans*) and Austral stonecrop (*Crassula sieberiana*). The area was assessed in line with condition categories in the ACT lowland woodland conservation strategy (ACT Government 2004). The area is considered to be 'partially modified lowland woodland'. Using condition criteria of ACT Government (2013), this area is in 'moderate/good' condition. If vegetation is not in low condition (paddock trees or native pasture) then it is in moderate to good condition.

3.2 Area within the Molonglo stage 3 development

The ecological condition of the 300 metre area of the western boundary of Molonglo stage 3 development (adjoining Kama Nature Reserve) is generally low, consisting of degraded exotic pastures, and an area containing scattered Blakely's red gum with an exotic understorey. Vegetation type and condition mapping undertaken by ELA (2013) provides a fair representation of ecological values. As requested in project brief, a full-floristic plot surveyed by ELA (2013) (plot O3-01) was surveyed, confirming that the area is dominated by exotic pasture grasses.

The only feature of ecological significance is the presence of five potential pink-tailed worm lizard (*Aprasia parapulchella*) habitat areas. One of these (location PTWL1) is within a patch of diverse native grasses, whereas the others are of moderate to low value due to a higher abundance of Phalaris (*Phalaris aquatica*) and wild oats (*Avena* spp.) These areas are mapped as moderate habitat quality by Osborne & Wong (2010)[6].

[6] Osborne W & Wong D (2010) Extent of potential pink-tailed worm-lizard (Aprasia parapulchella) habitat in the Stage 2 Investigation Area – East Molonglo downstream of Coppins Crossing. Report commissioned by ACTPLA.

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The location of these potential areas is shown in **Figure 3.1**.

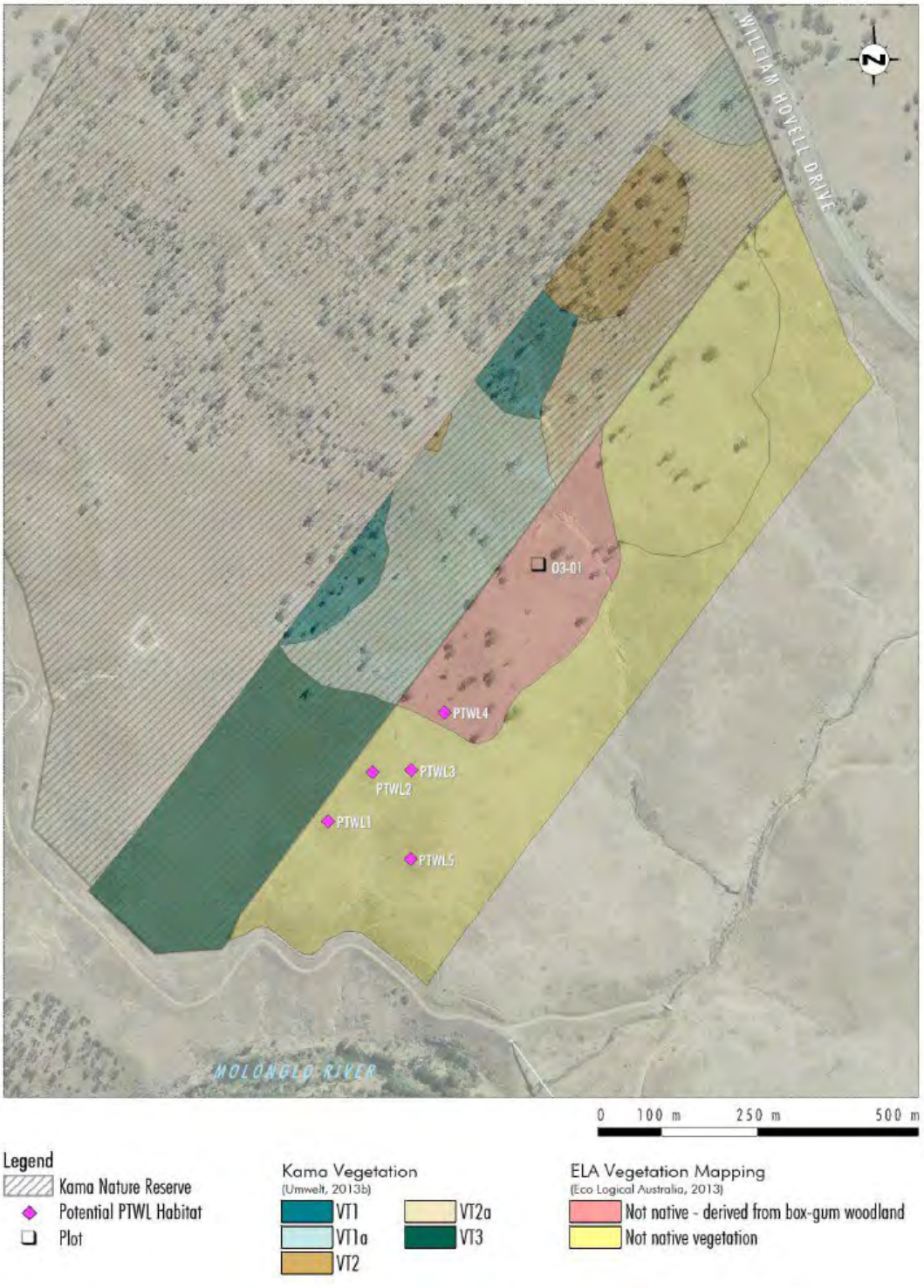

Figure 3.1 - Ecological assets of the outer asset protection zone including potential pink-tailed worm lizard habitat.

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Vegetation types within Kama Nature Reserve are as follows (Umwelt 2013b)[7]:

VT1:	Blakely's red gum - yellow box grassy woodland
VT1a:	Derived mixed exotic and native grassland (derived from VT1)
VT2:	Scribbly gum grassy open forest
VT2a:	Scribbly gum grassy open forest (partially cleared)
VT3:	Natural temperate grassland

4.0 Conclusions & Recommendations

- The ecological condition of the eastern 200 metres of Kama Nature Reserve are generally moderate to high within areas of 'box-gum' woodland and natural temperate grassland. While there are patches dominated by exotic flora which are likely to be improved with some active management. Specifically, the natural temperate grassland and box-gum areas could benefit from active St John's wort control both in areas adjacent to the Molonglo stage 3 development, and broadly across the reserve.

- The ecological condition of the scribbly gum woodland is generally low due to a dominance of exotic perennial grasses. It may be difficult to restore these areas to their former value, although supplementary tree planting may assist in a move towards this by reducing the available sunlight to the exotic grasses.

- There are at least five potential pink-tailed worm lizard habitat areas within areas identified as the Molonglo stage 3 outer asset protection zone; there may be additional based on findings by Osborne & Wong (2010). It is recommended that these be considered in the context of the Molonglo Valley NES Plan and associated implications for development in meeting obligations under the approved strategic assessment.

[7] Umwelt (2013b) Briefing note: vegetation mapping for Kama Nature Reserve, Molonglo. Prepared by Umwelt Pty Limited for Daniel Santosuosso, ACT Land Development Agency. 11 October 2013.

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5.0 Site Photographs

Photo 1: Natural temperate grassland in the south-eastern corner of Kama Nature Reserve, with considerable cover of exotic St John's Wort.

Photo 2: Blakely's red gum - yellow box grassy woodland (box-gum) (partially cleared) (VT1a), inside Kama Nature Reserve.

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Photo 3: Scribbly gum grassy open forest (partially cleared), with a mosaic of native and perennial exotic grass understorey, inside Kama Nature Reserve.

Photo 4: Exotic Phalaris and wild oats dominated pastures, inside the Molonglo stage 3 development area.

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ATTACHMENT B – ANALYSIS OF VEGETATION STRUCTURE AND FIRE RISK – WEST DENMAN PROSPECT

UMWELT – April 2015.

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Aloisi, Angelina

From: Richardson, Dave
Sent: Tuesday, 25 August 2015 2:56 PM
To: ABPP
Cc: Santosuosso, Daniel
Subject: Molonglo Strategy
Attachments: P00971-Molonglo Valley Bushfire Plan V4.pdf

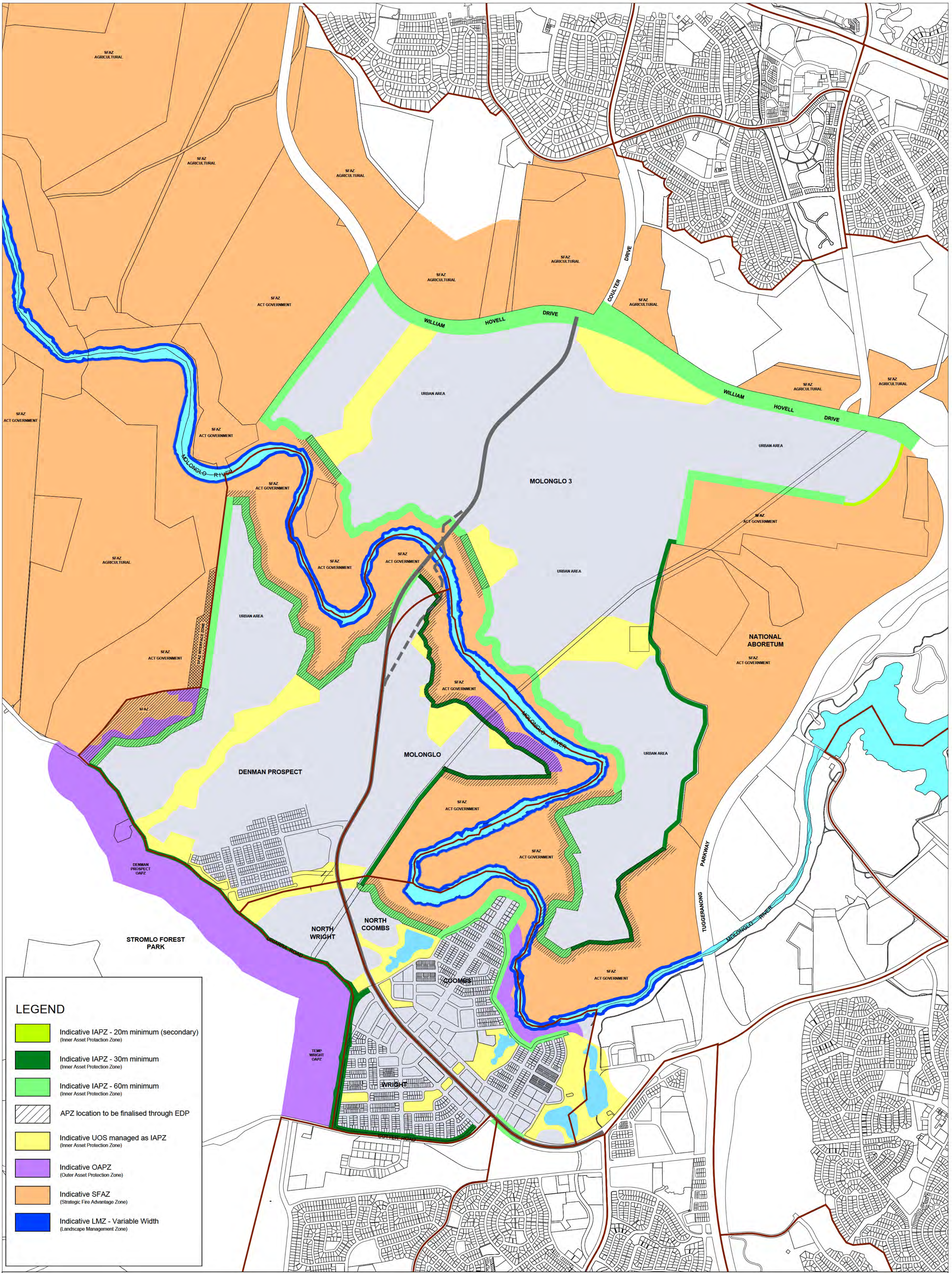
Importance: High

Graham,

In relation to the river corridor, what BAL levels should apply? Any comments welcome! Please see Dan's revised plan for reference.

Regards

Dave



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DIRECTORATE/DEPARTMENT

ACT Government | Land Development Agency CANBERRA FIRST

PROJECT

Molonglo Valley

DRAWING TITLE

Bushfire Management Plan

PROJECT NUMBER	DRAWING NUMBER	AMENDMENT
P00971	1	D
DATE ISSUED:	Plot Time/Date: Wednesday, 12 August 2015 11:26:54 AM	

Aloisi, Angelina

From: Richardson, Dave
Sent: Tuesday, 25 August 2015 3:34 PM
To: ABPP
Cc: Santosuosso, Daniel
Subject: Molonglo Strategy
Attachments: B132154 - A3 - Molonglo Stage 3; Denman Prospect & Molonglo River Corridor ACT - Bushfire Risk Assessment - LDA - 29.5 DR Add - TC Off 14082015 V2.docx

Importance: High

Graham,

Here is the near finished document. Still need some comment re BALs to river corridor and need to add more from the Coleman report.

Fig 1 is being redone now and will be available in the morning. Will talk to Dan re figure 5 which is an Umwelt plan showing OAPZ all up the western edge of DP. It should agree with figure 3.

For some reason I can't get the page numbers to flow. It gets to about page 67 okay and then the landscape plans throw it out of kilter and no matter what I try, I can't get them to read correctly after that. I will ask Kellie in the morning to go through it for us correcting formatting to agree with yours.

Any comments welcome.

Want to get this to Nick tomorrow at the very latest.

Regards

Dave

BUSHFIRE RISK STRATEGY MOLONGLO

STAGE 3; DENMAN PROSPECT &

THE MOLONGLO RIVER CORRIDOR

AUSTRALIAN CAPITAL TERRITORY

PREPARED FOR THE LAND DEVELOPMENT AGENCY

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STAGE 3; DENMAN PROSPECT &

THE MOLONGLO RIVER CORRIDOR

AUSTRALIAN CAPITAL TERRITORY

PREPARED FOR THE LAND DEVELOPMENT AGENCY

Assessment Number	Document	Preparation Date	Issue Date	Directors Approval
B132154 – A3	Final Draft	25.8.2015	25.8.2015	*G.L.Swain*

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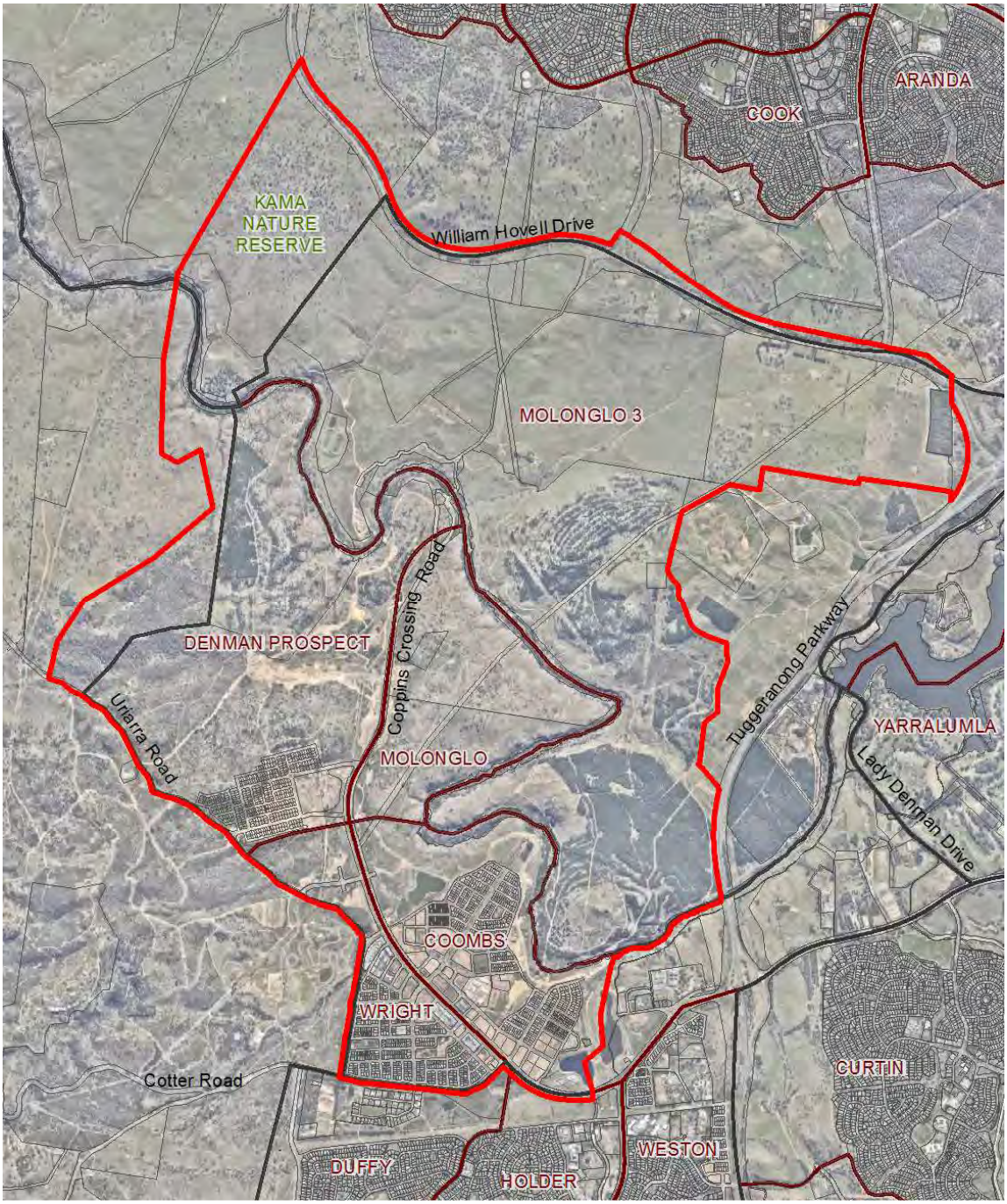
SECTION 1

INTRODUCTION

1.1 Background.

Australian Bushfire Protection Planners Pty Limited has been commissioned by the Land Development Agency [LDA] to undertake a Bushfire Study for Molonglo Stage 2, Stage 3 and the Molonglo River Corridor. **Figure 1** shows the study area.

Figure 1 – Plan of Study Area.



The objective of the brief is to guide the development of the Land Development Agency Masterplan for the Molonglo Stage 3 study area, review the bushfire

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protection measures to Molonglo Stage 2 [Denman Prospect] and the Molonglo River Corridor and prepare a report on the findings of the study detailing the recommended bushfire protection measures identified by the study group.

Scope of Work – Molonglo Stage 2/3 and Molonglo River Corridor Study:

1. Review existing literature/reports & studies;

2. Review the study undertaken by Umwelt to determine the ecological constraints and opportunities for fuel hazard reduction management;

3. Attend pre-workshop site familiarisation;

4. Attend and participate in a workshop between LDA, Umwelt, TaMS Fire Management Unit and EPD to discuss all issues related to the protection of the north-western edge of Molonglo Stage 3; the western edge of Molonglo Stage 2 and the Molonglo River corridor;

5. Examine the results of the workshop, liaise with LDA & Umwelt and others [as required] to identify the measures which are required to be implemented to mitigate the potential bushfire risk;

6. Attend and participate in a follow-up workshop between LDA, Umwelt, TaMS Fire Management Unit, EPD, ESA, ACTRFS, Fire & Rescue ACT and other selected Stakeholders to present the findings/results of the initial workshop and the recommendations determined in the review of these findings/results;

7. Review the results of the follow-up workshop, liaise with LDA & Umwelt and others as required, to finalise the measures which are required to be implemented to mitigate the potential bushfire risk;

8. Prepare, in co-operation with Umwelt, a report which details the findings of the studies undertaken, the results of the workshops and the final recommendations on those measures required to be implemented to mitigate the bushfire risk to the western, north-eastern urban edge and the Molonglo River corridor;

9. Attend and participate in a final workshop between LDA, Umwelt, TaMS Fire Management Unit, EPD, ESA, ACTRFS, Fire & Rescue ACT and other selected Stakeholders to present the final report;

10. Generally, liaise with LDA, Umwelt, TaMS, ESA, ACTRFS, Fire & Rescue ACT and other ACT Government Departments as required.

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1.2 Information Reviewed.

The following report/studies were reviewed as part of the scope of works:

- The Molonglo River Park – Concept Plan prepared by Hassell – September 2011;
- The Molonglo Valley Plan for the Protection of Matters of National Environmental Significance [NES Plan] September 2011;
- Molonglo Vegetation Survey – Baseline Condition Assessment prepared by Ecological Australia – July 2013;
- Molonglo Stage 3 Slope Analysis – LDA;
- Bushfire Risk Assessment Report – Molonglo Structure Plan – prepared for ACTPLA, 19.7.2005;
- Updated Bushfire Risk Assessment Report – Molonglo Structure Plan – prepared for ACTPLA – 26.4.2006;
- Bushfire Risk Assessment Report – Molonglo Stage 2 Group Centre prepared for Indesco 23.8.2012;
- Territory Plan - ACTMAPi;
- Molonglo Stage 2 Vegetation Conservation Assessment prepared by Openlines, February 2014;
- Indicative Fire Management Strategy – Urban Area – TaMS – 2015;
- Indicative Fire Management Strategy – Molonglo Valley – TaMS – 2015;
- Analysis of Vegetation Structure and Fire Risk – Umwelt – April 2015;
- Molonglo River Reserve [Kama] Operational Plan 2014 – 2017 – TaMS;
- ACT Strategic Bushfire Management Plan – Version 3 – 2014;
- ACT Bushfire Management Standards – Strategic Bushfire Management Plan – Version 3 – 2014;
- Briefing Note on the Ecological Values of the Kama Nature Reserve – Molonglo Stage 3 Outer Asset Protection Zone – Umwelt – October 2013;
- Bushfire Risk Assessment for the north-western edge of Denman Prospect [Aurecon Australia Pty Ltd – 25.2.2014] - Incomplete.

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1.3 Review of Documents.

The following documents have been reviewed and a brief summary of the findings/recommendations of each follows. A more complete summary is at **Appendix A**:

1. Bushfire Risk Assessment Reports prepared by Australian Bushfire Protection Planners Pty Ltd [ABPP] for the Molonglo Structure Plan [August 2005 & April 2006];
2. The Molonglo River Park Concept Plan – ESDD (Hassell) – 2012;
3. The NES Plan – ACTPLA - 2011;
4. The Adaptive Management Strategy – TaMS – 2013; and
5. The Draft Indicative Fire Management Strategy – Molonglo Valley – TaMS – 2015.

1.4 Summary of the Review of Reports.

The following is a summary of the findings/recommendations of the documents reviewed:

1. **Bushfire Risk Assessment Reports prepared by ABBP – 2005 & 2006:**

The Bushfire Risk Assessment Report 2005 prepared by ABPP stated:

"The long exposure of the north-western edge of the precinct to uphill burning fires, influenced by hot, dry, strong north-westerly winds, will result in significant fire impact either directly or indirectly from ember attack, depending on the level of protection provided by active management of the fuels within the river corridor.

Similar impacts may also occur to the western / south western edge from westerly and south-westerly wind-driven fires and the influence of wind turbulence in the Mount Stromlo area.

The northern edge will be impacted by fires burning within the habitat corridor, north of William Hovell Drive.

Due to the level of risk and to address the potential impacts of future bushfires to the exposed urban edge and the concerns over the long-term viability of minimising fuel loads within the abatement zone, a Critical Management Zone should be provided to a minimum width of 300 metres.

The objective of land uses within the Critical Management Zone should be to provide permanent management of the hazardous fuels to levels which prevent the spread of fire into the urban edge.

The Molonglo River Corridor will separate the eastern development node from the western development node and therefore provide a direct fire path into the suburbs adjoining the corridor and to the International Arboretum to the south east.

The river corridor separating the north-eastern and south-western nodes of the East Precinct should be activity managed as a recreation reserve/public park to mitigate the effects of fire runs along the river".

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The Bushfire Risk Assessment Report 2006 prepared by A B P P retained the recommendation for the provision of a Critical Management Zone to the north-western edge of Molonglo and notes that the Draft Structure Plan had introduced 'Lake Molonglo' with the construction of a new dam on the Molonglo River.

For the Critical Management Zone [CMZ] the report stated:

- ***Purpose.***

To provide a permanently managed fuel reduced zone, wide enough to mitigate the impact of radiant heat and ember transfer to the urban edge during major bushfire events.

- ***Location.***

The Critical Management Zone shall be located beyond the edge of the Inner Asset Protection Zone on the north-western and northern edge of the western "node" and the south-western edge of the East Molonglo precinct; the northern, north-western, western and south-western edge of the Central Molonglo.

- ***Depth.***

A minimum width of 300 metres shall be provided. (Minimum 100 metres width provided to the north-western edge of the East Molonglo precinct).

- ***Establishment & Maintenance.***

The Critical Management Zone shall be established on the hazard side of the Inner Asset Protection Zone and shall extend to the widths nominated.

The zone may contain agricultural pursuits which permanently minimise combustible fuel ground litter, (vineyards, orchards); or land uses that utilize irrigation supply drawn from grey water recycling, or irrigation from the new lake created by the damming of the Molonglo River. Such land uses may include the cultivation of summer crops/Lucerne.

The Critical Management Zone may also include recreation and open space facilities such as Golf Courses, Sports Fields, Carparks etc.

Where these land uses are not utilized to provide the Critical Management Zone and the zone consists of Habitat Corridors/Rural Land, a stock proof fence with access gates shall be provided on the outer edge of the zone. A 30 metre wide wind break shall be established by planting smooth barked trees on the outer edge of the zone. A second wind break shall be established to a width of 10 metres, 10 metres from the Inner Asset Protection Zone/Critical Management Zone boundary.

A four (4) metre wide fire trail shall be established on the centre line of the Critical Management Zone, with link roads provided to the edge road at approximately 500 metre intervals.

Management of the combustible fuels within the CMZ shall be undertaken to maintain a Low – Moderate Overall Fuel Hazard, in accordance with the methodology provided by the NRE Overall Fuel Hazard Guide. Management shall be implemented by regular stocking of the zone, or by a combination of mechanical slashing/stocking/hazard reduction burning. A Fuel Management Plan shall be prepared for the maintenance of the Critical Management Zone, irrespective of land use".

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The final Structure Plan for Molonglo removed the damming of the Molonglo River, primarily due to the results of ecological studies, and replaced the lake with the Molonglo River Park [Nature Reserve] and established the Kama Nature Reserve to the northwest of Molonglo Stage 3.

These changes to the Draft Structure Plan – i.e. establishment of a Nature Reserve to the northwest of Molonglo Stage 3 and within the Molonglo River corridor, increase the bushfire risk to future development located adjacent to the north-western edge and to both sides of the river corridor.

The examination of the mitigation measures required to provide a reduction of this risk forms the core objective of the Working Group established by the Land Development Agency.

2. Molonglo River Park Concept Plan – ESDD (Hassell) – 2012

The Molonglo River Park Concept Plan prepared by Hassell supports the recommendation of the provision of the 300 metre wide 'Critical Management Zone' to the north-western edge. Note that the Hassell concept plan was completed after the NES Plan and before the Adaptive Management Strategy and presented recommendations for the management and development of the river corridor.

The Concept Plan also recommended that the river corridor should be managed for ecological values with the corridor being broken into precincts to prevent the 'wick' effect and in particular the management of the western entrance to the river park and the area around the sludge ponds to mitigate the passage of fire along the river.

It calls for strategic discontinuity zones within the riparian corridor which aim to reduce the ability of a fire to move continuously up the corridor and into the urban areas, and provide access for defense and fuel management. One of those areas would be located around and to the west of Coppins Crossing, from the proposed sewer line crossing to the proposed John Gorton Drive crossing the river. Another one would be at Misery Point.

The Hassell report goes on to describe the vegetation in the recreation areas would contain large areas of groomed grassland maintained to a height of less than 100mm with scattered tree planting as well as formal parks and gardens with irrigated plantings.

3. The NES Plan – 2011:

The NES Plan provided, under Section 2.3 – Bushfire Management Framework a 'motherhood' statement about bushfire management which reads:

"Within the strategic assessment area fire management will be aimed at protection of both built assets and MNES values. This will be achieved through the identification of appropriate asset protection zones and application of hazard reduction techniques that will both:

- *Ensure that the standards for fuel loads in the SBMP are met; and*
- *Protect MNES values through the use of sympathetic management techniques".*

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The aim of this document does not address the recommendation that the vegetation in the river corridor or on the land to the west of Molonglo 3 [Kama] and Denman Prospect be managed to mitigate the impact of fire on the north- western edge of the future urban development and from a fire spreading along the river corridor.

In the document under Management and offsetting it called for the establishment of a buffer outside of the Kama Nature Reserve on its eastern side to protect the ecological values of the reserve. It went on under Commitments to MNES:

"Establish a buffer outside the Kama Nature Reserve between the reserve and the proposed development area, and allow for appropriate uses consistent with nature conservation uses of the reserve. The buffer will be developed to ensure that fire management is undertaken outside of the Kama Nature Reserve and will provide protection against urban edge effects."

It assumed that ESA would agree to no bushfire management inside Kama Nature Reserve despite there being a requirement underlying strategic bushfire management in the ACT that individual land managers are responsible for bushfire management on the land they manage. It also assumed that no bushfire management would be undertaken despite Kama being identified on the ESA website as being managed as an SFAZ (agricultural).

There are no dimensions provided in the NES Plan for the width of the buffer.

The document does not address the potential bushfire risk to the future development adjacent to the north-western edge or the river corridor.

4. The Molonglo Adaptive Management Strategy – TaMS 2013

The Molonglo Adaptive Management Strategy (AMS) was a key commitment from the NES Plan. Its purpose was to define a set of measures designed to achieve the conservation outcomes and performance targets for MNES in Molonglo strategic assessment area.

One of the outcomes of the baseline condition assessment was that an assessment of the buffer zone consisting of patches O2, O3 and O4 located to the east of Kama Nature Reserve found that these patches were not representative of a Threatened Ecological Community.

Under Management Objectives for fire, the document makes the statement that fire management activities for the purposes of protecting the urban development east of Kama Nature Reserve will be undertaken outside Kama Nature Reserve. It goes on to mention:

"The prescribed eastern buffer zone for Kama Nature Reserve is to ensure that fire management is undertaken outside of the Reserve and will provide protection against edge effects."

There are no dimensions provided in the AMS that defines the width of the buffer to Kama Nature Reserve.

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The document does not address the potential bushfire risk potential to the future development adjacent to Kama Nature Reserve.

5. **Draft Indicative Fire Management Strategy – TaMS 2015:**

TaMS have prepared a draft Indicative Fire Management Strategy – Urban Area and the Indicative Fire Management Strategy – Molonglo Valley. The review of these documents has found that few of the recommended bushfire management strategies contained within the Molonglo River Concept Plan have been incorporated into the management strategies proposed by TaMS.

The recommendation provided in the Australian Bushfire Protection Planners reports and the Molonglo River Concept Plan that a 'Critical Management Zone [CMZ] be provided to the northwest of the urban development [and river park] was not adopted in favour of ecological and habitat values.

Similarly, the Molonglo River Concept Plans' recommendation that the river corridor be broken into precincts to prevent the 'wick' effect and in particular the management of the western entrance to the river park and the area around the sludge ponds to mitigate the passage of fire along the river was not adopted.

These items are critical to the prevention of fire spread along the river corridor and should be reinstated or at least given proper consideration.

1.5 Working Group.

In late 2013 the LDA identified the need to establish a working group to examine the outstanding issues relating to the bushfire risk to the north-western edge of Molonglo 3; Molonglo Stage 2 [Denman Prospect] and the Molonglo River Corridor.

The brief of the Working Group was to bring together all Government Agencies involved in the development of the Molonglo East precinct to enable consideration of previous studies, undertake site inspections and consider all options available so as to develop a report that establishes the principles, processes and funding required to address the bushfire risk. Representatives of Government Agencies included:

- Dave Richardson [LDA];
- Kerry Browning [LDA];
- Adam Carmody [LDA];
- Dylan Kendall [TaMS];
- Adam Leavesley [TaMS];
- Nick Lhuede [ESA];
- Greg Potts [ACT RFS];
- Conrad Barr [Acting Chief Officer] ACT Fire & Rescue;
- Andrew Starke – Commissioner ACT Rural Fire Service;
- Ros Ransome [TaMS];
- Steven Gianakis [EPD];
- Daniel Iglesias [TaMS];
- Tony Corrigan [TaMS]; and
- Stuart McKenzie [EPD]

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Two external companies were commissioned to provide assistance to the Working Group, Umwelt to undertake a peer review of the previous ecological studies and additional ecological investigations and ABBP to provide advice on bushfire risk, fire protection strategies and the preparation of a Bushfire Report.

These companies were represented by;

- Peter Cowper Armstrong [Umwelt];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

Appendix B provides details on the Working Group, including meeting and site inspection dates, attendees and decisions/resolutions determined.

1.6 Studies Undertaken by Umwelt.

Stemming from the second meeting of the Working Group the LDA commissioned Umwelt to undertake a study into the ecological values of the Kama Nature Reserve – Molonglo Stage 3 Outer Asset Protection Zone.

A copy of the study prepared by Umwelt [15th October 2013] is attached as **Attachment A**.

The purpose of the study was to provide LDA with a comparison of the ecological values of the 200 metre zone either side of the interface between Kama Nature Reserve and the Molonglo Stage 3 development.

The findings of the study identified that the condition of the 200 metre wide area inside the eastern boundary of Kama Nature Reserve is variable, comprised of a mosaic of high condition box-gum woodland, low condition natural temperate grassland and low condition Scribbly Gum woodland.

The ecological condition of the 300 metre wide area of the western boundary of Molonglo Stage 3 [adjoining Kama Nature Reserve] is generally low, consisting of degraded exotic pasture, and an area containing scattered Blakely's red gum with an exotic understorey and is not the Box-gum Woodland community.

The report confirms that the area is dominated by exotic pasture grasses and the only feature of ecological significance is the presence of five potential pink- tailed worm lizard habitat areas. One of these [location PTWL1] is within a patch of diverse native grasses, whereas the others are of moderate to low value due to a higher abundance of Phalaris and wild oats. These areas are mapped as moderate habitat quality by Osborne & Wong [2010].

Refer to **Figure 2** – Ecological Assets of the Outer Asset Protection Zone including potential Pink-tailed Worm Lizard habitat.

Figure 3 provides a copy of the project area studied by Umwelt, the location of the Outer Asset Protection Zone within the urban boundary of Denman Prospect; the Strategic Fire Advantage Zones and the 'Interface Zone' to the west of Denman Prospect.

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Figure 2 - Ecological Assets of the Outer Asset Protection Zone including potential Pink-tailed Worm Lizard habitat – Umwelt Briefing Note 15th October 2013 – Kama and Molonglo 3.

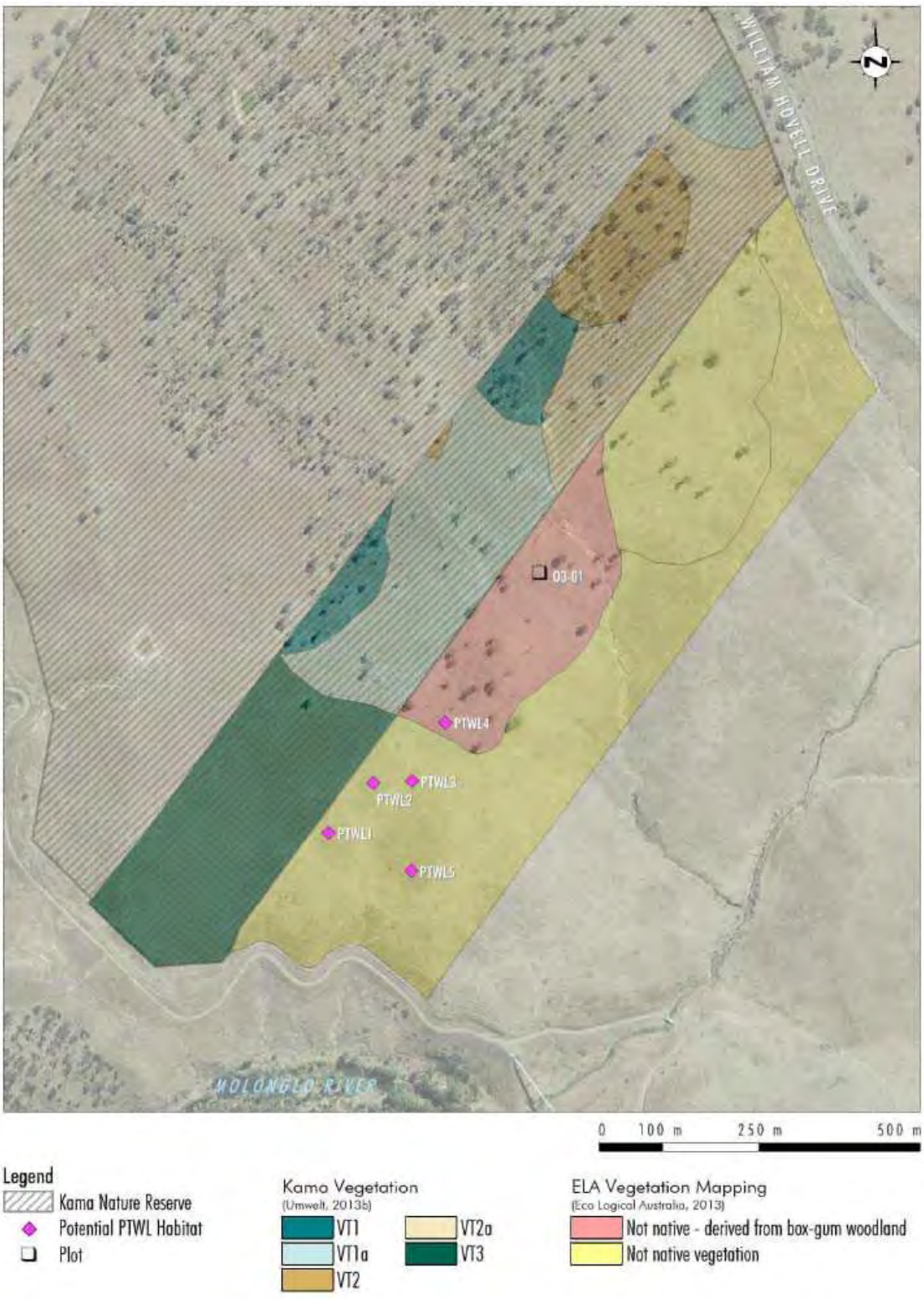

Figure 3.1 - Ecological assets of the outer asset protection zone including potential pink-tailed worm lizard habitat.

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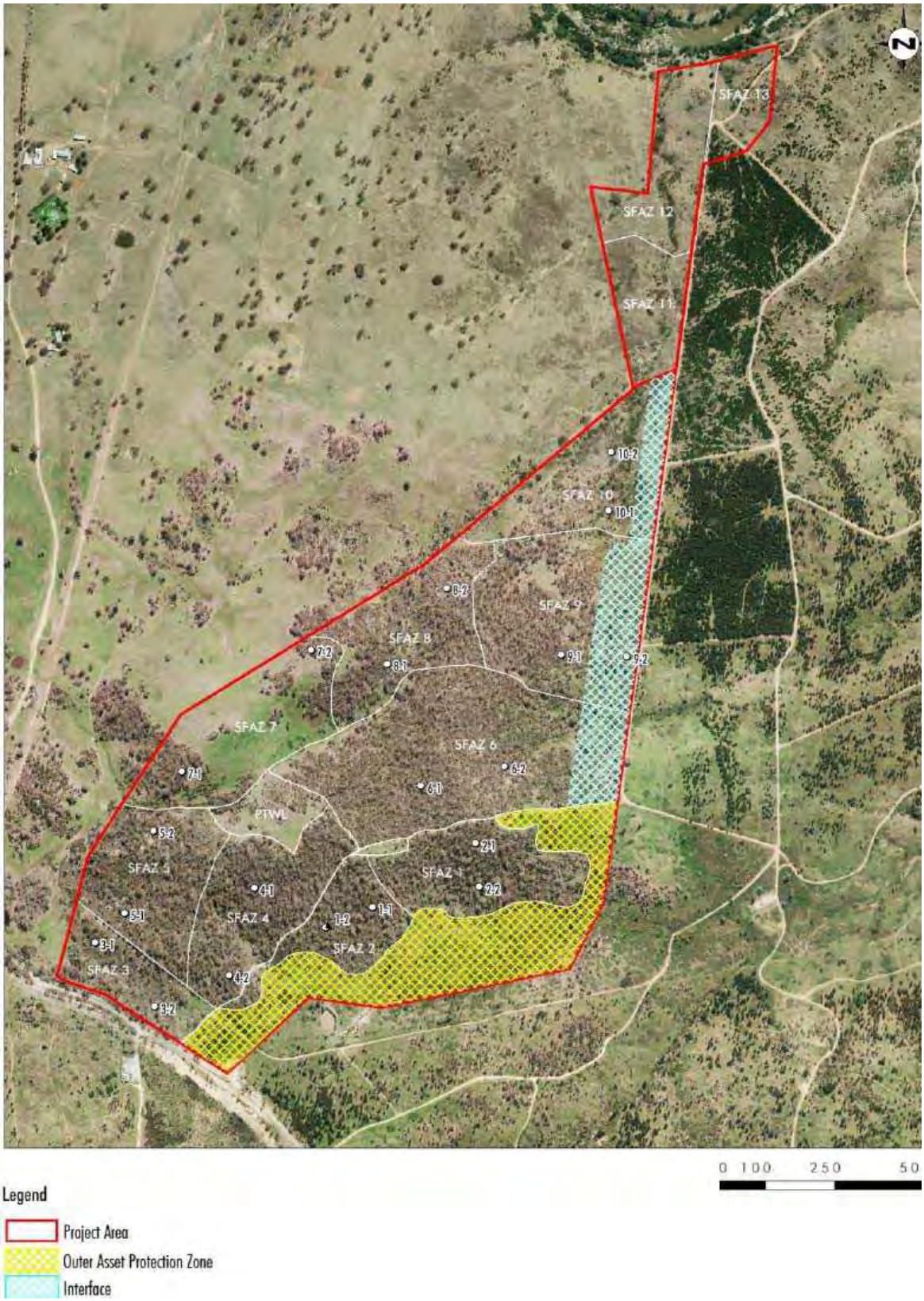
Figure 3 – Plan showing the study area, the location of the Outer Asset Protection Zone; Strategic Fire Advantage Zones and Interface Zone – Denman Prospect, prepared by Umwelt April 2015



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The LDA commissioned Umwelt to undertake an analysis of vegetation values in areas west of Denman Prospect and identify practical solutions to meet joint objectives of fuel hazard management and biodiversity conservation.

A copy of the final report dated April 2015 is at **Attachment B**.

The key messages of the report include:

1. Much of the vegetation within the Project Area is in a regenerating thicket state from the 2003 wildfires;

2. Vegetation in a regenerating thicket state will benefit from active management to promote restoration of the remnant to a state which accelerates the provision of structural diversity important for both fauna and flora diversity. This is demonstrated through discussion of the state and transition model concept;

3. Active management of regenerating thicket vegetation will provide greater opportunity for fire management and suppression, reducing the likelihood of a major fire event compromising biodiversity values in the future;

4. Research outlined in the report suggests that reducing the density of smaller stems that compete strongly for resources leads to greater structural and floristic diversity and subsequent greater conservation values. The use of hazard reduction burning as a tool to achieve this is unlikely to reduce understory vegetation diversity provided burn intervals are set at the lower limits by maturity of smaller plants and non-breeding periods of poorly dispersed or rare birds, and at the upper limits by the longevity of plants which usually required fire as part of the reproductive cycle;

5. Hazard reduction burns in Red Stringybark Dry Sclerophyll Forest within the project area should be initially undertaken in a mosaic every five to ten years. For Box-Gum Woodland burns should not occur in periods of less than 10 years and longer should fuel levels remain naturally low or other fuel management techniques be used.

   Practical implementation of this measure should be done in consultation with ACT Government Conservation Planning and Research officers to determine the most appropriate interval between burns, particularly to each Strategic Fire Advantage Zone [SFAZ];

6. Management should be undertaken with adaptive management principles in mind. This will ensure an iterative process of robust decision making in the face of uncertainty, with uncertainty reduced over time as determined by monitoring;

7. Hazard reduction burning should be avoided in areas of known Pink- tailed Worm Lizard habitat; if hazard reduction burning occurs this should happen between late winter and mid spring [preferably in August to September].

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Section 6 – 'Conclusion' of the Umwelt report provides recommendations for the management of the Strategic Fire Advantage Zones, including by hazard reduction burning; silvicultural thinning; combined approach and the management of areas known to contain Pink-tailed Worm Lizards.

Section 6 also provided recommendations on the management of the Outer Asset Protection Zone, including hazard reduction burning and silviculture within the 'Box-Gum Woodland' along the eastern boundary.

Section 6.3 covers the management of the 'Urban Interface' along the eastern edge of the project area [to the western edge of Denman Prospect]. This zone consists of a 100 metre wide corridor adjacent to the urban interface and is considered to be a primary fire threat to the proposed Denman Prospect development. It also contains natural assets including 'Box-Gum Woodland' in an advanced regeneration state. This vegetation is likely to regenerate into an open forest structure without management.

The report states:

"In order to protect important values within the 'Box-Gum Woodland' area and to mitigate bushfire risk to the adjacent urban development, it is recommended to use silviculture thinning to accelerate an open woodland structure as a primary management tool in this area. This treatment is only required for SFAZ6 and SFAZ 7.

Ongoing management of grassy sward fuel may be required in the event of grassland fire hazard exceeds 35 when grass curing is > 70% [refer to Table 21.5 and Table 21.8 in the ACT Strategic Fire Management Plan – 2014 – Version 3'.

Figure 4 below identifies the maximum 'Overall Fuel Hazard Assessment' ratings for each SFAZ.

Figure 5 on page 18 shows the distribution of Box-Gum Woodland within the Project Area.

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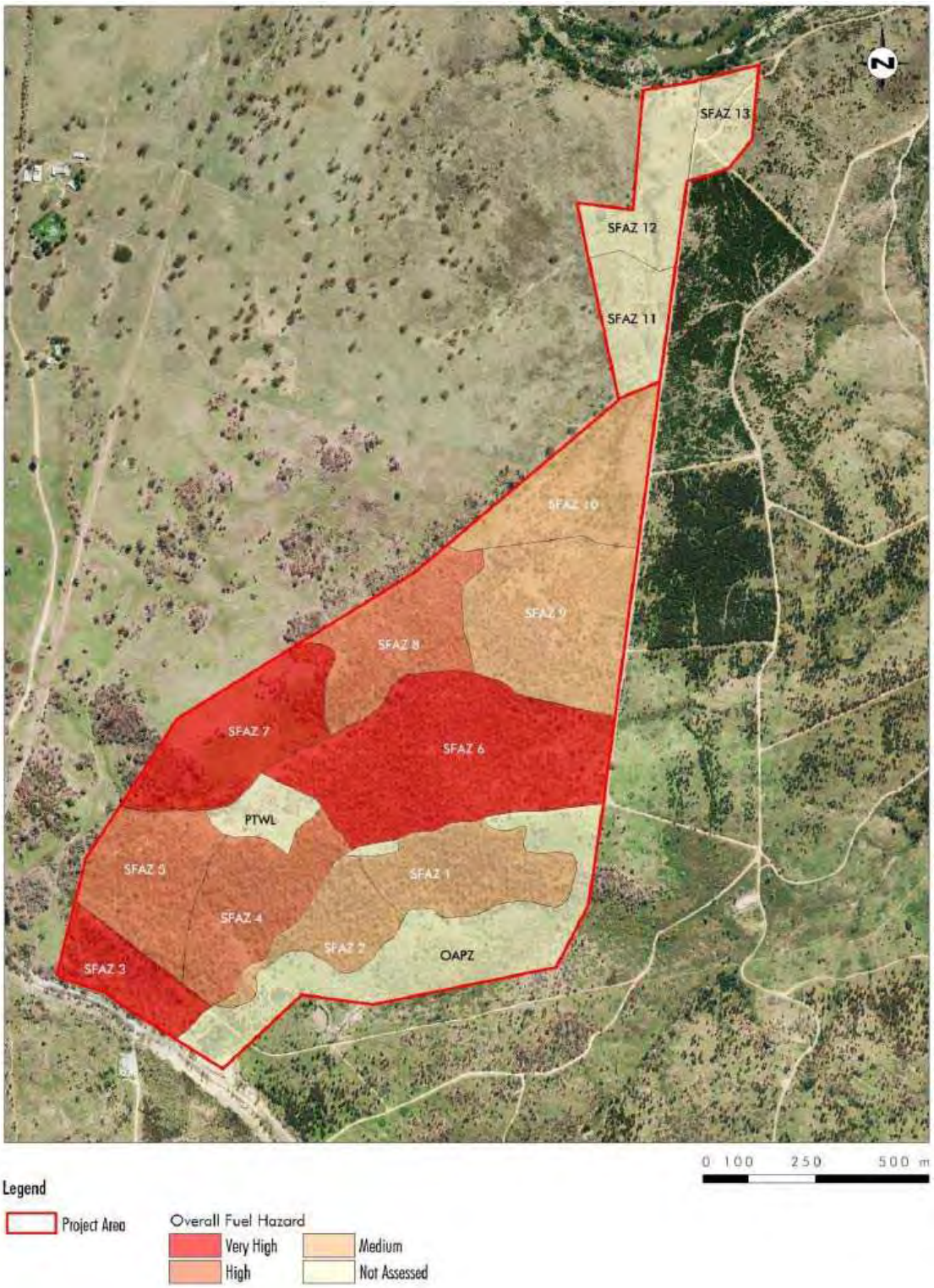
Figure 4 – Denman Prospect maximum 'Overall Fuel Hazard Assessment' ratings for each Strategic Fire Advantage Zone – Umwelt April 2015



Note: due to subjectivity in the assessment method, areas with a 'Medium' hazard may in fact be 'High', or tending to 'High' i the near future as stringybark bark matures, stem charring is reduced and leaf litter accumulates.

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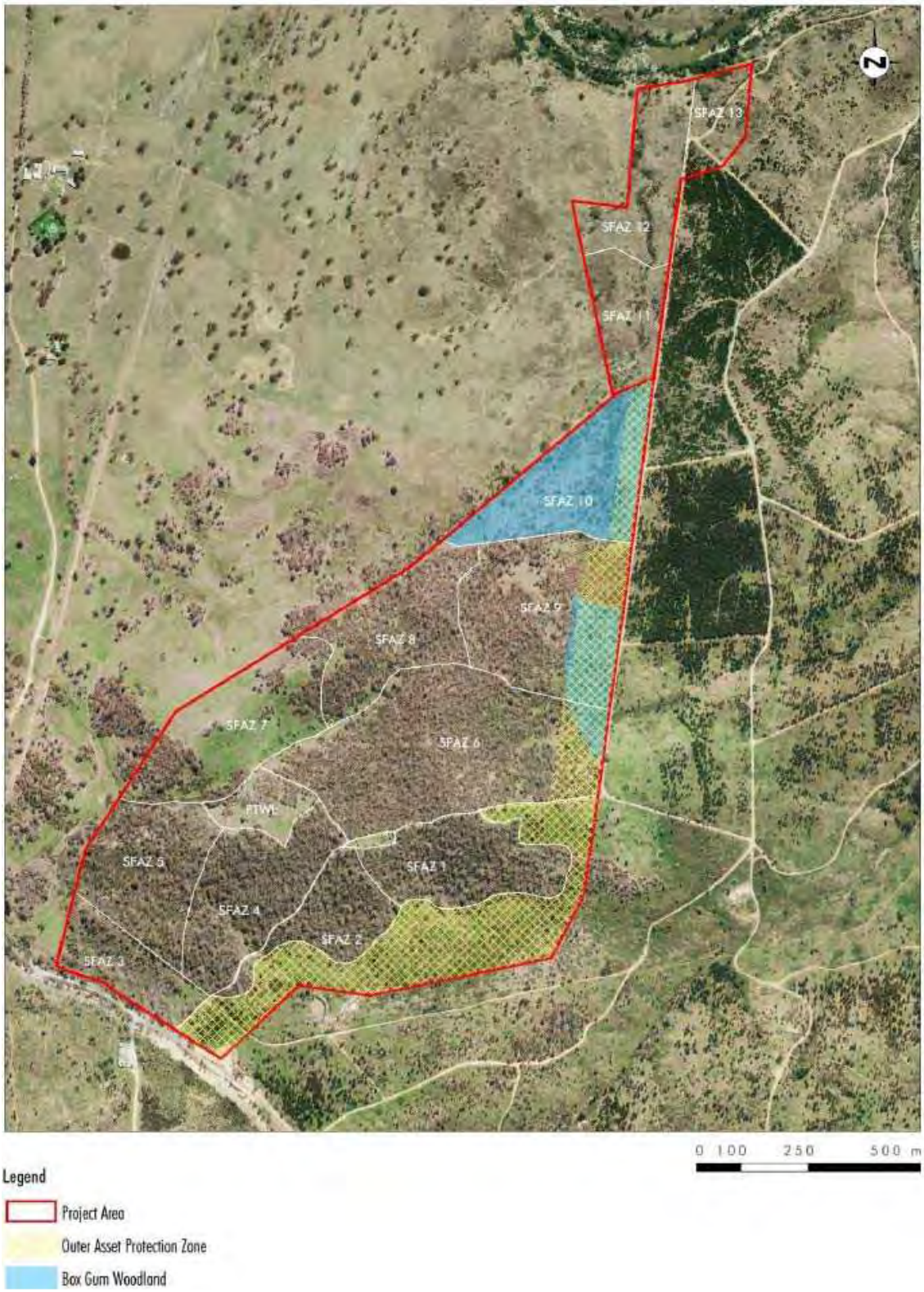
Figure 5 – Denman Prospect distribution of Box-Gum Woodland within the Project Area – Umwelt April 2015



Confusing as it shows OAPZ over SFAZ along western edge. This could be the "interface area" and is a "special" SFAZ requirement.

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SECTION 2
BUSHFIRE RISK ASSESSMENT

2.1 Introduction.

The Australian Standard AS/NZS ISO 31000:2009, the ACT Government Enterprise-wide risk management framework and the Emergency Management Australia (EMA) emergency risk management process provide the framework for establishing the context, analysis, evaluation, treatment, monitoring and communication of risk.

Risk has two elements: Likelihood, the chances of a bushfire occurring and consequence, the impact of a bushfire when it occurs.

Bushfire risk is defined as the chance of a bushfire occurring that will have harmful consequences to human communities and the environment. Bushfire risk is usually assessed through consideration of the likelihood of ignition and consequences of a bushfire occurring. Risk reduction can be achieved by reducing the likelihood of a bushfire, the opportunity for a bushfire to spread or the consequence of a bushfire (on natural and built assets).

Bushfire management should have a clear objective to reduce both the likelihood of bushfires and reduce the negative impacts of bushfires. It should also consider the costs, inconvenience and dangers of measures taken to reduce the risk of bushfires.

The consequences of bushfire management activities and the failure to implement programs also need to be considered. A range of factors influence bushfire risk – these include:

- The likelihood of human and natural fire ignitions, as influenced by time, space and demographics;
- The potential spread and severity of a bushfire, as determined by fuel, topography and weather conditions;
- The proximity of assets vulnerable to bushfire fuels, and likely bushfire paths; and
- The vulnerability of assets including natural assets, or their capacity to cope with, and recover from bushfire.

An assessment of bushfire risk must firstly define the problem. This involves the identification of the nature and scope of issues to be addressed and defining the possible boundaries for the assessment *(Emergency Risk Management – Applications Guide. (EMA Echo Press, 2000), and AS/NZS* ISO 31000:2009*).*

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For the purpose of analysing fire risks that might emerge in the ACT, a dangerous and damaging fire has the potential to occur when the following conditions prevail:

- Continuous available fuel – fuel at moisture content sufficiently low to enable rapid combustion, arising from drought effects or the maturing and drying, of grasslands;

- Exposure of vulnerable assets. The 'catchment' for such fires may be within several hundred metres or many (60-70) kilometres from the asset/s;

- A combination of weather conditions that generate a forest or grass fire danger index of Very High (24) or greater. Typically in the ACT, prevailing adverse fire weather will have a strong northerly, through south-westerly wind influence;

- Fire in the landscape not effectively suppressed.

2.2 Risk Assessment.

Australian Bushfire Protection Planners Pty Limited prepared a Bushfire Risk Assessment Report in 2005 for the Molonglo Structure Plan.

The findings of this report, in respect to the bushfire risk, fire paths and potential fire scenarios are applicable for the Molonglo Stage 3, Denman Prospect and the Molonglo River Corridor – refer to Attachment A.

An extract from this report states under 'Summary of Bushfire Risk':

"Major bushfires have occurred in the Molonglo Valley in 1926, 1939, 1952, 1991, 1994, 2001 and 2003.

The topography and landform of the valley predisposes the valley to impacts of fires burning under north-westerly and westerly wind influences and to a slightly lesser extent, south-westerly wind influences.

The slope of the valley to the north-west and the ridgelines/ gullies will influence the spread of fire from the northwest, west and south west and result in sporadic fire runs.

Fuel loads within the retained Habitat Corridors and Parklands, Nature Reserves and Lease Holdings, unless managed, will promulgate future bushfires up to the urban edge and into the vegetated corridors within the urban precinct.

Whilst the Overall Fuel Hazard for the vegetation within the valley is Very High there is, due to the fire history, topography, aspect, wind influence and climatic conditions within the valley, an extreme risk of damaging bushfires impacting the north western edge of the East Precinct [Molonglo Stage 3 and Denman Prospect].

The ‘Conclusion’ of the 2005 Bushfire Risk Assessment Report stated:

“The orientation of the Molonglo Valley and the ability for northwest, west and south-west wind-driven fires to impact the proposed development edge will continue the extreme level of risk to any development proposed in the valley with the potential to cause major damage to buildings and infrastructure.

Subsequent to the preparation of the original Bushfire Risk Assessment Report [19.7.2005] an updated report was prepared by ABPP, dated 26.4.2006. The Executive Summary of this report stated:

The Molonglo Stage 2 Bushfire Risk Assessment quantifies the current level of risk to future development within the Molonglo Valley, prior to the implementation of mitigation measures as ***Extreme.***

Mitigation measures which have been identified within the report as necessary to reduce the level of potential risk to future development include the creation and permanent management of a Critical Management Zone to the north- western edge of the East Molonglo Precinct and to the western and south- western edge of the Central Molonglo Precinct.

The provision of the Critical Management Zone (CMZ) replaces the Outer Asset Protection Zone, as defined in the Strategic Bushfire Management Plan for the ACT and the management of this zone, in accordance with the performance standards defined in this report, are considered to be a mandatory requirement in the reduction of the bushfire risk to the future development within the Molonglo Valley.

In addition to the provision of a Critical Management Zone to the north- western edge of East Molonglo Precinct, this report recommends, due to the risk of fire over-run along the Molonglo River corridor and into the future suburb, the damming of the Molonglo River below Coppins Crossing and the creation of Lake Molonglo”.

This recommendation was not adopted in the final Molonglo Structure Plan.

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SECTION 3

PROTECTION MEASURES TO BE IMPLEMENTED TO REDUCE THE BUSHFIRE RISK TO THE NORTH-WESTERN EDGE OF MOLONGLO STAGE 3 & DENMAN PROSPECT AND THE MOLONGLO RIVER CORRIDOR.

3.1 Introduction.

The primary purpose of the LDA established Working Group was to establish solutions to the problem of providing bushfire protection measures to the north-western edge of Molonglo Stage 3 and Denman Prospect and to the Molonglo River Corridor which would not only mitigate the bushfire risk but also be acceptable to ACT Government Agencies.

The solutions also had to be achievable, ecologically and economically sustainable and able to be funded in the long term – in perpetuity.

Consideration was also given to the 'alternate solutions' provided by the updated ACT Strategic Bushfire Management Plan – Version 3, particularly in respect to the ability to increase the width of the Inner Asset Protection Zone so as to remove to need to provide and manage an Outer Asset Protection Zone on ecologically sensitive land.

Having considered the total removal of the Outer Asset Protection Zone and the potential for catastrophic bushfire events to impact the north-western edge of Molonglo Stage 3 and Denman Prospect and development adjacent to the Molonglo River corridor, the Working Group has adopted a policy of implementing a bushfire protection zone to future development. This contains an Inner Asset Protection Zone supported on the outside by a Strategic Fire Advantage Zone [SFAZ] – within Kama to the northwest of Molonglo Stage 3 as well as within the land to the northwest and west of Denman Prospect and broadly within the Molonglo River Park.

The study undertaken by Umwelt, in concert with TaMS Fire Management Unit (FMU) has formed the basis upon which the decision has been taken to implement the establishment of a SFAZ within Kama Nature Reserve. It is noted that consensus has been reached that the performance criteria of a SFAZ, as required by the ACT Strategic Bushfire Management Plan – 2014 – Version 3 can be achieved whilst maintaining the ecological biodiversity of the reserve.

Similarly, the study undertaken by Umwelt, in concert with TaMS FMU has formed the basis upon which the decision has been taken to implement the establishment of a SFAZ on the land to the northwest and west of Denman Prospect – refer to Attachment B – Analysis of Vegetation Structure and Fire Risk.

Discussions with TaMS FMU and the need to manage the vegetation within the Molonglo River corridor to mitigate the spread of fire have also formed the basis upon which the establishment of the SFAZ has been recommended within the Molonglo River Park.

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This report also recommends the inclusion of the community facility located at the former Sludge Ponds and the western end of the River Park as detailed in the Molonglo River Park Concept Plan prepared by Hassell.

For completeness, this report also provides recommendations on the bushfire protection zones to the northern and eastern edge of Molonglo Stage 3.

The SBMP Version 3 highlights the need on rural land inside the Bushfire Abatement Zone for the development of property-level fire management plans under the Farm Firewise Program, the legislative requirements for the development and approval of a bushfire operational plan (BOP) under the Emergencies Act 2004. The BOPs are to be reviewed every 5 years.

It calls for undertaking a planned, whole-of-property approach to reduce the risk of bushfire in addition to considering the risk of fires starting and spreading. Through this approach, identified actions should:

- Complement activities undertaken on adjacent rural or government-managed lands
- Consider safety as a priority, as well as environmental and legal issues, and long-term sustainability
- Consider bushfire recovery.

Property level fire management plans developed under the Farm Firewise Program will meet the requirements for BOPs according to the SBMP Version 3.

The SBMP Version 3 also highlighted the Broad area bushfire fuel reduction across the natural and rural landscape through the use of Strategic Firefighting Advantage Zones (SFAZs). These have the objective of reducing the intensity and spread of fires across large landscape units contributing to the success of firefighting under moderate weather conditions and reducing impacts of unplanned fires on catchment values.

In these areas, specific actions amongst others include:

- Land managers preparing BOPs that detail fuel that detail fuel management works in SFAZs to meet the standards in the ACT Bushfire Management Standards with the BOPs audited and assessed to ensure compliance
- The implementation of landscape fuel management treatments will be reported on a cumulative basis
- The location and timing of fuel reduction activities in SFAZs for the period 2019-24 will be developed.

The ESA and TaMS measure the IAPZ width from the back of kerb on the block side to the IAPZ/SFAZ interface where an edge road is provided. The LDA on the other hand measures the width to the block boundary which is easy to define on the ground whereas roads and road verges can be of variable widths and variable distances from the block boundaries.

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Note that TaMS does not consider the road verge on the block side of an edge road in the IAPZ to be part of their management responsibility. Note however, that lessees are not responsible for the management of road verges as they are unleased Territory land. Hence, for example, a 60m IAPZ from the ACT Bushfire Management Standards would result in a distance of 67 to 70m to the block boundary.

However, the LDA through discussion in the Working Group have support from the ESA for consideration of a 50m IAPZ (measured from back of kerb where an edge road will be provided). So, a 50m IAPZ would result in a total width of 60m to the block boundary.

Where no edge road will be provided, there is a possibility that the width of the IAPZ will be unaltered at 50m and this corresponds to the block boundary with those blocks are serviced from the side or rear.

The reference to an IAPZ width of 60m in the remaining parts of this document is the ESA suggested 50m plus 7.5 to 10m of verge to the block boundary.

Plans outlining the urban edge outcomes are at **Attachment C**. Note that they contain an aerial photograph image including contours and the agreed position of the urban edge boundary.

Refer to **Figure 6** on page 28 for locations of the mitigation measures.

The following section details the Working Groups' recommendations.

3.2. North-western edge to Molonglo Stage 3:

1) There shall be established and maintained a minimum 60.0 metre wide Inner Asset Protection Zone to the north-western edge of the urban development, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. This zone shall contain an edge road and also a gravel fire trail located adjacent to the eastern boundary of Kama and shall include stormwater treatment ponds, cycleway/pedestrian access and electrical power lines, as required.

2) There shall be established and maintained, over the whole of Kama Nature Reserve, a Strategic Fire Advantage Zone, cyclically managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3;

3) There shall be established and maintained a six [6] metre wide fire break located inside the eastern boundary of Kama Nature Reserve;

4) The existing access/fire trails within Kama Nature Reserve shall be upgraded and maintained to provide access for management works and fire-fighting operations.

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3.3 North-western/Western edge to Denman Prospect:

1) There shall be established and maintained a minimum 60.0 metre wide Inner Asset Protection Zone to the north-western and western edge of the urban development within Denman Prospect, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. This zone shall include an edge road and where provided, stormwater treatment ponds and shall also include cycleway/ pedestrian access as required – refer to Denman Prospect **Figure 6** on Page 28.

2) There shall be established and maintained, to the location as shown on **Figure 6** on Page 28, an Outer Asset Protection Zone of varying widths, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3;

3) There shall be established and maintained to the area as shown on **Figure 6** on Page 28, a series of Strategic Fire Advantage Zones, cyclically managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3 and in accordance with the recommendations contained in the *Analysis of Vegetation Structure and Fire Risk* report prepared by Umwelt - 2015;

4) There shall be established a series of Fire Trails, generally as located as shown on **Figure 6** on Page 28 – also refer to the *Analysis of Vegetation Structure and Fire Risk* report prepared by Umwelt - 2015. These trails shall be maintained to provide access for management works and fire-fighting operations.

3.4 Molonglo River Park:

1) There shall be established and maintained a minimum 60.0 metre wide Inner Asset Protection Zone to the north and south of the Molonglo River Park, to the extent detailed on **Figure 6** on Page 28, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. This zone shall include an edge road and where provided the managed easement for services [sewer / water / electricity], stormwater treatment ponds and shall also include cycleway/pedestrian access as required. **Note on the south side of the river the locations of the IAPZs will be determined at the EDP stages**;

2) There shall be established and maintained, to the area as shown on **Figure 6** on Page 28, a series of Strategic Fire Advantage Zones, cyclically managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. **Note on the south side of the river, the locations of the SFAZs will be determined at the EDP stages**;

3) There shall be provided, to the locations as shown on **Figure 6** on Page 28, a Landscape Fire Management Zone of varying width to each side of the Molonglo River.

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Fuel management standards do not apply to this zone;

4) The existing fire trail/access roads within the river corridor shall be maintained to provide access for management works and fire-fighting operations.

5) There shall be established and maintained access for management works and fire-fighting operations within the Group Centre precinct.

6) The recommendations provided in the Molonglo River Concept Plan report prepared by Hassell, in respect to the establishment of a community facility in the location of the Sludge Ponds and the western end of the Molonglo River Park shall be included in the Park Management Plan.

3.5 Molonglo Stage 3 – Northern and Eastern Edges:

1) To the northern edge of the Molonglo Stage 3 precinct the full width of the William Hovell Drive carriageway shall be maintained as an Inner Asset Protection Zone, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3;

2) To the eastern edge of the Molonglo Stage 3 precinct, adjacent to the National Arboretum, there shall be provided an Inner Asset Protection Zone having a minimum width of 40 metres, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. This zone shall include an edge road and where provided, the managed easement for services [sewer/water/electricity], stormwater treatment ponds and shall also include cycleway/pedestrian access as required.

3.6 Bushfire Construction Standards to Buildings.

Except for the future buildings within Denman Prospect, all buildings located within 100 metres of land that is subject to, or likely to be subject to, bushfire attack [bushfire prone land] shall be constructed to comply with the standards required by Australian Standard A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.*

Note: Refer to the ACT Strategic Bushfire Management Plan for the location of Bushfire Prone Land.

The minimum level of construction for buildings located adjacent to the Inner Asset Protection Zone shall be BAL 29 for the first row of houses adjacent to the IAPZ. The minimum construction standard of all other buildings located within 100 metres of bushfire prone land shall be BAL 12.5.

For Denman Prospect, all buildings located within 400 metres of the forest/woodland vegetation on the land to the northwest and west of Denman Prospect shall be constructed to comply with the standards required by Australian Standard A.S. 3959 –

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2009 – *'Construction of Buildings in Bushfire Prone Areas'.* The minimum level of construction for buildings located adjacent to the Inner Asset Protection Zone shall be BAL 29 for the first row of houses adjacent to the IAPZ. The minimum construction standard of all other buildings located within 400 metres of bushfire prone land shall be BAL 12.5.

For buildings adjacent to the IAPZ along the Molonglo River corridor, the BAL levels will be confirmed at the time of the EDPs. As a guide until that occurs, it is expected that the minimum BAL levels will be BAL 12.5 with a possible maximum of BAL 29. The distance that the application of BAL levels will apply into each estate will also be determined at the same time.

3.7 Support Infrastructure.

3.7.1 Access for fire-fighting Operations:

Edge roads shall be designed to comply with the access code for heavy rigid and articulated vehicles and the ACT Bushfire Management Standards under SBMP Version 3.

3.7.2 Water Supplies for Fire Fighting Operations:

A fire-fighting water supply shall be installed to comply with F4 and the standards agreed by ACTEW and ACT Fire & Rescue.

Type F5 standard 45 l/s single hydrants at 60 metre intervals shall be installed within the Edge Road.

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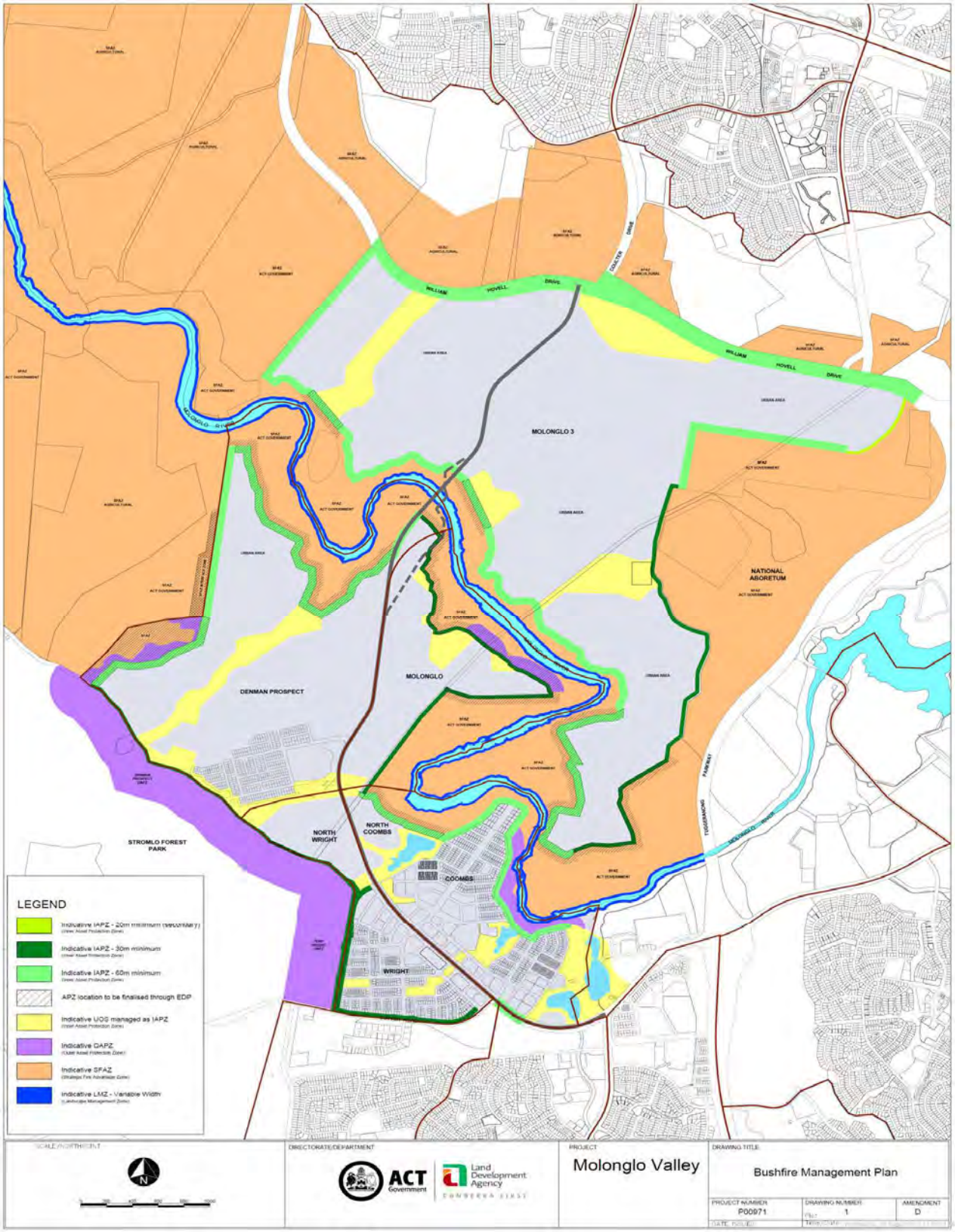
Figure 6 – Bushfire Risk Strategy showing Management Outcomes



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SECTION 4

FUNDING FOR BUSHFIRE MANAGEMENT WORKS

4.1 General

Residential and infrastructure development in the Molonglo Valley is proceeding in accordance with the Government's Indicative Land Release Programs and associated budget appropriations for capital works funding to support land release.

Subdivision construction is continuing in Molonglo Stage 1 (Coombs) over the life of the Program with the first releases in Molonglo Stage 2 (Denman Prospect) in 2014-15. Molonglo Stage 3 on the north side of the Molonglo River is programmed to commence in 2018-19.

The LDA/EDD are undertaking due diligence assessment investigations based on the approved Molonglo Valley Structure Plan and other documentation across a range of significant issues in Molonglo Stage 2 and Stage 3 including but not limited to ecological, contamination, infrastructure provision, UXO and bushfire risk. These assessments, especially bushfire in conjunction with TaMS, can materially influence the location of land use boundaries due to impacts and responsibilities for cost efficient land management.

Multiple directorates/agencies are involved with overseeing different parts of the Molonglo Valley. It could be argued that this has led to less than adequate decision-making and a lack of understanding of past and present processes and Government expectations.

This in turn leads to developing less than a whole-of-Government position to achieve the perceived outcomes. Other directorates however may have other parameters to meet while including the need to implement Government policies.

The TaMS has a management parameter to manage all the Government's assets. This includes managing the ever increasing asset base such as new roads, urban open space associated with Greenfield development.

Bushfire risk and the associated mitigation measures can have a significant impact on ecological, economic and social parameters. Since the 2003 Canberra bushfire, there has been a significant shift in the increase of the awareness and delivery of bushfire mitigation measures across Government. This commenced immediately after the bushfire with changes to subdivision design and the introduction of edge roads and specific controls within asset protection zones both within the urban area and outside it. This in turn has led to revisions of standards, guidelines, expectations and responsibilities both public and private.

It has also increased the responsibility of TaMS to manage a large proportion of the asset protection zones possibly to higher standards than was necessary before the bushfire.

4.2 Typical Cross Section of Zones at the Urban/Non-urban Interface:

A typical cross section at the urban/non-urban interface today would include:

- House asset protection zone – extending from the front of the residential block boundary into the suburb for distances up to 100m or more depending on risk and mitigating against ember attack. This requires housing design and construction (and landscaping) to meet specific Bushfire Attack Levels (BALs) under the Australian Standard. Management of this area lies partly with TaMS (public open space and roads including verges) and individual block owners.

- Inner asset protection zone – extends from the front of the residential block boundary to the edge of the urban/non-urban interface. Distances vary depending on risk and management requirements. A usual width would be a minimum of 30 to 40m and include significant infrastructure such as subdivision edge road, fire trail, stock proof fencing at the urban/non-urban interface, stormwater cut-off drains, hydraulic services for fire fighting, and street trees on the block side of the edge road. Management includes control of fuel loads by slashing. Management of this area lies with TaMS.

- Outer asset protection zone or Strategic fire fighting advantage zone – extends into the non-urban area for some distance depending on risk and management requirements. These could be 100m to around 300m in width and contain fire trails to aid management. Management methods depend on fuel loads and may include thinning of existing inappropriate vegetation, weed management, grazing or other ecological controls that ensures fuel loads are not exceeded during the fire season. Management of this area lies with TaMS and may be on a private lease.

4.3 Current Process of Conversion of Rural Land to Urban Land:

The development/management process that transforms rural land to urban land is typically set out below:

- Rural land and Canberra Nature Parks including Nature Reserves are managed by TaMS as the land custodian.
- LDA/EDD undertakes due diligence assessments to gain necessary approvals to clear the way to proceed to preparation of individual Estate Development Plans (EDPs) and gain budget approvals for the delivery of infrastructure associated with land delivery.

- LDA/EDD prepares EDP and capital works program. Note capital works may have started ahead of the EDP preparation by as much as a couple of years but may not be required to deliver some items for years after land development and block occupation is complete - i.e. staged infrastructure.

- Land custodianship transferred from TaMS to LDA usually prior to lodging EDP for approval.

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- EDP lodged for final circulation and approval as a DA. Note EDP usually contains site specific Bushfire risk assessment. Note however that in the case of Molonglo Stages 2 and 3, the western edge and river corridor bushfire risk assessment is designed to cover the whole of the remaining development. In the meantime detailed design has commenced and readied for submitting to TaMS for design approval.

- DA approved by EPD followed by design approval by TaMS.

- Construction commences and includes the provision of bushfire mitigation measures.

- Blocks sold by the LDA but settlement is delayed until after consolidation is complete.

- Construction finishes and consolidation period commences.

- Consolidation period ends.

- Blocks in private ownership after settlement.

- Other areas handed back to Government (usually TaMS) for continuation of approved management including bushfire risk mitigation measures and management of public open space, roads and other land.

- TaMS prepares budget bids to maintain management on a year-by-year basis within the constraints of the ACT Government budget parameters.

4.4 Issues with the Current Process:

There are a significant number of issues with the current process. In the case of development in the Molonglo Valley, these include:

- There is a need for a whole-of-Government outcome for the delivery of Molonglo 2 and 3 and the Molonglo River Corridor.
- The NES Plan and Adaptive Management Strategy, while agreed with the Commonwealth, were not “road tested” to prove data or feasibility of implementation ahead of gaining approval from the Commonwealth.

- Competing budget bids delaying or diluting funding for management of assets including bushfire mitigation obligations including the provision of resources.

- Diversion of budget funding to other competing priorities at both Treasury and TaMS levels.

- A partial solution could be that initial funding be provided by the LDA or a private developer for a period associated with construction timing for the implementation of management regimes but with a sunset clause on when TaMS would be required to take over responsibility including funding.

  For example, LDA or a private developer could construct and implement bushfire

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mitigation management regimes while land development is proceeding generally adjacent to the non-urban edge. The issue is how long a time period would LDA or a private developer be practically required to fund and manage such an arrangement and when TaMS would be expected to take over. While this could be a set period of time, there is an issue when or if there is a slowdown in the private sector development or there is a reduction in the demand for new housing. This could mean that the LDA or a private developer would need to be involved for a longer period of time.

- Remember the issue of requiring bushfire mitigation management measures is not restricted to the Molonglo Valley – it encompasses on- going management at the edges of all development areas at the interface with the rural or broadacre land use zones in Canberra. As the urban area expands, so too does the bushfire mitigation management issue requiring increases in funding.

4.5 Funding Options:

A number of funding options were discussed in the preparation of this assessment. However, it was agreed the existing arrangements met the overall strategies and objectives of Government.

A difficulty with this funding method is that it leaves Treasury in final control of management funding of bushfire mitigation measures. Funding is therefore dependent on dividing up the budget and competing against other bids on a year by year basis.

It does not allow the guarantee of prioritising critical management to protect residents and assets from bushfire risk on a season by season basis.

Even when yearly funding is made available to directorates with management responsibilities, there is no guarantee in return to Treasury that all the available funding will be used against bushfire mitigation purposes.

Where the allocated guaranteed funding is not all used (because perhaps a lessening of bushfire risk did not require as much management work to be undertaken) any excess would be expected to be returned to Treasury.

However, there is a distinct risk that the subsequent year or years may require extra funding which would have to be guaranteed by Treasury regardless.

As part of the guarantee mentioned above, a solution is suggested that Treasury may require, at a minimum, an agreed rolling bushfire mitigation management document for say a 5 year period to plan ahead for Budget predictions. This may allow for expenditure variations such as changing seasonal needs and the reaction to catastrophic events. This could be “signed off” by the responsible directorate after agreement at Directors-General level and Treasury.

Public land management agencies are continuously pressed and express public concern that they are expected to do more with fewer resources.

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A funding framework, or tweaking of the existing funding arrangements, may be needed that ensures ongoing protection to the public given that Government agencies may be reluctant to shoulder the ongoing cost responsibility.

The ubiquitous and often-stated challenge is securing funding for the long- term, 'in perpetuity' costs to maintain and in some cases enhance the biodiversity values for which the asset was originally protected.

After consultation with other members of the Working Group, it was agreed that the existing funding arrangements based on annual budget bids to Treasury would continue to be the method to fund recurrent bushfire risk mitigation work.

These arrangements do not stop the possibility of adding the 'flexibility' mentioned above to the existing funding methodology.

4.6 Costs

In line with the discussion in this chapter, the LDA would be expected to put in place and fund bushfire mitigation measures including management regimes while land development is proceeding. This includes:

- the use and management of temporary asset protection zones while stages of estates are gradually advancing to the final edge of development.
- the development of the IAPZs, OAPZs and more recently, SFAZs to the point of handover to TaMS for continued management after asset acceptance.
- OAPZs on privately leased land such as at Bonner in Gungahlin where on-going management is required to be undertaken by the lessee in accordance with a Land Management Agreement after asset acceptance.

In the case of Molonglo Stage 3 western edge, the LDA, or a developer in the case of an englobo sale, will put in place and fund the development infrastructure associated within the IAPZ adjacent to Kama Nature Reserve. This will include to the requirements of the ACT Bushfire Management Standards:

- The public edge road to the estates
- Fire trails along the entire western edge of the development areas with connection to Kama
- Utility services infrastructure including water supply for fire fighting purposes
- Storm water cut-off drains
- Fencing the IAPZ at the outer edge of the zone including gates to the Kama boundary
- Establishing and initially managing the IAPZ to the required fuel management standards
- Providing opportunities for the location of other infrastructure services as required.

Once the estates are accepted at asset acceptance stage, the entire IAPZ will become the management responsibility of TaMS including recurrent funding.

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In the case of Denman Prospect at the western edge of Molonglo Stage 2, the LDA, or a developer in the case of an englobo sale, will put in place and fund the development infrastructure associated within the IAPZ, the OAPZ and the SFAZs adjacent to suburb boundary. This will include, to the requirements of the ACT Bushfire Management Standards:

- The public edge road to the estates
- Fire trails along the entire western edge of the development areas with connection to area to the west
- Utility services infrastructure including water supply for fire fighting purposes
- Storm water cut-off drains
- Fencing the suburb boundary including gates to the western edge
- Establishing and initially managing the IAPZ, OAPZ and SFAZs to the required fuel management standards
- Providing opportunities for the location of other infrastructure services as required.

Once the estates are accepted at asset acceptance stage, the entire IAPZ, OAPZ and SFAZs will become the management responsibility of TaMS including recurrent funding.

In the case of Kama Nature Reserve, the area is being managed already to the standard required for an SFAZ and this has been occurring for a number of years and is acknowledged on the ESA website. The LDA, or a developer in the case of an englobo sale for the land opposite Kama, will fund the initial upgrading of firetrails within Kama Nature Reserve to the satisfaction of TaMS Fire Management Unit. The responsibility for other management within Kama remains with TaMS.

In the case of Denman Prospect, the area immediately to the west of the suburb boundary on TaMS land, has been assessed as being capable of being managed as a series of SFAZs. Here the LDA or a developer in the case of an englobo sale, will assist TaMS in setting up the SFAZs by funding for a two year period their initial development to the requirements of the ACT Bushfire Management Standards. This is expected to include:

- Fire trails around and separating each of the SFAZs
- Establishing the initial management of the SFAZs.

After that period of time the ongoing management of the SFAZs will pass to TaMS.

4.7 Costs of Implementing the 60m IAPZ

The LDA has investigated the costs of setting blocks back from the edge of Kama Nature Reserve and the western edge of Denman Prospect in order to comply with the Strategic Bushfire Management Plan version 3 where OAPZs are not supported in the non-urban land.

In order to identify the quantum of costs associated with implementing the bushfire risk strategy recommendations, the LDA engaged Coleman Engineering Services. The investigation specifically targeted the bushfire mitigation measures and developing urban

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infrastructure along the boundaries of Kama Nature Reserve and the suburb of Denman Prospect over and above the costs to service other comparable subdivisions in the ACT but keeping in mind the requirements of version 3 of the Strategic Bushfire Management Plan and the associated standards.

This latter point is important to note because the standards allowable for IAPZs have been revised to reflect the combinations of IAPZs, OAPZs and SFAZs now considered acceptable by the ESA but point out that the applications of the zones require approval by the ESA in each circumstance.

Also, it should be noted that ESA expects individual land managers to manage their land for bushfire management. The use of SFAZs does allow the management for biodiversity to be protected where other APZs would not meet that requirement.

For example, for an IAPZ in combination with an OAPZ on a primary interface for forest and woodland, the respective widths should be 30m and a minimum of 200m (target 300m). Where an OAPZ is not achievable such as within a nature reserve, the IAPZ should be widened to 60m to compensate.

In the case of Molonglo, Kama Nature Reserve is already managed as an SFAZ or multiple SFAZs and it is the intention that the area to the west of Denman Prospect also be managed as a series of SFAZs.

Section 8 of the Coleman report sets out the likely establishment and recurrent costs to put in place the IAPZ and the SFAZs along the western edge of Denman Prospect and adjacent to and within Kama Nature Reserve. The following summary encapsulates those expected indicative costs.

Note that the summary has adjusted the costs in the Coleman report to take account of items not normally provided for example in the development of fire trails such as removing & stockpiling topsoil and then re-spreading the topsoil towards the end of the project.

North of the Molonglo River

Inside Kama Nature Reserve (SFAZs)

- Upgrade existing firetrails for TaMS - $24,000

Outside Kama Nature Reserve (IAPZ)

- Fire trail establishment cost - $420,000
- Fire trail recurrent cost (over 5 years) - $11,000
- Edge road establishment cost - $1,400,000
- IAPZ recurrent cost - $4,000 (over 5 years)

South of the Molonglo River

Outside Denman Prospect (SFAZs)

- Vegetation establishment & management cost (over 3 years) - $136,000
- Fire trail establishment & management cost (over 3 years) - $119,000

Inside Denman Prospect (IAPZ, OAPZ and SFAZ)

- Fire trail establishment cost - $870,000

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- Fire trail recurrent cost (over 5 years) - $20,000
- Edge roads establishment cost - $2,900,000
- IAPZ recurrent cost (over 5 years) - $9,000.

These expected indicative costs will be firmed up during the design stage for the adjacent developments. Note that the costs identified inside Kama Nature Reserve and outside Denman Prospect will be finalised with TaMS Fire Management Unit ahead of estate design so that the measures above can be incrementally implemented in the correct timeframe.

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SECTION 5
CONCLUSION

The bushfire protection measures detailed in Section 3 of this report have been determined by the Working Group with the aim of mitigating the potential bushfire risk to the future development within Molonglo Stage 3, Denman Prospect and the development precincts which adjoin the Molonglo River Park.

However, a level of residual risk will remain as not all of the bushfire threat can be completely removed – only managed to reduce fuel loads.

Another matter that will influence the level of risk reduction, and therefore residual risk, is the commitment for ongoing management of the recommended bushfire protection zones and funding of these works in perpetuity.

Bushfire Operations Plans [BOPs] will be required to be prepared annually, by TaMS, for the works and there will be an expectation that Government will meet the funding requirements to enable the BOPs to be undertaken.

For Molonglo 3, Denman Prospect and the Molonglo River corridor, the initial establishment of the recommended fire protection measures shall be funded by the developer of the land – i.e. LDA or private developer or joint venture partners with LDA.

The initial funding shall be made available for the construction and maintenance of fire trails and fire breaks, the provision of fencing and access gates and initial clearing and establishment of the Asset Protection Zones.

LDA, or the private developer, shall provide initial seed funding to TaMS for hazard reduction and land management activities such as the establishment of the Strategic Fire Advantage Zones.

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Australian Bushfire Protection Planners Pty Limited.
25.8.2015

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APPENDIX A – PRECISE OF REPORTS REVIEWED

Bushfire Risk Assessments prepared by ABPP [2005 & 2006]:

Australian Bushfire Protection Planners Pty Limited was commissioned to undertake a study of bushfire risk for the preparation of the Molonglo Structure Plan and produced a Bushfire Risk Assessment, dated 19.07.2005, for the ACT Planning Authority [ACTPLA].

An extract from this report states under 'Summary of Bushfire Risk':

"Major bushfires have occurred in the Molonglo Valley in 1926, 1939, 1952, 1991, 1994, 2001 and 2003.

The topography and landform of the valley predisposes the valley to impacts of fires burning under north-westerly and westerly wind influences and to a slightly lesser extent, south-westerly wind influences.

The slope of the valley to the north-west and the ridgelines/ gullies will influence the spread of fire from the northwest, west and south west and result in sporadic fire runs.

Fuel loads within the retained Habitat Corridors and Parklands, Nature Reserves and Lease Holdings, unless managed, will promulgate future bushfires up to the urban edge and into the vegetated corridors within the urban precinct.

Whilst the Overall Fuel Hazard for the vegetation within the valley is Very High there is, due to the fire history, topography, aspect, wind influence and climatic conditions within the valley, an extreme risk of damaging bushfires impacting the north western, western and south western edges of the West 1 and West 2 Precincts, the north western edge of the East Precinct and a high risk of damaging bushfires impacting the south western edge of the East Precinct".

Figure 12 on Page 40 provides an extract from the Molonglo Concept Plan Bushfire Risk Assessment Report 2005 identifying the Study Area;

Figure 13 on Page 41 provides an extract from the Molonglo Concept Plan Bushfire Risk Assessment Report 2005 identifying the potential north-westerly fire path;

Figure 14 on Page 42 provides an extract from the Molonglo Concept Plan Bushfire Risk Assessment Report 2005 identifying the potential westerly fire path; and

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Figure 12 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report 2005 showing the study areas

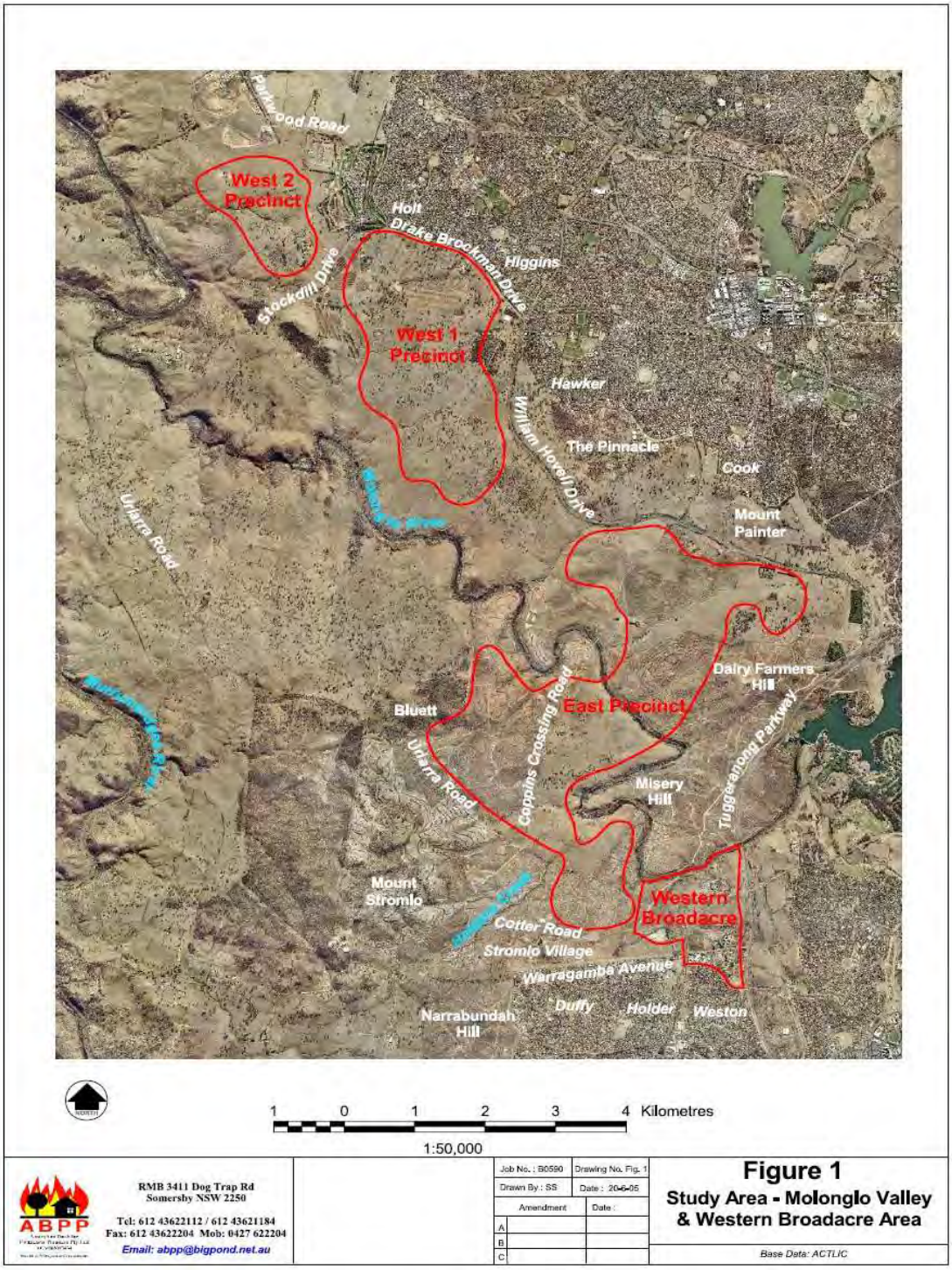
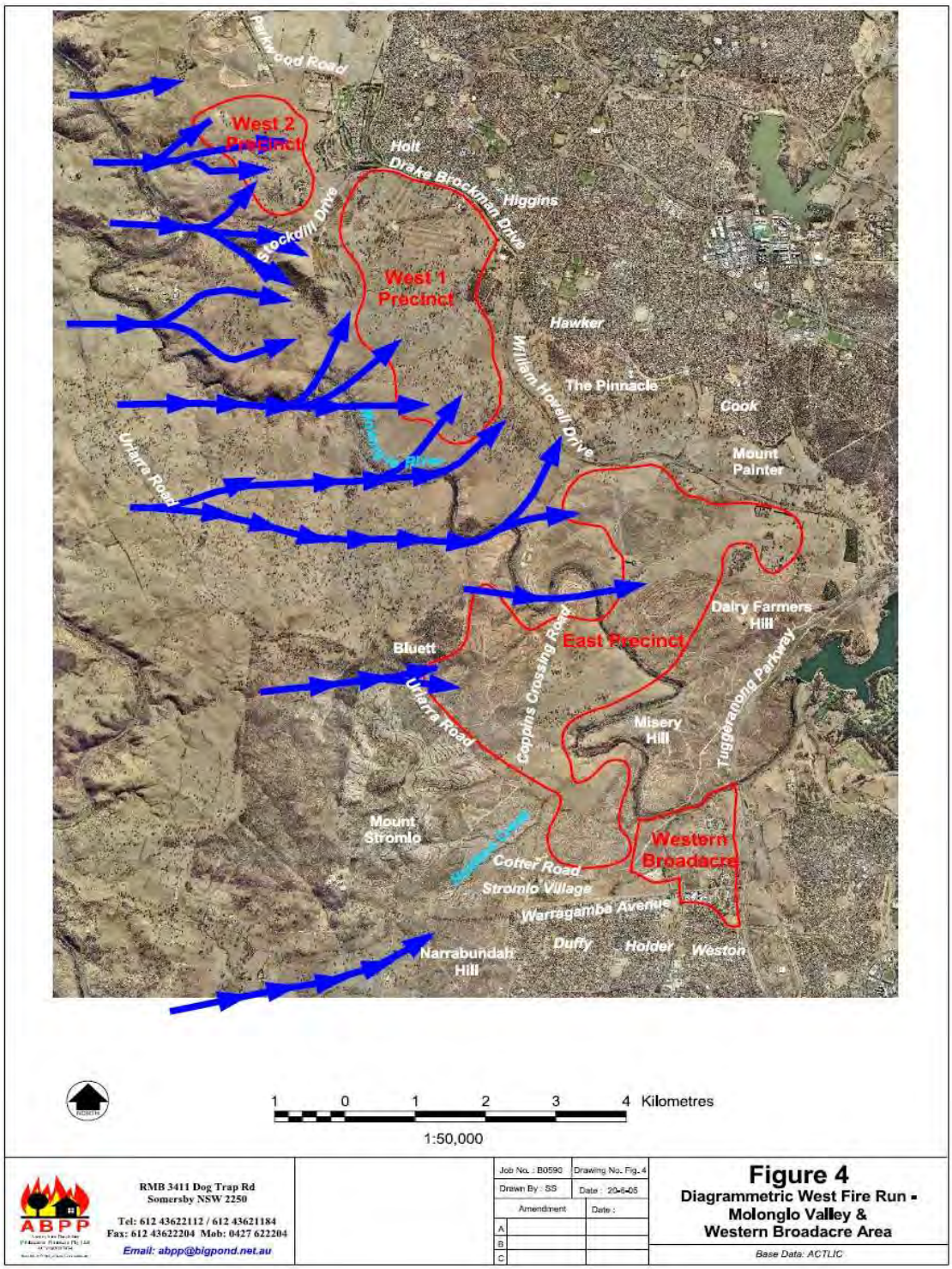


Figure 13 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report 2005 showing the Diagrammatic Northwest fire run

Figure 14 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report 2005 showing the Diagrammatic West fire run



Under Section 6.1 Management of the Vegetation beyond the Urban Interface the ABPP report states:

"The Strategic Bushfire Management Plan for the ACT (Version1) states:

"Under the Emergencies Act 2004 the ESA has declared an area of the ACT to be a Bushfire Abatement Zone. The purpose of the Bushfire Abatement Zone is to reduce the impact of bushfires on the built up areas within the ACT.

Bushfire preparation within the BAZ requires collaborative development of fuel management guidelines and the provision of advice to land managers consistent with land use. Guidelines for bushfire management must achieve a reasonable balance between the increasing community demands on ACT lands for recreation and existing use for farming, forestry and conservation".

"Bushfire fuel hazard is the only factor of bushfire behaviour that can be influenced by land managers and residents. However, fuel management alone is not the panacea for bushfire protection and it ***will not eliminate future severe bushfires.***

"The use of fire in land management requires land managers to make decisions about complex balances and trade-offs between bushfire protection and often-divergent social, environmental and economic requirements".

Heavy emphasis has been placed on the effectiveness of hazard reduction burning as the most cost effective means of management within the Abatement – Zone, however the Strategic Bushfire Management Plan states :

"The opportunity to schedule and implement prescribed burning within a desirable window of favourable conditions is relatively limited".

"Land managers and owners must take into account the potentially limited number of days and the possible interaction with air quality guidelines in the development, costing and implementation of prescribed burning programs".

Therefore the viability of maintaining the urban edge protection by hazard reduction burning and / or mechanical means needs to be established to guarantee the integrity of the Molonglo and Western Broadacre urban edge against damaging fire impact.

Under 6.2 – Shape of the Development Precincts [Page 32] the ABPP reports states:

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East Precinct.

"The long exposure of the north-western edge of the precinct to uphill burning fires, influenced by hot, dry, strong north-westerly winds, will result in significant fire impact either directly or indirectly from ember attack, depending on the level of protection provided by active management of the fuels within the river corridor.

Similar impacts may also occur to the western / south western edge from westerly and south-westerly wind-driven fires and the influence of wind turbulence in the Mount Stromlo area.

The northern edge will be impacted by fires burning within the habitat corridor, north of William Hovell Drive.

The Molonglo River Corridor will separate the eastern development node from the western development node and therefore provide a direct fire path into the suburbs adjoining the corridor and to the International Arboretum to the south east".

Under Section 6.4 – Habitat Corridors – Gazetted Nature Parks the ABPP report states:

"The Landscape and Environmental Analysis Plan in the Molonglo Valley Suitability Study identifies habitat connectivity for wildlife movement corridors from The Pinnacle to the north-west and alternate and /or additional Habitat Corridors between the three development precincts.

If the Habitat Corridor identified extending to the north-west of The Pinnacle remains it will allow fire to enter the West 1 Precinct and expose the adjoining urban development to fire impact.

The alternative Habitat Corridors will allow fires to penetrate between the development precincts. Management of these corridors for Habitat Protection and ecological protection will conflict with the need to provide active management of fuel hazards within the abatement zones to the perimeters of the urban precincts.

The Lower Molonglo River Nature Reserve will provide a direct northwest fire path for future bushfires to impact the central portion of the north western edge of the East Precinct and the return edges to the north east and south west of the Reserve".

Section 10.1 – Conclusion – Molonglo Valley [Page 43] of the ABPP report states:

"The orientation of the Molonglo Valley and the ability for northwest, west and south-west wind-driven fires to impact the proposed development edge will continue the extreme level of risk to any development proposed in the valley with the potential to cause major damage to buildings and infrastructure.

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Whilst the McLeod Report recommendation was for implementation of an Abatement Zone to the west and south-west of the City, the extent of the zone and the management abilities of those responsible for the fuel maintenance measures recommended, may not provide a level of defence which will remove the risk of devastating fires impacting to the north-western edge of the Molonglo East Precinct and the north-western, western and south-western edge of the Molonglo West 1 and West 2 Precincts".

It is therefore recommended that for development to proceed, the primary protection against the impact of fires to the north-western edge of Molonglo East and the north- western, western and south-western edge of Molonglo West 1 should be provided by the provision of a land use that creates a Critical Management Zone which is permanently fuel-managed by the nature of the land use. (i.e. vineyards / sporting grounds).

"The Molonglo River Corridor through the East Precinct should be actively managed as a Village Park to prevent fire extension into the precinct".

Figure 15 on Page 46 provides an extract from the Molonglo Concept Plan Bushfire Risk Assessment Report 2005 identifying the recommended bushfire protection measures.

Subsequent to the preparation of the original Bushfire Risk Assessment Report [19.7.2005] an updated report was prepared by ABPP, dated 26.4.2006. The Executive Summary of this report states:

The Molonglo Stage 2 Bushfire Risk Assessment quantifies the current level of risk to future development within the Molonglo Valley, prior to the implementation of mitigation measures as ***Extreme.***

Mitigation measures which have been identified within the report as necessary to reduce the level of potential risk to future development include the creation and permanent management of a Critical Management Zone to the north-western edge of the East Molonglo Precinct and to the western and south-western edge of the Central Molonglo Precinct.

The provision of the Critical Management Zone (CMZ) replaces the Outer Asset Protection Zone, as defined in the Strategic Bushfire Management Plan for the ACT and the management of this zone, in accordance with the performance standards defined in this report, are considered to be a mandatory requirement in the reduction of the bushfire risk to the future development within the Molonglo Valley.

In addition to the provision of a Critical Management Zone to the north-western edge of East Molonglo Precinct, this report recommends, due to the risk of fire over-run along the Molonglo River corridor and into the future suburb, the damming of the Molonglo River below Coppins Crossing and the creation of Lake Molonglo".

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Figure 15 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report 2005 showing the recommended Bushfire Protection Strategies.

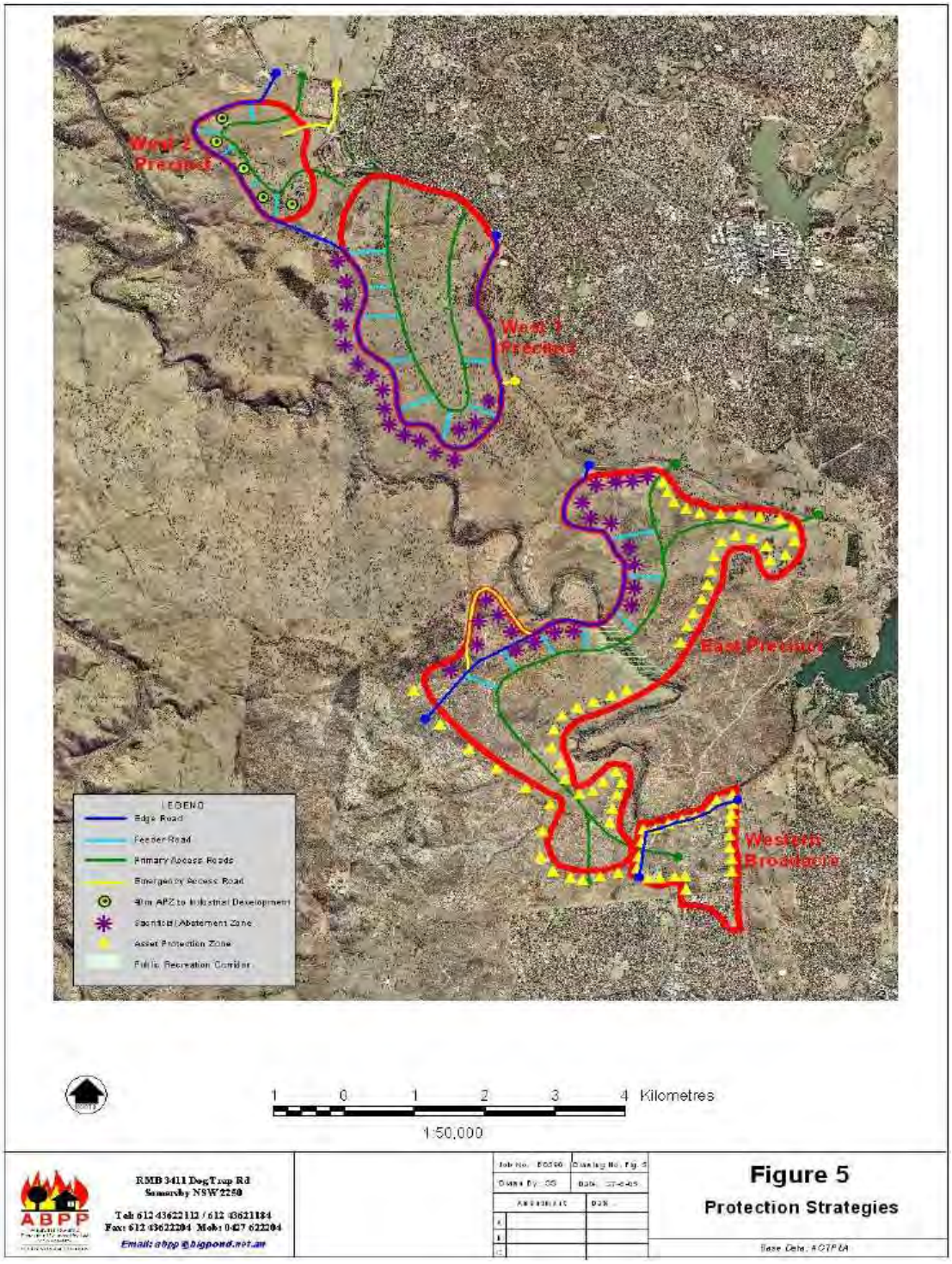

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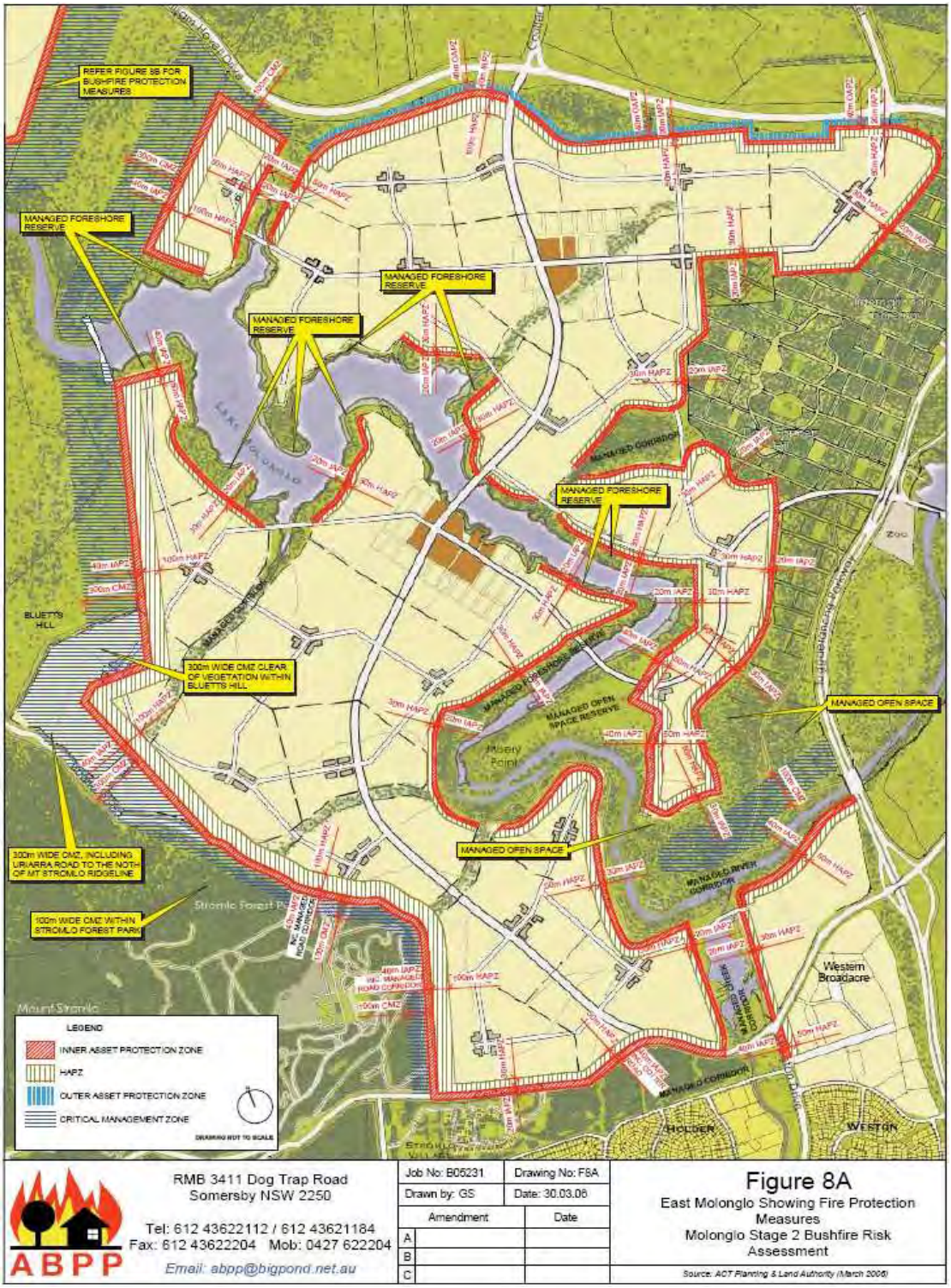
Figure 16 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report Stage 2 - 2006 showing the recommended Bushfire Protection Strategies



The recommendation contained within the latter report that damming of the Molonglo River below Coppins Crossing should occur to remove the bushfire risk along the river corridor was originally implemented in the Strategic Planning process, however is now not included in the Territory Plan.

The comments about the level of risk to the north-western edge and the risk posed by the retention of vegetation within the river corridor therefore defaults back to the original Bushfire Risk Assessment [19.7.2005] [refer to Figure 4 on Page 17] which recommended the implementation and management of a Critical Management Zone of at least 300 metres to the north-western edge of the new suburb and that the *"Molonglo River Corridor through the East Precinct should be actively managed as a Village Park to prevent fire extension into the precinct".*

Molonglo Valley Plan for Protection of Matters of National Environmental Significance – NES Plan (2011):

A review of the Molonglo Valley Plan for Protection of Matters of National Environmental Significance – NES Plan – September 2011 prepared by ACT Planning & Land Authority has identified that the aim of this document is to enhance the areas of Box Gum Woodland not only within the Molonglo River corridor but also within the Kama Nature Reserve and pockets of retained vegetation within the Molonglo Stage 3 precinct.

The document provides, under Section 2.3 – Bushfire Management Framework a 'motherhood' statement about bushfire management which reads:

"Within the strategic assessment area fire management will be aimed at protection of both built assets and MNES values. This will be achieved through the identification of appropriate asset protection zones and application of hazard reduction techniques that will both:

- *Ensure that the standards for fuel loads in the SBMP are met; and*
- *Protection MNES values through the use of sympathetic management techniques".*

The aim of this document does not address the recommendation that the river corridor is managed as a *'Village Park'* or the land to the west of Molonglo 3 and Denman Prospect is managed to mitigate the impact of fire on the north-western edge of the future urban development and from a fire spreading along the river corridor.

In the document under Management and offsetting it called for the establishment of a buffer outside of the Kama Nature Reserve on its eastern side to protect the ecological values of the reserve. It went on under Commitments to MNES:

"Establish a buffer outside the Kama Nature Reserve between the reserve and the proposed development area, and allow for appropriate uses consistent with nature conservation uses of the reserve. The buffer will be developed to ensure that fire management is undertaken outside of the Kama Nature Reserve and will provide protection against urban edge effects."

The NES Plan recommends that the following reports be prepared:

1. 'Molonglo River Park Concept Plan';
2. Kama Management Plan;
3. Management Plan for Patch GG; and
4. Management Plans for High and Moderate PTWL habitat.

Molonglo River Park – Concept Plan prepared by Hassall (2012):

This document was prepared by Hassell in 2011 and finalised in 2012 and states that one of the primary objectives of the plan is to manage bushfire risk and details the need to provide Inner and Outer Asset Protection Zones as required by the *Strategic Bushfire Management Plan for the ACT 2009* with the Inner Asset Protection Zone located within the urban envelope and the Outer Asset Protection Zone and Strategic Fire Advantage Zone [SFAZ] located within the park.

Section 3 – Investigation Summary of the Concept Plan states:

"Risk assessments completed for Coombs and Stage 2 urban development areas identified a high to extreme bushfire risk for future urban areas. The most significant risk is that of a fire moving from the west or northwest, from which it would not only threaten the peripheral urban development in these areas but also potentially penetrate deeper onto the development area by moving up the Molonglo River corridor".

Under 'Additional Strategies' the report suggests that relevant group(s) further investigate the establishment of a 300 metre wide 'Critical Management Zone' to the northwest of the site – extending in a downstream direction from the north west limit of the park.

The table on page 50 is an extract from the Concept Plan identifying the Fire Management Objectives and Strategies.

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Objectives and strategies

Objectives of fire management	Strategies
Mitigate bush fire hazard.	Active management of fuels associated with vegetation within the park.
Mitigate the potential for the riparian area to have a 'wicking' effect that could carry a fire deep into the urban area.	Creation of a mosaic landscape in which the potential for long runs of fire fuels are minimised.
Afford the occupants of the urban areas adjacent to the park protection from exposure to a bushfire.	Development and maintenance of an outer APZ that complies with ACT Emergency Services Agency (ESA) standards. (ACT SBMP)
Provide defendable space and adequate separation to minimise the chance of direct flame contact and material ignition, for any assets that could be vulnerable to a fire, which would be located within the park lands.	
Provide for the ongoing maintenance of fuel loads and vegetation continuity within the outer APZ and parklands.	
Ensure that emergency service personnel and parkland users have access to adequate access and egress in the event of a bush fire.	Development and maintenance of a network of roads and fire trails that meet emergency services access requirements.
Ensure that utility services, particularly water supplies, are adequate to meet the needs of fire fighters.	Provide water supplies suitable for use during fire and fuel management exercises.

The Molonglo River Park Concept Plan Report's focus of the 'Fire Management Theme' is on strategies for the control of vegetative fuels within the following specific areas:

- Critical Management Zone [CMZ] to the west of the park;
- Strategic discontinuity zones within the riparian corridor which aim to reduce the ability of a fire to move continuously up the corridor and into the urban areas, and provide access for defence and fuel management;
- Outer APZ adjacent to the urban interface [Inner APZ within the statutory urban area, not in the riparian parkland].

The Molonglo River Park Concept Plan Report states that the Critical Management Zone forms a key component of the overall strategy to reduce the potential for a fire to move up the riparian parkland and into the urban areas.

"The Critical Management Zone is a 300 metre wide zone extending from the western boundary of the proposed urban areas and the riparian parkland, in a downstream direction. This area would be managed to provide a strategic fire break or control line to reduce the impact of a fire moving from the west/northwest, towards the urban areas".

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The report continues with advice on the strategic discontinuity zones and states that these zones "would be located at intervals within the parkland to reduce the potential for a fire to move continuously along the riparian corridor and potentially fuel an intense fire that could have catastrophic effects on the adjacent urban areas".

"The development of strategic discontinuities within the riparian parkland responds to the significant hazard potentially affecting this area, which is located on the north-west fringe of Canberra and is therefore directly exposed to extreme fire weather and the potential fire hazard associated".

"This strategy also responds to the potential of the riparian corridor itself to act as a 'wick', funnelling a fire, driven by hot, dry, north-westerly winds, onto the heart of the urban area. This risk is a function of the physical location and the orientation of the river corridor itself".

"The discontinuity areas would be located:

- At the northwest extreme of the riparian area;
- Around, and to the west of Coppins Crossing, from the proposed sewer line crossing to the proposed extension of John Gordon Drive crossing the river;
- At Misery Point.

These areas would be characterised by more concentrated vehicle access and intense location of recreational facilities such as playing fields, parking areas, irrigated gardens and picnic areas. Alternatively, they would comprise open woodland/grassland habitat".

"Vegetation in the recreation areas would have the following characteristics:

- Large areas of groomed grassland maintained to a height of less than 100mm;
- Scattered tree planting;
- Formal parks and gardens with irrigated plantings.

"Generally fuels in these areas would be maintained by mechanical mowing/slashing. Where areas of PTWL habitat occur, fuels would be managed in accordance with the TAMS *Pinked Tail Worm Lizard Fuel & Fire Suppression Guidelines [TAMS 2011]".*

"Outer Asset Protection Zones would be developed in accordance with ESA standards and the following OAPZ are required: Primary asset interface classification – 100m; Secondary asset interface classification – 0 metres.

All vegetation within the riparian zone would be maintained as grassland or open woodland.

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Figure 17 shows the Molonglo River Park Illustrative Concept Plan prepared by Hassell.

Figure 18 shows the Molonglo River Park Illustrative Landscape setting Plan prepared by Hassell.

Figure 19 shows the Molonglo River Park Fire Management Plan concept prepared by Hassell.

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Figure 17 – Molonglo River Park Illustrative Concept Plan – Hassell.

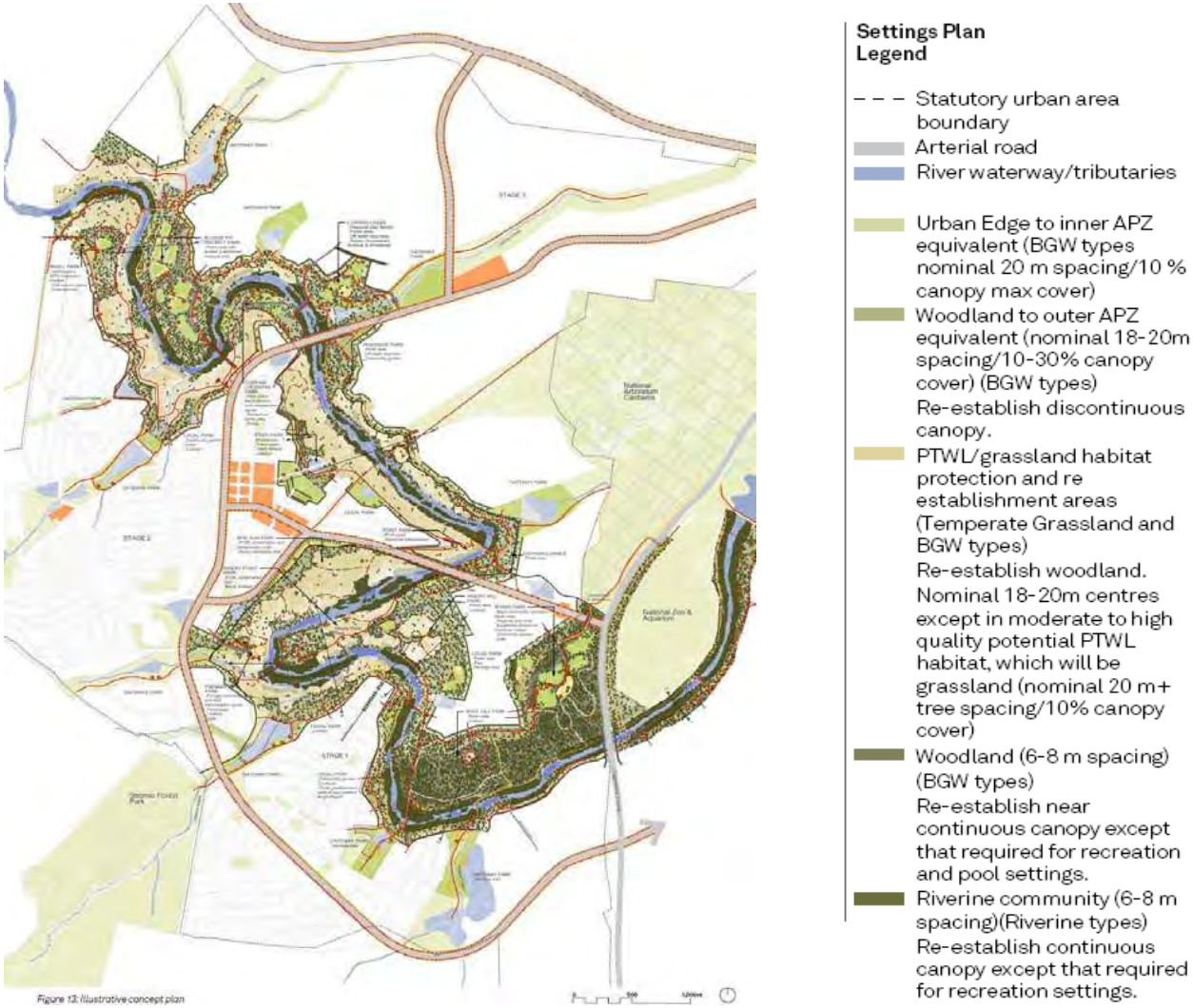

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Figure 18 – Molonglo River Park Illustrative Landscape settings Plan – Hassell.

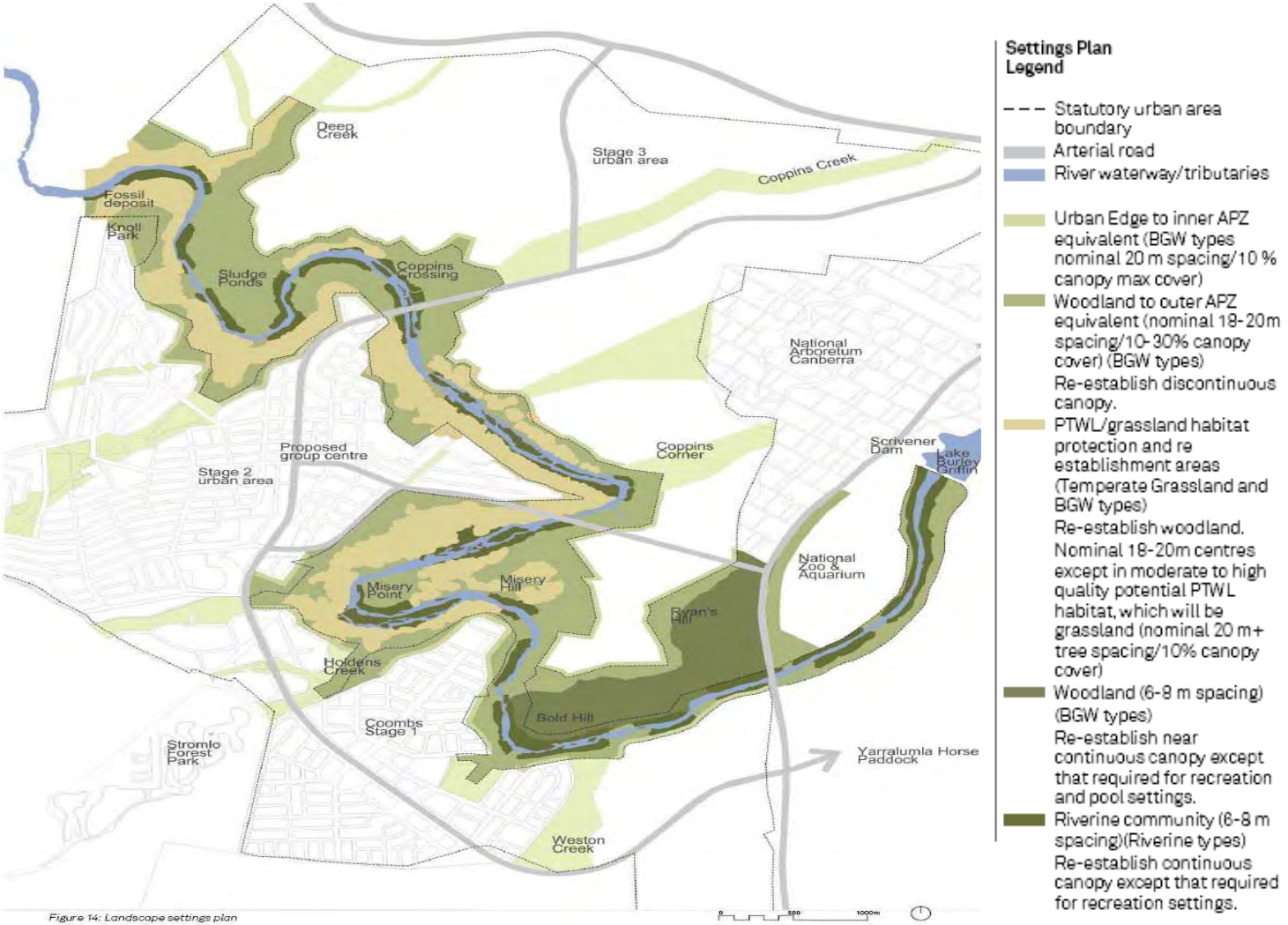

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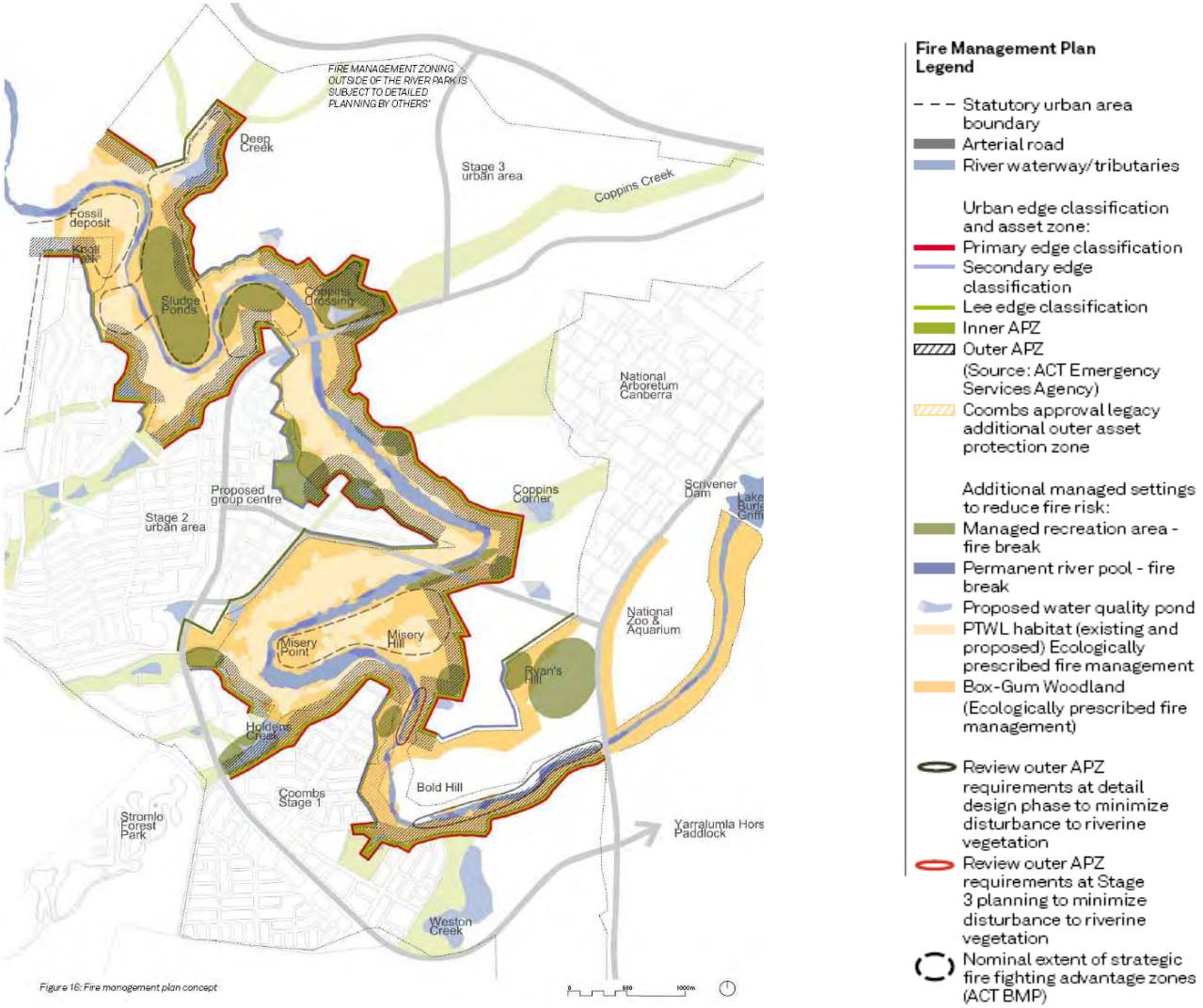
Figure 19 – Molonglo River Park Fire Management Plan Concept – Hassell.



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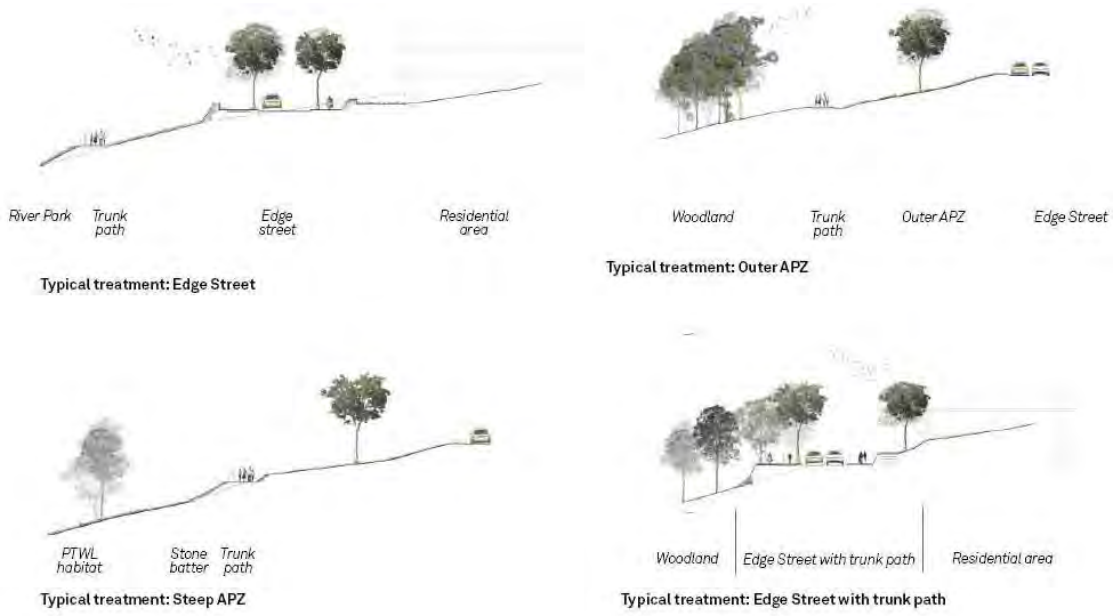
Section 7 of the Concept Plan also provides recommendations on the provision of access and egress and states:

'In addition to recreational access, where required within the park area, access and egress would be provided for emergency purposes and the maintenance of fire protection infrastructure. Road and trail standards would be designed in consultation with local emergency services to enable the traffic of emergency service vehicles and their access to adjacent, more natural areas of vegetation".

Figure 20 below provides sectional details of the location of Trunk Paths/Emergency Service access.

Figure 20 – Molonglo River Park – access – Hassell.



Section 7 – Concept Plan – Fire Management Theme states:

"Under the ACT Strategic Bushfire Management Plan, a Fire Management Plan would be developed for the Molonglo Valley in accordance with Emergency Services Agency [ESA] standards. The plan would take into account consideration of the recommendations of the existing bushfire hazard assessments for the proposed adjacent urban areas. The Molonglo Valley Fire Management Plan would provide the basis for the development of an overarching Plan of Management for the riparian area and annual Operations Plan [BOP]".

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Molonglo Adaptive Management Strategy – ESDD – (2013):

The Molonglo Adaptive Management Strategy (AMS) was a key commitment from the NES Plan. Its purpose was to define a set of measures designed to achieve the conservation outcomes and performance targets for MNES in Molonglo strategic assessment area.

One of the outcomes of the baseline condition assessment was that an assessment of the buffer zone consisting of patches O2, O3 and O4 located to the east of Kama Nature Reserve found that these patches were not representative of a Threatened Ecological Community.

Under Management Objectives for fire, the document makes the statement that fire management activities for the purposes of protecting the urban development east of Kama Nature Reserve will be undertaken outside Kama Nature Reserve. It goes on to mention:

"The prescribed eastern buffer zone for Kama Nature Reserve is to ensure that fire management is undertaken outside of the Reserve and will provide protection against edge effects."

There are no dimensions provided in the AMS that defines the width of the buffer to Kama Nature Reserve.

The document does not address the potential bushfire risk potential to the future development adjacent to Kama Nature Reserve.

Draft Fire Management Plan – Molonglo River Corridor – TaMS – (2015):

TaMS have prepared a draft Indicative Fire Management Strategy – Urban Area and the Indicative Fire Management Strategy – Molonglo Valley.

Figure 21, below, is a copy of the 'Indicative Fire Management Strategy – Urban Area prepared by TaMS.

Figure 22 provides a copy of the Indicative Fire Management Strategy – Molonglo Valley prepared by TaMS.

This document is currently with the ESA for consideration. Based on the current information available, the document raises issues which ESA require to be addressed.

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Figure 21 – Indicative Fire Management Strategy – Urban Area [TaMS 2015]

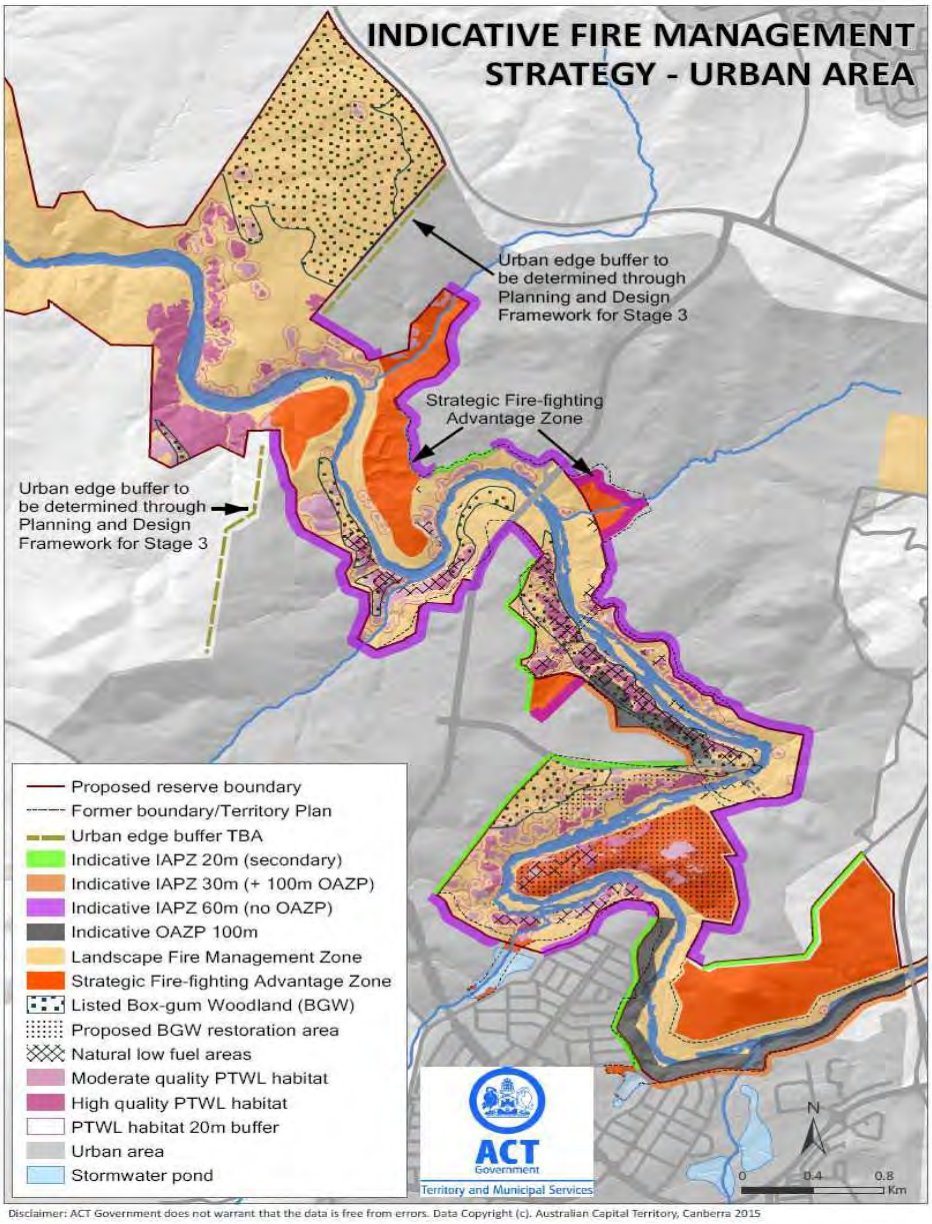

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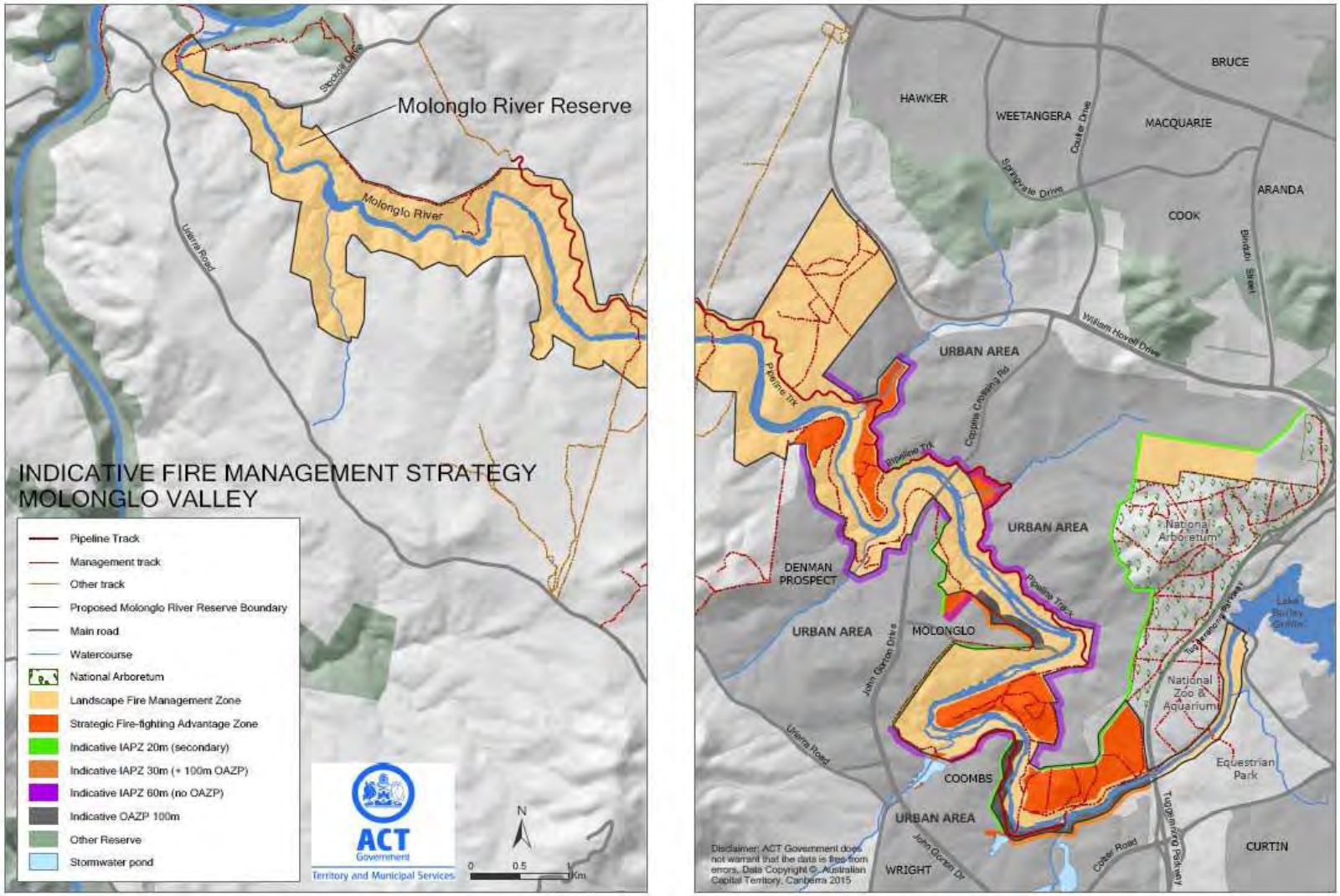
Figure 22 – Indicative Fire Management Strategy – Molonglo Valley [TaMS 2015]



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APPENDIX B – WORKING GROUP - MEETING DATES, LIST OF ATTENDEES & RESOLUTIONS

In late 2013 – early 2014, the Land Development Agency [LDA] identified the need to bring together a working group to examine the outstanding issues relating to the bushfire risk to the north- western edge of Molonglo 3; Denman Prospect and the Molonglo River Corridor.

Initially the Working Group consisted of representatives of LDA, ABPP and Umwelt to discuss issues and the way forward.

The brief of the Working Group was widened to bring together all Government Agencies involved in the development of the Molonglo East precinct to enable examination of previous studies, undertake site inspections and consider all options available so as to develop a report that establishes the principles, processes and funding required to address the bushfire risk.

Representatives of Government Agencies included:

- Dave Richardson [LDA];
- Kerry Browning [LDA];
- Adam Carmody [LDA];
- Dylan Kendall [TaMS];
- Adam Leavesley [TaMS];
- Nick Lhuede [ESA];
- Greg Potts [ACT RFS];
- Conrad Barr [Acting Chief Officer] ACT Fire & Rescue;
- Andrew Starke – Commissioner ACT Rural Fire Service;
- Ros Ransome [TaMS];
- Steven Gianakis [EPD];
- Daniel Iglesias [TaMS];
- Tony Corrigan [TaMS]; and
- Stuart McKenzie [EPD]

Two external companies were commissioned to provide assistance to the Working Group, Umwelt to undertake a peer review of the previous ecological studies and additional ecological investigations and ABBP to provide advice on bushfire risk, fire protection strategies and the preparation of a Bushfire Mitigation Strategy Report.

These companies were represented by;

- Peter Cowper Armstrong [Umwelt];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

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TaMS was invited to a second workshop on the 28th May 2014 with the aim to establish initial understanding of ecological values and management requirements and development of feasible options to manage bushfire risk. Attendees included:

- Dave Richardson [LDA];
- Kerry Browning [LDA];
- Adam Carmody [LDA];
- Dylan Kendall [TaMS];
- Peter Cowper Armstrong [Umwelt];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

Umwelt was commissioned to review the existing reports/studies and undertake field surveys and investigation into the vegetation and ecological values in Kama.

The results of this study are contained in the separate document attached as Attachment A.

Initial findings on the extent of the ecological value of the vegetation within Kama varied from the previous studies.

A third workshop was held on the 29th July 2014 with the aim to undertake a wider consultation with key fire planners within TaMS and ESA; establish a broader understanding of ecological values and management requirements and further development of feasible options to manage fire risk. Attendees were:

- Dave Richardson [LDA];
- Daniel Santosuosso [LDA];
- Adam Carmody [LDA];
- Dylan Kendall [TaMS];
- Adam Leavesley [TaMS];
- Nick Lhuede [ESA],
- Greg Potts [ACT RFS];
- Conrad Barr [Acting Chief Officer] ACT Fire & Rescue;
- Peter Cowper [Umwelt];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

Various options were considered in the methods of providing protection to the north-western edge of Molonglo 3 including support for the provision of an Asset Protection Zone within Molonglo 3 with the vegetation within Kama managed as a Strategic Fire Advantage Zone [SFAZ], provided that adequate on-going funding was available to support the management works in perpetuity.

Following discussions on the protection measures for Denman Prospect, Umwelt were commissioned to review the existing reports/studies and undertake field surveys and investigation into the vegetation and ecological values of the vegetation within the north-western portion of Denman Prospect and the adjoining land to the northwest.

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A fourth workshop was held on the 21st October 2014 with the aim of confirming the proposed management of the north-western edge of Molonglo 3 and examining options for fire management of the western edge to Denman Prospect and the Molonglo River Corridor.

Attendees were:

- Dave Richardson [LDA];
- Daniel Santosuosso [LDA];
- Adam Carmody [LDA];
- Adam Leavesley [TaMS];
- Greg Potts [ACT RFS] & Conrad Barr [Acting Chief Officer ACT Fire & Rescue];
- Peter Cowper & Rob Armstrong [Umwelt];
- Ros Ransome [TaMS]; and
- Graham Swain [ABPP].

At this meeting it was agreed that to the north-western edge of Molonglo 3 the proposed fire management zones would consist of:

1. A 60 metre wide Inner Asset Protection Zone, located inside the western edge to the Molonglo Stage 3 precinct;

2. A Fire Trail would be constructed along the boundary with Kama – inside the Molonglo Stage 3 precinct;

3. A managed fire break would be provided in Kama, adjacent to the boundary with Molonglo Stage 3;

4. That the vegetation within Kama would be managed in a series of Strategic Fire Advantage Zones, in accordance with the prescriptions provided by the *Strategic Bushfire Management Plan for the ACT* – 2009 – refer to Appendix C – Plan of proposed Bushfire Management Strategies – Kama/Molonglo 3 Western Edge.

   Existing access trails would be maintained and managed to provide edges to the Strategic Fire Advantage Zones – refer to Appendix C – Plan of proposed Bushfire Management Strategies – Kama/Molonglo 3 western edge.

5. The proposed management strategies were supported by ESA provided adequate on- going funding was available to support the works in perpetuity.

The meeting also resolved to examine the fire management options for Denman Prospect provided by ABPP and to assess these options in the field.

It was also agreed to inspect the line of the Asset Protection Zone to the north of the river corridor, as determined by TaMS. This inspection was attended by Dave Richardson; Nick Lhuede; Adam Leavesley and Daniel Santosuosso and agreement

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reached that a 60 metre wide Inner Asset Protection Zone [IAPZ] be provided to the full length of the river corridor, measured from the outside (or riverside) of the existing Sewer Access Track.

Where stormwater management ponds occurred, the IAPZ will include these facilities.

The acceptance by ESA of the 60 metre wide IAPZ was predicated on the vegetation within the river corridor being managed as a Strategic Fire Advantage Zone which is to be maintained to the standards prescribed by the *Strategic Bushfire Management Plan for the ACT – 2014 – Version 3.*

An inspection of the western edge of Denman Prospect and adjoining land to the northwest was undertaken on the 28th November 2014. Attendees were:

- Dave Richardson [LDA];
- Daniel Santosuosso [LDA];
- Adam Leavesley [TaMS];
- Nick Lhuede [ESA],
- Greg Potts [ACT RFS];
- Conrad Barr [ESA][Acting Chief Officer ACT Fire & Rescue],
- Andrew Starke – Commissioner ACT Rural Fire Service;
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

General consensus was reached on the location of the proposed fire protection measures which include the provision of a 60 metre wide IAPZ to the full length of the urban edge; management of a varying width Outer Asset Protection Zone [OAPZ] between the IAPZ and the retained forest vegetation within Denman Prospect and the management of the Territory Land to the northwest and west of the fire protection zones as a series of Strategic Fire Advantage Zones.

Whilst this consensus was broadly spread across the group concern was raised by ESA over the Strategic Fire Advantage Zone extending beyond the boundary of the Denman Prospect precinct and that this issue needed to be addressed before the final support of ESA would be considered.

Another matter raised by ESA related to the environmental consequences of the management of the proposed Outer Asset Protection Zones and SFAZs and the cost of the ongoing management and the long term funding of the management program.

To address the matter of possible environmental consequences of the management of the proposed SFAZs, Umwelt were commissioned to undertake further studies to determine the location of vegetation communities, threatened species and the viability of management of the vegetation to achieve the fuel loads required in a SFAZ.

The results of the study are contained in the Umwelt Report attached as Attachment B.

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The Umwelt report identifies an increase in the extent of Box Woodland, confirms the location of Pink Tailed Worm Lizard habitat and also confirms that the management of the SFAZs by hazard reduction burning is ecologically sustainable.

The Umwelt report was reviewed by Adam Leavesley from the Fire Management Unit of TaMS.

An inspection of the southern side of the Molonglo River corridor was undertaken on the 19th March 2015.
Attendees were:

- Dave Richardson [LDA];
- Daniel Santosuosso [LDA];
- Adam Leavesley [TaMS];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

This inspection examined the bushfire risk to the western edge of the Molonglo River Park and the fire paths/vegetation along the river corridor to the bend in the river, east of the Group Centre precinct.

Consensus was reached that the fire protection principle developed for the northern edge of the corridor [60 metre wide IAPZ within the urban development and management of the river corridor as a SFAZ] would be applied along the southern edge of river corridor.

It was noted that the position of the interface between any IAPZ and SFAZ would be identified at the time of developing EDPs for the length of this corridor in Denman Prospect.

It should be noted that the LDA is undertaking a review of the EPD Group Centre Concept Plan east of John Gorton Drive and south of the river. The review is examining the layout and dwelling densities against rational market expectations.

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ATTACHMENT A – BRIEFING NOTE

UMWELT – 15th October 2013.

KAMA NATURE RESERVE INTERFACE

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ATTACHMENT B – ANALYSIS OF VEGETATION STRUCTURE AND FIRE RISK – WEST DENMAN PROSPECT

UMWELT – April 2015.

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ATTACHMENT C – DETAILED PLANS

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ATTACHMENT D – INNER ASSET PROTECTION ZONE ESTABLISHMENT…

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Aloisi, Angelina

From: ABPP <abpp@bigpond.net.au>
Sent: Tuesday, 25 August 2015 10:53 PM
To: 'mailto:david.envplanning@bigpond.com'; Richardson, Dave; Santosuosso, Daniel
Subject: Molonglo
Attachments: B132154 - A3 - Molonglo Stage 3 Denman Prospect Molonglo River Corridor ACT - Bushfire Risk Assessment - LDA - 29 5 DR Add - TC Off 14082015 V2.docx

Hi Dave, I have looked over the report and made some edits – mainly formatting. It still needs tidying up. I will burn a copy of the original report and bring down on Thursday so that you are not working on a modified PDF. That will also improve the quality,

Regards

Graham
Australian Bushfire Protection Planners Pty Limited
RMB 3411 Dog Trap Road, SOMERSBY, NSW, 2250
Mob: 0427 622204 Ph: (02) 43622112 Fax: (02) 43622204

BUSHFIRE RISK STRATEGY

MOLONGLO STAGE 3;

DENMAN PROSPECT &

THE MOLONGLO RIVER CORRIDOR

AUSTRALIAN CAPITAL TERRITORY

PREPARED FOR THE LAND DEVELOPMENT AGENCY

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BUSHFIRE RISK

STRATEGY MOLONGLO

STAGE 3; DENMAN

PROSPECT &

THE MOLONGLO RIVER

CORRIDOR AUSTRALIAN CAPITAL

TERRITORY

PREPARED FOR THE
LAND DEVELOPMENT AGENCY

Assessment Number	Document	Preparation Date	Issue Date	Directors Approval
B132154 – A3	Final Draft	25.8.2015	25.8.2015	*G.L.Swain*

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(Steve Coleman paper on costs)

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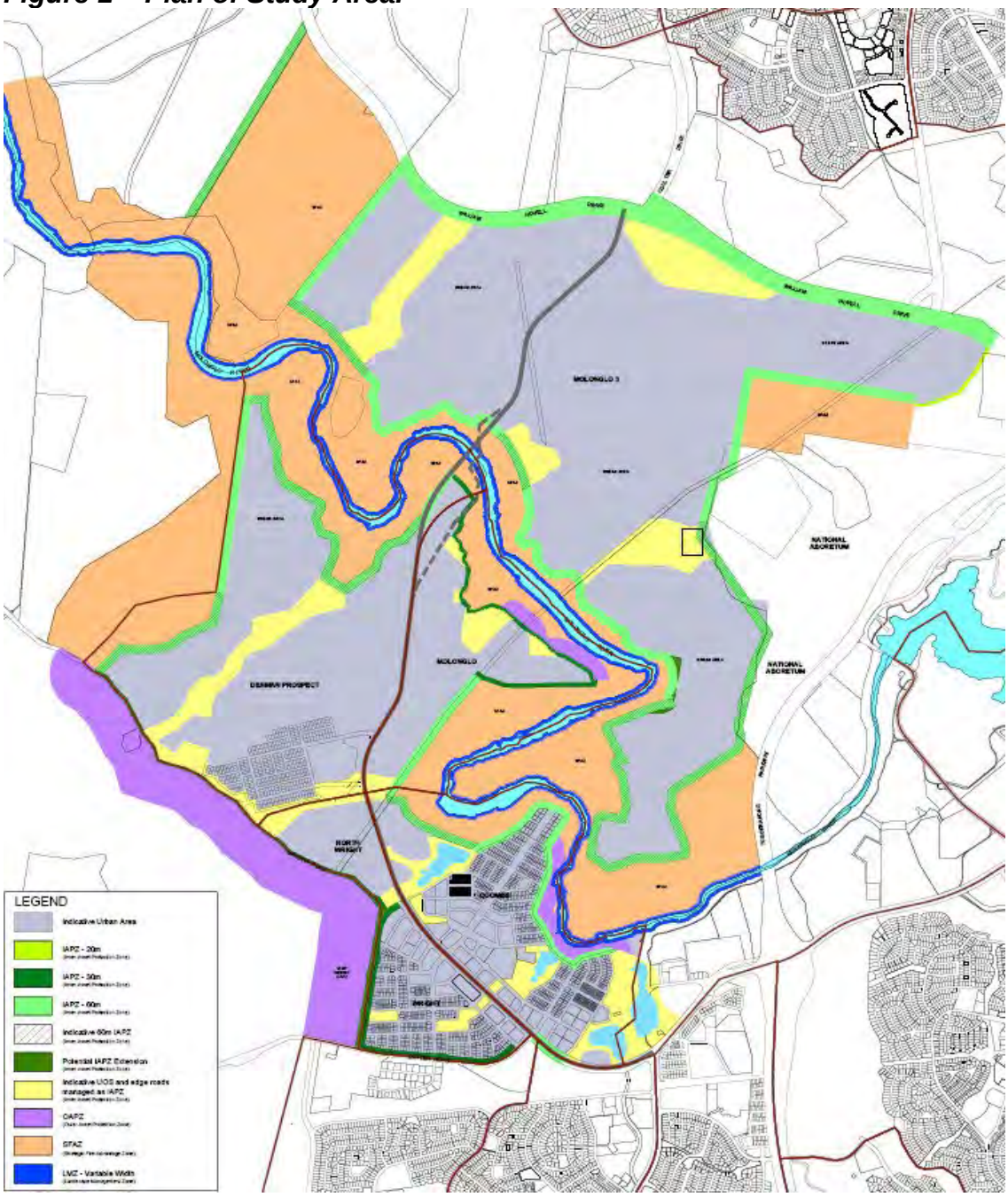
SECTION 1

INTRODUCTION

1.1 Background.

Australian Bushfire Protection Planners Pty Limited has been commissioned by the Land Development Agency [LDA] to undertake a Bushfire Study for Molonglo Stage 2, Stage 3 and the Molonglo River Corridor. **Figure 1** shows the study area.

Figure 1 – Plan of Study Area.



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The objective of the brief is to guide the development of the Land Development Agency Masterplan for the Molonglo Stage 3 study area, review the bushfire protection measures to Molonglo Stage 2 [Denman Prospect] and the Molonglo River Corridor and prepare a report on the findings of the study detailing the recommended bushfire protection measures identified by the study group.

Scope of Work – Molonglo Stage 2/3 and Molonglo River Corridor Study:

1. Review existing literature/reports & studies;

2. Review the study undertaken by Umwelt to determine the ecological constraints and opportunities for fuel hazard reduction management;

3. Attend pre-workshop site familiarisation;

4. Attend and participate in a workshop between LDA, Umwelt, TaMS Fire Management Unit and EPD to discuss all issues related to the protection of the north-western edge of Molonglo Stage 3; the western edge of Molonglo Stage 2 and the Molonglo River corridor;

5. Examine the results of the workshop, liaise with LDA & Umwelt and others [as required] to identify the measures which are required to be implemented to mitigate the potential bushfire risk;

6. Attend and participate in a follow-up workshop between LDA, Umwelt, TaMS Fire Management Unit, EPD, ESA, ACTRFS, Fire & Rescue ACT and other selected Stakeholders to present the findings/results of the initial workshop and the recommendations determined in the review of these findings/results;

7. Review the results of the follow-up workshop, liaise with LDA & Umwelt and others as required, to finalise the measures which are required to be implemented to mitigate the potential bushfire risk;

8. Prepare, in co-operation with Umwelt, a report which details the findings of the studies undertaken, the results of the workshops and the final recommendations on those measures required to be implemented to mitigate the bushfire risk to the western, north-eastern urban edge and the Molonglo River corridor;

9. Attend and participate in a final workshop between LDA, Umwelt, TaMS Fire Management Unit, EPD, ESA, ACTRFS, Fire & Rescue ACT and other selected Stakeholders to present the final report;

10. Generally, liaise with LDA, Umwelt, TaMS, ESA, ACTRFS, Fire & Rescue ACT and other ACT Government Departments as required.

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1.2 Information Reviewed.

The following report/studies were reviewed as part of the scope of works:

- The Molonglo River Park – Concept Plan prepared by Hassell – September 2011;
- The Molonglo Valley Plan for the Protection of Matters of National Environmental Significance [NES Plan] September 2011;
- Molonglo Vegetation Survey – Baseline Condition Assessment prepared by Ecological Australia – July 2013;
- Molonglo Stage 3 Slope Analysis – LDA;
- Bushfire Risk Assessment Report – Molonglo Structure Plan – prepared for ACTPLA, 19.7.2005;
- Updated Bushfire Risk Assessment Report – Molonglo Structure Plan – prepared for ACTPLA – 26.4.2006;
- Bushfire Risk Assessment Report – Molonglo Stage 2 Group Centre prepared for Indesco 23.8.2012;
- Territory Plan - ACTMAPi;
- Molonglo Stage 2 Vegetation Conservation Assessment prepared by Openlines, February 2014;
- Indicative Fire Management Strategy – Urban Area – TaMS – 2015;
- Indicative Fire Management Strategy – Molonglo Valley – TaMS – 2015;
- Analysis of Vegetation Structure and Fire Risk – Umwelt – April 2015;
- Molonglo River Reserve [Kama] Operational Plan 2014 – 2017 – TaMS;
- ACT Strategic Bushfire Management Plan – Version 3 – 2014;
- ACT Bushfire Management Standards – Strategic Bushfire Management Plan – Version 3 – 2014;
- Briefing Note on the Ecological Values of the Kama Nature Reserve – Molonglo Stage 3 Outer Asset Protection Zone – Umwelt – October 2013;
- Bushfire Risk Assessment for the north-western edge of Denman Prospect [Aurecon Australia Pty Ltd – 25.2.2014] - Incomplete.

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1.3 Review of Documents.

The following documents have been reviewed and a brief summary of the findings/recommendations of each follows. A more complete summary is at **Appendix A**:

1. Bushfire Risk Assessment Reports prepared by Australian Bushfire Protection Planners Pty Ltd [ABPP] for the Molonglo Structure Plan [August 2005 & April 2006];

2. The Molonglo River Park Concept Plan – ESDD (Hassell) – 2012;

3. The NES Plan – ACTPLA - 2011;

4. The Adaptive Management Strategy – TaMS – 2013; and

5. The Draft Indicative Fire Management Strategy – Molonglo Valley – TaMS – 2015.

1.4 Summary of the review of Reports.

The following is a summary of the findings/recommendations of the documents reviewed:

1. **Bushfire Risk Assessment Reports prepared by ABBP – 2005 & 2006:**

The Bushfire Risk Assessment Report 2005 prepared by ABPP stated:

"The long exposure of the north-western edge of the precinct to uphill burning fires, influenced by hot, dry, strong north-westerly winds, will result in significant fire impact either directly or indirectly from ember attack, depending on the level of protection provided by active management of the fuels within the river corridor.

Similar impacts may also occur to the western / south western edge from westerly and south-westerly wind-driven fires and the influence of wind turbulence in the Mount Stromlo area.

The northern edge will be impacted by fires burning within the habitat corridor, north of William Hovell Drive.

Due to the level of risk and to address the potential impacts of future bushfires to the exposed urban edge and the concerns over the long-term viability of minimising fuel loads within the abatement zone, a Critical Management Zone should be provided to a minimum width of 300 metres.

The objective of land uses within the Critical Management Zone should be to provide permanent management of the hazardous fuels to levels which prevent the spread of fire into the urban edge.

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The Molonglo River Corridor will separate the eastern development node from the western development node and therefore provide a direct fire path into the suburbs adjoining the corridor and to the International Arboretum to the south east.

The river corridor separating the north-eastern and south-western nodes of the East Precinct should be activity managed as a recreation reserve/public park to mitigate the effects of fire runs along the river".

The Bushfire Risk Assessment Report 2006 prepared by A B P P retained the recommendation for the provision of a Critical Management Zone to the north- western edge of Molonglo and notes that the Draft Structure Plan had introduced 'Lake Molonglo' with the construction of a new dam on the Molonglo River.

For the Critical Management Zone [CMZ] the report stated:

- ***Purpose.***

To provide a permanently managed fuel reduced zone, wide enough to mitigate the impact of radiant heat and ember transfer to the urban edge during major bushfire events.

- ***Location.***

The Critical Management Zone shall be located beyond the edge of the Inner Asset Protection Zone on the north-western and northern edge of the western "node" and the south-western edge of the East Molonglo precinct; the northern, north-western, western and south-western edge of the Central Molonglo.

- ***Depth.***

A minimum width of 300 metres shall be provided. (Minimum 100 metres width provided to the north-western edge of the East Molonglo precinct).

- ***Establishment & Maintenance.***

The Critical Management Zone shall be established on the hazard side of the Inner Asset Protection Zone and shall extend to the widths nominated.

The zone may contain agricultural pursuits which permanently minimise combustible fuel ground litter, (vineyards, orchards); or land uses that utilize irrigation supply drawn from grey water recycling, or irrigation from the new lake created by the damming of the Molonglo River. Such land uses may include the cultivation of summer crops/Lucerne.

The Critical Management Zone may also include recreation and open space facilities such as Golf Courses, Sports Fields, Carparks etc.

Where these land uses are not utilized to provide the Critical Management Zone and the zone consists of Habitat Corridors/Rural Land, a stock proof fence with access gates shall be provided on the outer edge of the zone. A 30 metre wide wind break shall be established by planting smooth barked trees on the outer edge of the zone. A second wind break shall be established to a width of 10 metres, 10 metres from the Inner Asset Protection Zone/Critical Management Zone boundary.

A four (4) metre wide fire trail shall be established on the centre line of the Critical Management Zone, with link roads provided to the edge road at approximately 500 metre intervals.

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Management of the combustible fuels within the CMZ shall be undertaken to maintain a Low – Moderate Overall Fuel Hazard, in accordance with the methodology provided by the NRE Overall Fuel Hazard Guide. Management shall be implemented by regular stocking of the zone, or by a combination of mechanical slashing/stocking/hazard reduction burning. A Fuel Management Plan shall be prepared for the maintenance of the Critical Management Zone, irrespective of land use".

The final Structure Plan for Molonglo removed the damming of the Molonglo River, primarily due to the results of ecological studies, and replaced the lake with the Molonglo River Park [Nature Reserve] and established the Kama Nature Reserve to the northwest of Molonglo Stage 3.

These changes to the Draft Structure Plan – i.e. establishment of a Nature Reserve to the northwest of Molonglo Stage 3 and within the Molonglo River corridor, increase the bushfire risk to future development located adjacent to the north-western edge and to both sides of the river corridor.

The examination of the mitigation measures required to provide a reduction of this risk forms the core objective of the Working Group established by the Land Development Agency.

2. Molonglo River Park Concept Plan – ESDD (Hassell) – 2012

The Molonglo River Park Concept Plan prepared by Hassell supports the recommendation of the provision of the 300 metre wide 'Critical Management Zone' to the north-western edge. Note that the Hassell concept plan was completed after the NES Plan and before the Adaptive Management Strategy and presented recommendations for the management and development of the river corridor.

The Concept Plan also recommended that the river corridor should be managed for ecological values with the corridor being broken into precincts to prevent the 'wick' effect and in particular the management of the western entrance to the river park and the area around the sludge ponds to mitigate the passage of fire along the river.

It calls for strategic discontinuity zones within the riparian corridor which aim to reduce the ability of a fire to move continuously up the corridor and into the urban areas, and provide access for defense and fuel management. One of those areas would be located around and to the west of Coppins Crossing, from the proposed sewer line crossing to the proposed John Gorton Drive crossing the river. Another one would be at Misery Point.

The Hassell report goes on to describe the vegetation in the recreation areas would contain large areas of groomed grassland maintained to a height of less than 100mm with scattered tree planting as well as formal parks and gardens with irrigated plantings.

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3. The NES Plan – 2011:

The NES Plan provided, under Section 2.3 – Bushfire Management Framework a 'motherhood' statement about bushfire management which reads:

"Within the strategic assessment area fire management will be aimed at protection of both built assets and MNES values. This will be achieved through the identification of appropriate asset protection zones and application of hazard reduction techniques that will both:

- *Ensure that the standards for fuel loads in the SBMP are met; and*
- *Protect MNES values through the use of sympathetic management techniques".*

The aim of this document does not address the recommendation that the vegetation in the river corridor or on the land to the west of Molonglo 3 [Kama] and Denman Prospect be managed to mitigate the impact of fire on the north-western edge of the future urban development and from a fire spreading along the river corridor.

In the document under Management and offsetting it called for the establishment of a buffer outside of the Kama Nature Reserve on its eastern side to protect the ecological values of the reserve. It went on under Commitments to MNES:

"Establish a buffer outside the Kama Nature Reserve between the reserve and the proposed development area, and allow for appropriate uses consistent with nature conservation uses of the reserve. The buffer will be developed to ensure that fire management is undertaken outside of the Kama Nature Reserve and will provide protection against urban edge effects."

It assumed that ESA would agree to no bushfire management inside Kama Nature Reserve despite there being a requirement underlying strategic bushfire management in the ACT that individual land managers are responsible for bushfire management on the land they manage. It also assumed that no bushfire management would be undertaken despite Kama being identified on the ESA website as being managed as an SFAZ (agricultural).

There are no dimensions provided in the NES Plan for the width of the buffer.

The document does not address the potential bushfire risk to the future development adjacent to the north-western edge or the river corridor.

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4. The Molonglo Adaptive Management Strategy – TaMS 2013

The Molonglo Adaptive Management Strategy (AMS) was a key commitment from the NES Plan. Its purpose was to define a set of measures designed to achieve the conservation outcomes and performance targets for MNES in Molonglo strategic assessment area.

One of the outcomes of the baseline condition assessment was that an assessment of the buffer zone consisting of patches O2, O3 and O4 located to the east of Kama Nature Reserve found that these patches were not representative of a Threatened Ecological Community.

Under Management Objectives for fire, the document makes the statement that fire management activities for the purposes of protecting the urban development east of Kama Nature Reserve will be undertaken outside Kama Nature Reserve. It goes on to mention:

"The prescribed eastern buffer zone for Kama Nature Reserve is to ensure that fire management is undertaken outside of the Reserve and will provide protection against edge effects."

There are no dimensions provided in the AMS that defines the width of the buffer to Kama Nature Reserve.

The document does not address the potential bushfire risk potential to the future development adjacent to Kama Nature Reserve.

5. Draft Indicative Fire Management Strategy – TaMS 2015:

TaMS have prepared a draft Indicative Fire Management Strategy – Urban Area and the Indicative Fire Management Strategy – Molonglo Valley. The review of these documents has found that few of the recommended bushfire management strategies contained within the Molonglo River Concept Plan have been incorporated into the management strategies proposed by TaMS.

The recommendation provided in the Australian Bushfire Protection Planners reports and the Molonglo River Concept Plan that a 'Critical Management Zone [CMZ] be provided to the northwest of the urban development [and river park] was not adopted in favour of ecological and habitat values.

Similarly, the Molonglo River Concept Plans' recommendation that the river corridor be broken into precincts to prevent the 'wick' effect and in particular the management of the western entrance to the river park and the area around the sludge ponds to mitigate the passage of fire along the river was not adopted.

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These items are critical to the prevention of fire spread along the river corridor and should be reinstated or at least given proper consideration.

1.5 Working Group.

In late 2013 the LDA identified the need to establish a working group to examine the outstanding issues relating to the bushfire risk to the north-western edge of Molonglo 3; Molonglo Stage 2 [Denman Prospect] and the Molonglo River Corridor.

The brief of the Working Group was to bring together all Government Agencies involved in the development of the Molonglo East precinct to enable consideration of previous studies, undertake site inspections and consider all options available so as to develop a report that establishes the principles, processes and funding required to address the bushfire risk. Representatives of Government Agencies included:

- Dave Richardson [LDA];
- Kerry Browning [LDA];
- Adam Carmody [LDA];
- Dylan Kendall [TaMS];
- Adam Leavesley [TaMS];
- Nick Lhuede [ESA];
- Greg Potts [ACT RFS];
- Conrad Barr [Acting Chief Officer] ACT Fire & Rescue;
- Andrew Starke – Commissioner ACT Rural Fire Service;
- Ros Ransome [TaMS];
- Steven Gianakis [EPD];
- Daniel Iglesias [TaMS];
- Tony Corrigan [TaMS]; and
- Stuart McKenzie [EPD]

Two external companies were commissioned to provide assistance to the Working Group, Umwelt to undertake a peer review of the previous ecological studies and additional ecological investigations and ABBP to provide advice on bushfire risk, fire protection strategies and the preparation of a Bushfire Report.

These companies were represented by;

- Peter Cowper Armstrong [Umwelt];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

Appendix B provides details on the Working Group, including meeting and site inspection dates, attendees and decisions/resolutions determined.

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1.6 Studies Undertaken by Umwelt.

Stemming from the second meeting of the Working Group the LDA commissioned Umwelt to undertake a study into the ecological values of the Kama Nature Reserve – Molonglo Stage 3 Outer Asset Protection Zone.

A copy of the study prepared by Umwelt [15th October 2013] is attached as **Attachment A**.

The purpose of the study was to provide LDA with a comparison of the ecological values of the 200 metre zone either side of the interface between Kama Nature Reserve and the Molonglo Stage 3 development.

The findings of the study identified that the condition of the 200 metre wide area inside the eastern boundary of Kama Nature Reserve is variable, comprised of a mosaic of high condition box-gum woodland, low condition natural temperate grassland and low condition Scribbly Gum woodland.

The ecological condition of the 300 metre wide area of the western boundary of Molonglo Stage 3 [adjoining Kama Nature Reserve] is generally low, consisting of degraded exotic pasture, and an area containing scattered Blakely's red gum with an exotic understorey and is not the Box-gum Woodland community.

The report confirms that the area is dominated by exotic pasture grasses and the only feature of ecological significance is the presence of five potential pink-tailed worm lizard habitat areas. One of these [location PTWL1] is within a patch of diverse native grasses, whereas the others are of moderate to low value due to a higher abundance of Phalaris and wild oats. These areas are mapped as moderate habitat quality by Osborne & Wong [2010].

Refer to **Figure 2** – Ecological Assets of the Outer Asset Protection Zone including potential Pink-tailed Worm Lizard habitat.

Figure 3 provides a copy of the project area studied by Umwelt, the location of the Outer Asset Protection Zone within the urban boundary of Denman Prospect; the Strategic Fire Advantage Zones and the 'Interface Zone' to the west of Denman Prospect.

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Figure 2 - Ecological Assets of the Outer Asset Protection Zone including potential Pink-tailed Worm Lizard habitat – Umwelt Briefing Note 15th October 2013 – Kama and Molonglo 3.

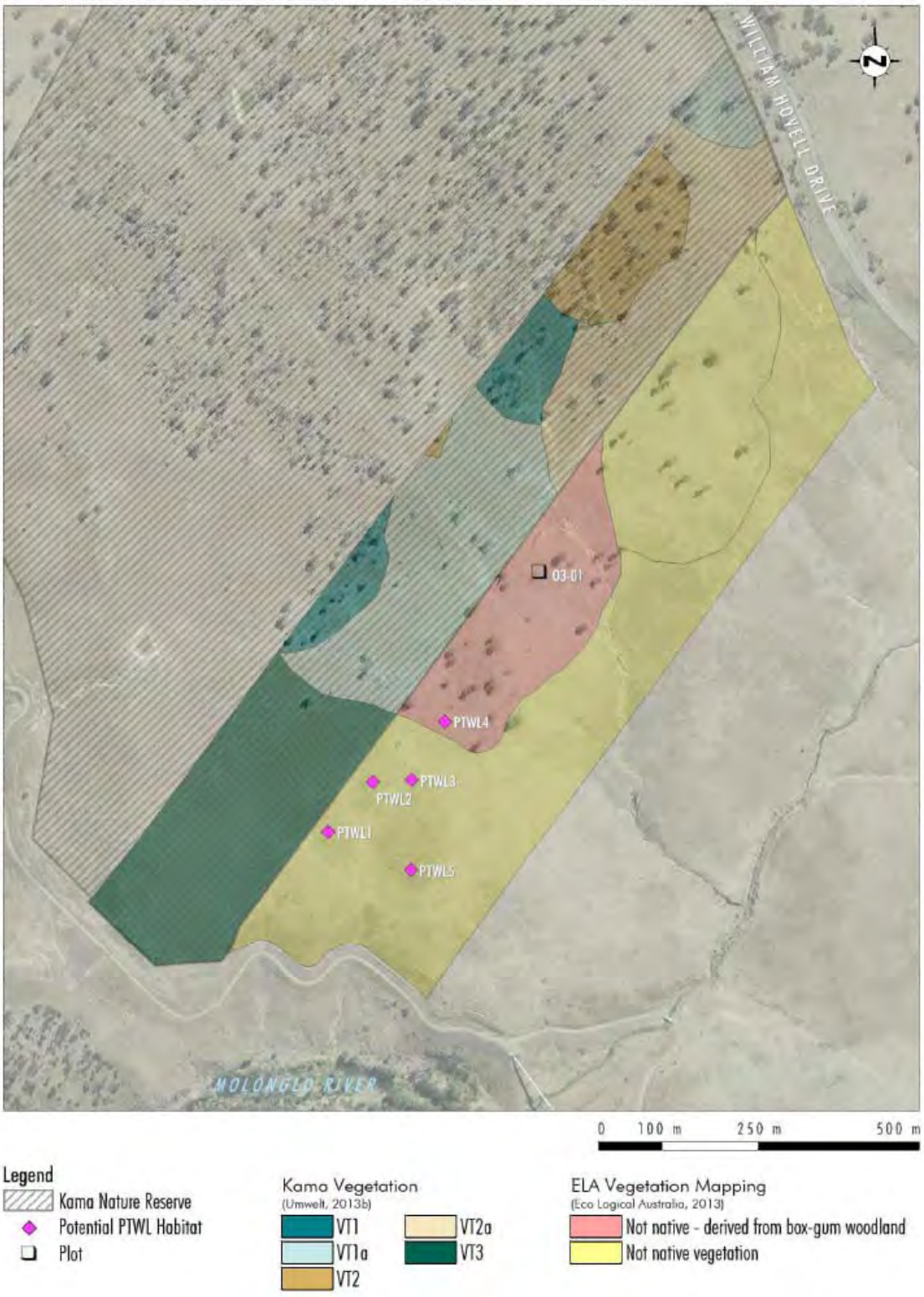

Figure 3.1 - Ecological assets of the outer asset protection zone including potential pink-tailed worm lizard habitat.

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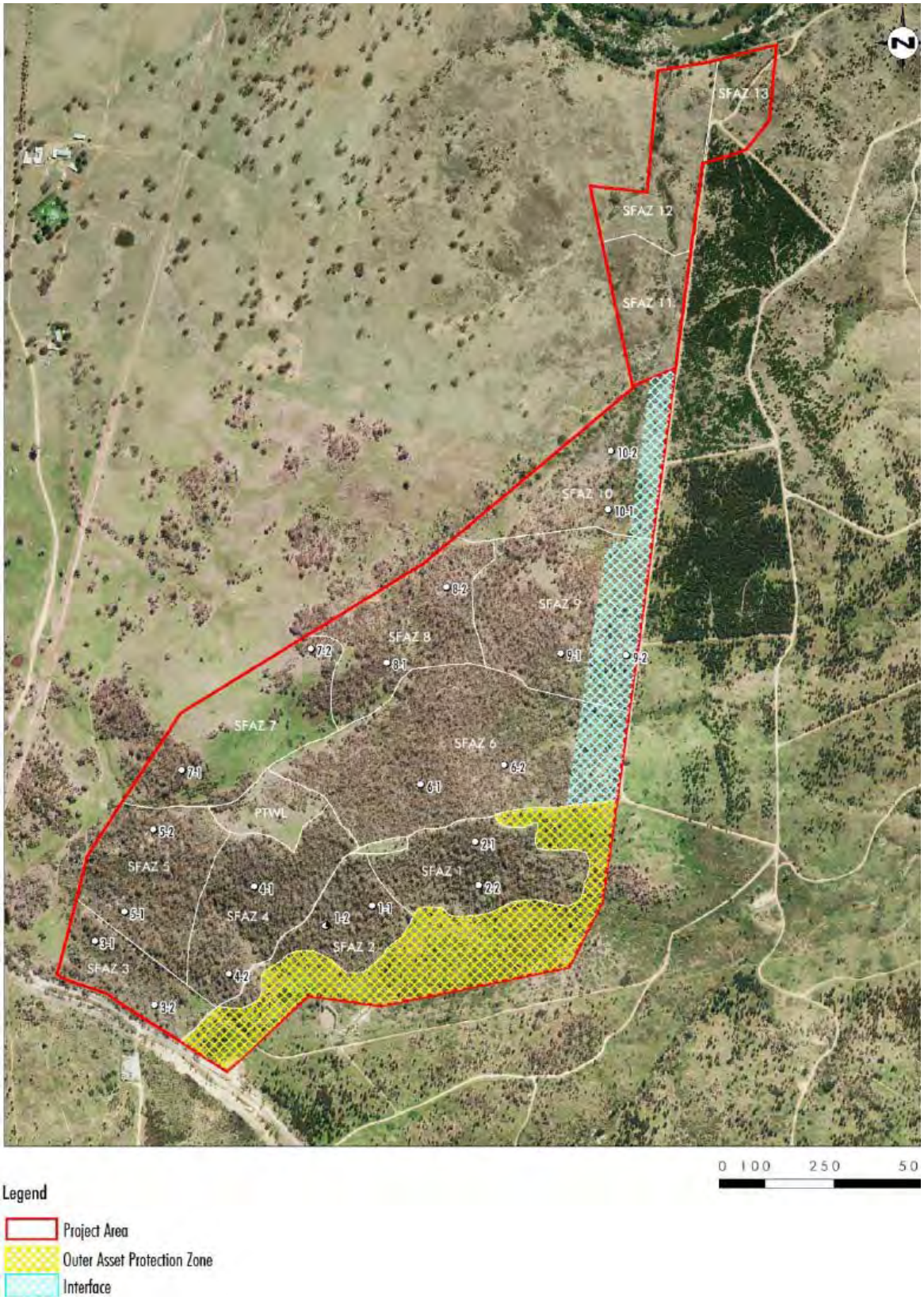
Figure 3 – Plan showing the study area, the location of the Outer Asset Protection Zone; Strategic Fire Advantage Zones and Interface Zone – Denman Prospect, prepared by Umwelt April 2015



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The LDA commissioned Umwelt to undertake an analysis of vegetation values in areas west of Denman Prospect and identify practical solutions to meet joint objectives of fuel hazard management and biodiversity conservation.

A copy of the final report dated April 2015 is at **Attachment B**.

The key messages of the report include:

1. Much of the vegetation within the Project Area is in a regenerating thicket state from the 2003 wildfires;

2. Vegetation in a regenerating thicket state will benefit from active management to promote restoration of the remnant to a state which accelerates the provision of structural diversity important for both fauna and flora diversity. This is demonstrated through discussion of the state and transition model concept;

3. Active management of regenerating thicket vegetation will provide greater opportunity for fire management and suppression, reducing the likelihood of a major fire event compromising biodiversity values in the future;

4. Research outlined in the report suggests that reducing the density of smaller stems that compete strongly for resources leads to greater structural and floristic diversity and subsequent greater conservation values. The use of hazard reduction burning as a tool to achieve this is unlikely to reduce understory vegetation diversity provided burn intervals are set at the lower limits by maturity of smaller plants and non-breeding periods of poorly dispersed or rare birds, and at the upper limits by the longevity of plants which usually required fire as part of the reproductive cycle;

5. Hazard reduction burns in Red Stringybark Dry Sclerophyll Forest within the project area should be initially undertaken in a mosaic every five to ten years. For Box-Gum Woodland burns should not occur in periods of less than 10 years and longer should fuel levels remain naturally low or other fuel management techniques be used.

   Practical implementation of this measure should be done in consultation with ACT Government Conservation Planning and Research officers to determine the most appropriate interval between burns, particularly to each Strategic Fire Advantage Zone [SFAZ];

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6. Management should be undertaken with adaptive management principles in mind. This will ensure an iterative process of robust decision making in the face of uncertainty, with uncertainty reduced over time as determined by monitoring;

7. Hazard reduction burning should be avoided in areas of known Pink-tailed Worm Lizard habitat; if hazard reduction burning occurs this should happen between late winter and mid spring [preferably in August to September].

Section 6 – 'Conclusion' of the Umwelt report provides recommendations for the management of the Strategic Fire Advantage Zones, including by hazard reduction burning; silvicultural thinning; combined approach and the management of areas known to contain Pink-tailed Worm Lizards.

Section 6 also provided recommendations on the management of the Outer Asset Protection Zone, including hazard reduction burning and silviculture within the 'Box-Gum Woodland' along the eastern boundary.

Section 6.3 covers the management of the 'Urban Interface' along the eastern edge of the project area [to the western edge of Denman Prospect]. This zone consists of a 100 metre wide corridor adjacent to the urban interface and is considered to be a primary fire threat to the proposed Denman Prospect development. It also contains natural assets including 'Box-Gum Woodland' in an advanced regeneration state. This vegetation is likely to regenerate into an open forest structure without management.

The report states:

"In order to protect important values within the 'Box-Gum Woodland' area and to mitigate bushfire risk to the adjacent urban development, it is recommended to use silviculture thinning to accelerate an open woodland structure as a primary management tool in this area. This treatment is only required for SFAZ6 and SFAZ 7.

Ongoing management of grassy sward fuel may be required in the event of grassland fire hazard exceeds 35 when grass curing is > 70% [refer to Table 21.5 and Table 21.8 in the ACT Strategic Fire Management Plan – 2014 – Version 3'.

Figure 4 below identifies the maximum 'Overall Fuel Hazard Assessment' ratings for each SFAZ.

Figure 5 on page 19 shows the distribution of Box-Gum Woodland within the Project Area.

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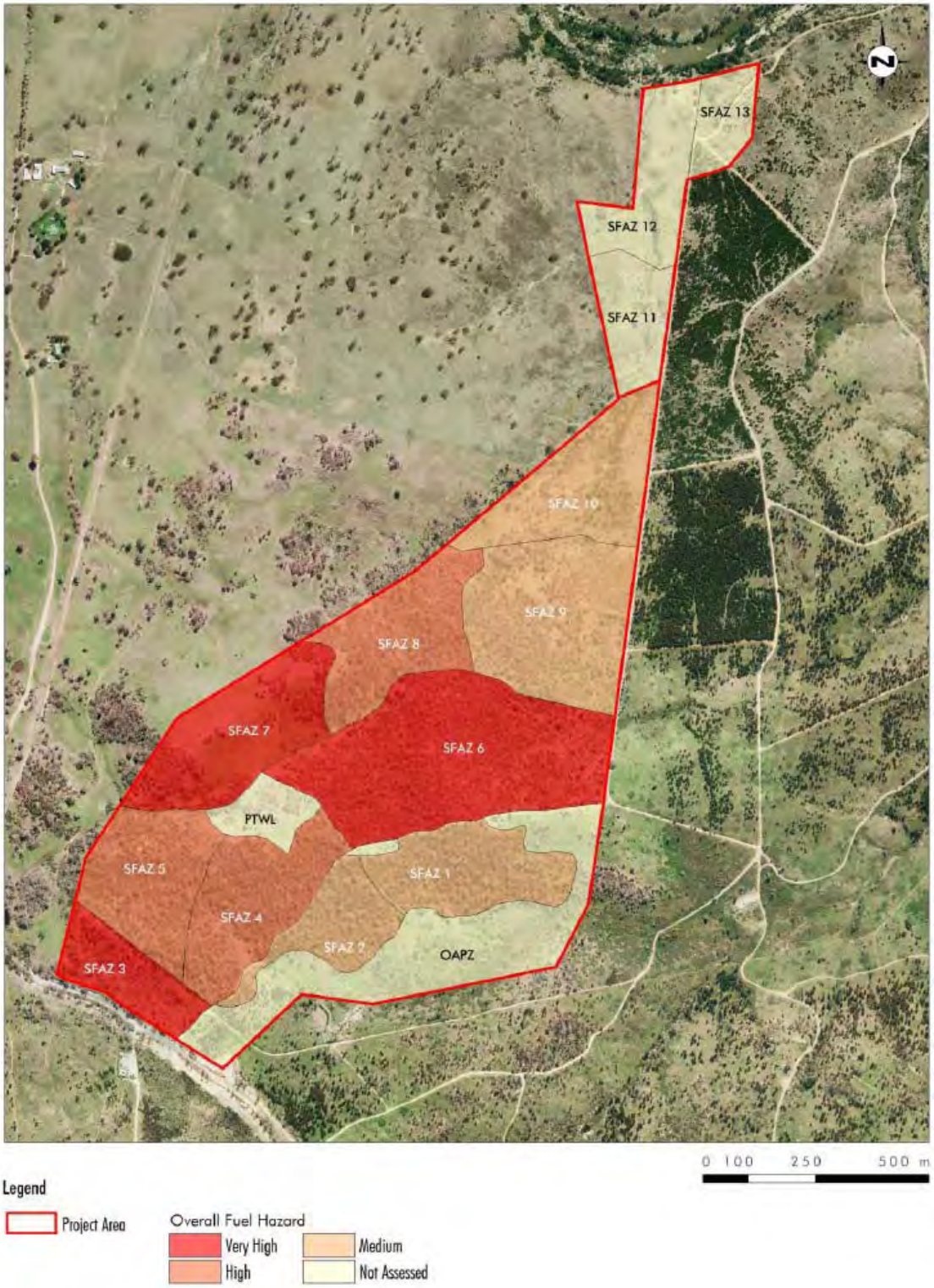
Figure 4 – Denman Prospect maximum 'Overall Fuel Hazard Assessment' ratings for each Strategic Fire Advantage Zone – Umwelt April 2015



Note: due to subjectivity in the assessment method, areas with a 'Medium' hazard may in fact be 'High', or tending to 'High' i the near future as stringybark bark matures, stem charring is reduced and leaf litter accumulates.

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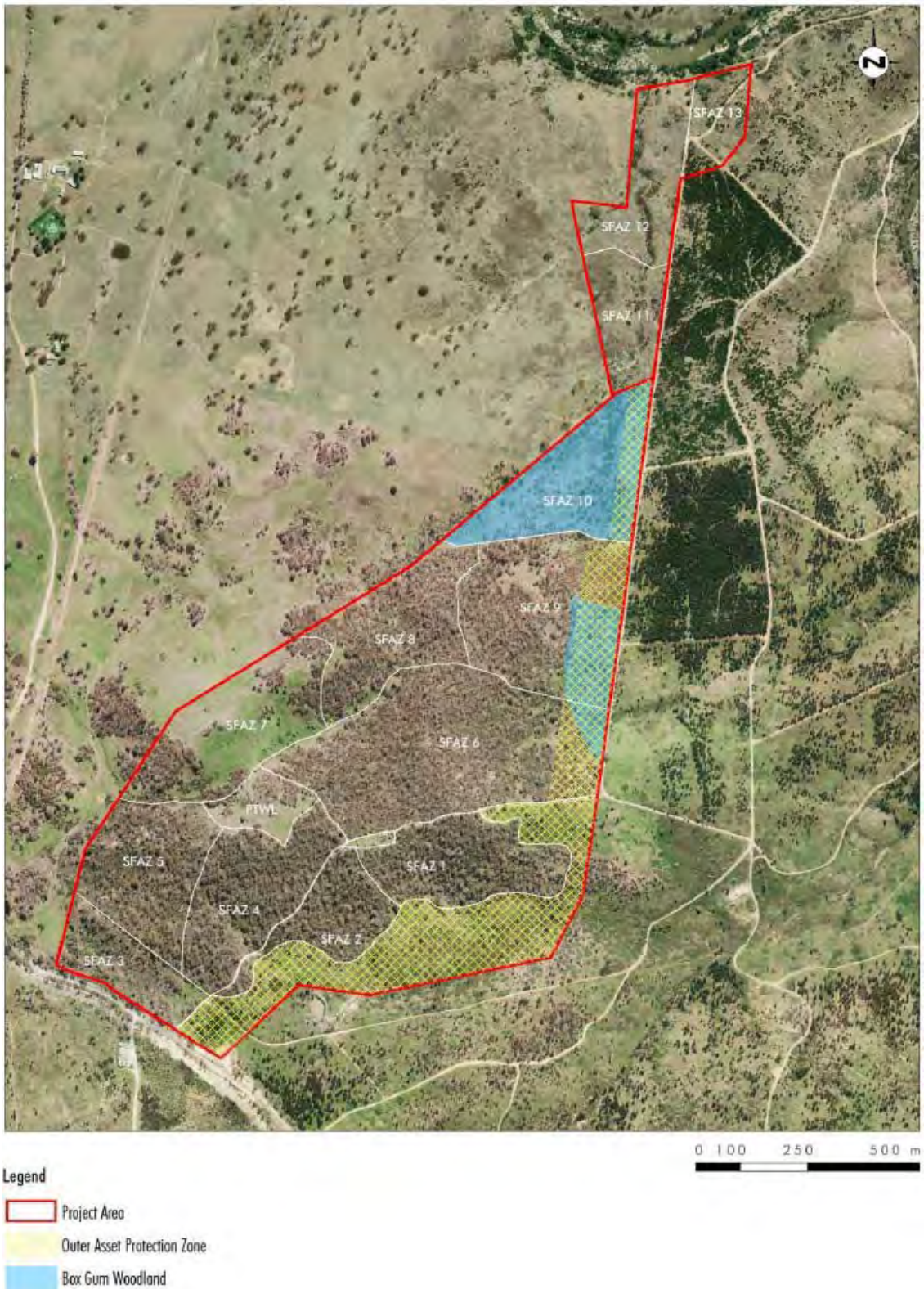
Figure 5 – Denman Prospect distribution of Box-Gum Woodland within the Project Area – Umwelt April 2015



Confusing as it shows OAPZ over SFAZ along western edge. This could be the "interface area" and is a "special" SFAZ requirement.

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SECTION 2

BUSHFIRE RISK ASSESSMENT

2.1 Introduction.

The Australian Standard AS/NZS ISO 31000:2009, the ACT Government Enterprise-wide risk management framework and the Emergency Management Australia (EMA) emergency risk management process provide the framework for establishing the context, analysis, evaluation, treatment, monitoring and communication of risk.

Risk has two elements: Likelihood, the chances of a bushfire occurring and consequence, the impact of a bushfire when it occurs.

Bushfire risk is defined as the chance of a bushfire occurring that will have harmful consequences to human communities and the environment. Bushfire risk is usually assessed through consideration of the likelihood of ignition and consequences of a bushfire occurring. Risk reduction can be achieved by reducing the likelihood of a bushfire, the opportunity for a bushfire to spread or the consequence of a bushfire (on natural and built assets).

Bushfire management should have a clear objective to reduce both the likelihood of bushfires and reduce the negative impacts of bushfires. It should also consider the costs, inconvenience and dangers of measures taken to reduce the risk of bushfires.

The consequences of bushfire management activities and the failure to implement programs also need to be considered. A range of factors influence bushfire risk – these include:

- The likelihood of human and natural fire ignitions, as influenced by time, space and demographics;
- The potential spread and severity of a bushfire, as determined by fuel, topography and weather conditions;
- The proximity of assets vulnerable to bushfire fuels, and likely bushfire paths; and
- The vulnerability of assets including natural assets, or their capacity to cope with, and recover from bushfire.

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An assessment of bushfire risk must firstly define the problem. This involves the identification of the nature and scope of issues to be addressed and defining the possible boundaries for the assessment *(Emergency Risk Management – Applications Guide. (EMA Echo Press, 2000), and AS/NZS* ISO 31000:2009*).*

For the purpose of analysing fire risks that might emerge in the ACT, a dangerous and damaging fire has the potential to occur when the following conditions prevail:

- Continuous available fuel – fuel at moisture content sufficiently low to enable rapid combustion, arising from drought effects or the maturing and drying, of grasslands;

- Exposure of vulnerable assets. The 'catchment' for such fires may be within several hundred metres or many (60-70) kilometres from the asset/s;

- A combination of weather conditions that generate a forest or grass fire danger index of Very High (24) or greater. Typically in the ACT, prevailing adverse fire weather will have a strong northerly, through south-westerly wind influence;

- Fire in the landscape not effectively suppressed.

2.2 Risk Assessment.

Australian Bushfire Protection Planners Pty Limited prepared a Bushfire Risk Assessment Report in 2005 for the Molonglo Structure Plan.

The findings of this report, in respect to the bushfire risk, fire paths and potential fire scenarios are applicable for the Molonglo Stage 3, Denman Prospect and the Molonglo River Corridor – refer to Attachment A.

An extract from this report states under 'Summary of Bushfire Risk':

"Major bushfires have occurred in the Molonglo Valley in 1926, 1939, 1952, 1991, 1994, 2001 and 2003.

The topography and landform of the valley predisposes the valley to impacts of fires burning under north-westerly and westerly wind influences and to a slightly lesser extent, south-westerly wind influences.

The slope of the valley to the north-west and the ridgelines/ gullies will influence the spread of fire from the northwest, west and south west and result in sporadic fire runs.

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Fuel loads within the retained Habitat Corridors and Parklands, Nature Reserves and Lease Holdings, unless managed, will promulgate future bushfires up to the urban edge and into the vegetated corridors within the urban precinct.

Whilst the Overall Fuel Hazard for the vegetation within the valley is Very High there is, due to the fire history, topography, aspect, wind influence and climatic conditions within the valley, an extreme risk of damaging bushfires impacting the north western edge of the East Precinct [Molonglo Stage 3 and Denman Prospect].

The 'Conclusion' of the 2005 Bushfire Risk Assessment Report stated:

"The orientation of the Molonglo Valley and the ability for northwest, west and south-west wind-driven fires to impact the proposed development edge will continue the extreme level of risk to any development proposed in the valley with the potential to cause major damage to buildings and infrastructure.

Subsequent to the preparation of the original Bushfire Risk Assessment Report [19.7.2005] an updated report was prepared by ABPP, dated 26.4.2006. The Executive Summary of this report stated:

The Molonglo Stage 2 Bushfire Risk Assessment quantifies the current level of risk to future development within the Molonglo Valley, prior to the implementation of mitigation measures as ***Extreme.***

Mitigation measures which have been identified within the report as necessary to reduce the level of potential risk to future development include the creation and permanent management of a Critical Management Zone to the north-western edge of the East Molonglo Precinct and to the western and south-western edge of the Central Molonglo Precinct.

The provision of the Critical Management Zone (CMZ) replaces the Outer Asset Protection Zone, as defined in the Strategic Bushfire Management Plan for the ACT and the management of this zone, in accordance with the performance standards defined in this report, are considered to be a mandatory requirement in the reduction of the bushfire risk to the future development within the Molonglo Valley.

In addition to the provision of a Critical Management Zone to the north-western edge of East Molonglo Precinct, this report recommends, due to the risk of fire over-run along the Molonglo River corridor and into the future suburb, the damming of the Molonglo River below Coppins Crossing and the creation of Lake Molonglo".

This recommendation was not adopted in the final Molonglo Structure Plan.

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SECTION 3
PROTECTION MEASURES TO BE IMPLEMENTED TO REDUCE THE BUSHFIRE RISK TO THE NORTH-WESTERN EDGE OF MOLONGLO STAGE 3 & DENMAN PROSPECT AND THE MOLONGLO RIVER CORRIDOR.

3.1 Introduction.

The primary purpose of the LDA established Working Group was to establish solutions to the problem of providing bushfire protection measures to the north-western edge of Molonglo Stage 3 and Denman Prospect and to the Molonglo River Corridor which would not only mitigate the bushfire risk but also be acceptable to ACT Government Agencies.

The solutions also had to be achievable, ecologically and economically sustainable and able to be funded in the long term – in perpetuity.

Consideration was also given to the 'alternate solutions' provided by the updated ACT Strategic Bushfire Management Plan – Version 3, particularly in respect to the ability to increase the width of the Inner Asset Protection Zone so as to remove to need to provide and manage an Outer Asset Protection Zone on ecologically sensitive land.

Having considered the total removal of the Outer Asset Protection Zone and the potential for catastrophic bushfire events to impact the north-western edge of Molonglo Stage 3 and Denman Prospect and development adjacent to the Molonglo River corridor, the Working Group has adopted a policy of implementing a bushfire protection zone to future development. This contains an Inner Asset Protection Zone supported on the outside by a Strategic Fire Advantage Zone [SFAZ] – within Kama to the northwest of Molonglo Stage 3 as well as within the land to the northwest and west of Denman Prospect and broadly within the Molonglo River Park.

The study undertaken by Umwelt, in concert with TaMS Fire Management Unit (FMU) has formed the basis upon which the decision has been taken to implement the establishment of a SFAZ within Kama Nature Reserve. It is noted that consensus has been reached that the performance criteria of a SFAZ, as required by the ACT Strategic Bushfire Management Plan – 2014 – Version 3 can be achieved whilst maintaining the ecological biodiversity of the reserve.

Similarly, the study undertaken by Umwelt, in concert with TaMS FMU has formed the basis upon which the decision has been taken to implement the establishment of a SFAZ on the land to the northwest and west of Denman Prospect – refer to Attachment B – Analysis of Vegetation Structure and Fire Risk.

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Discussions with TaMS FMU and the need to manage the vegetation within the Molonglo River corridor to mitigate the spread of fire have also formed the basis upon which the establishment of the SFAZ has been recommended within the Molonglo River Park.

This report also recommends the inclusion of the community facility located at the former Sludge Ponds and the western end of the River Park as detailed in the Molonglo River Park Concept Plan prepared by Hassell.

For completeness, this report also provides recommendations on the bushfire protection zones to the northern and eastern edge of Molonglo Stage 3.

The SBMP Version 3 highlights the need on rural land inside the Bushfire Abatement Zone for the development of property-level fire management plans under the Farm Firewise Program, the legislative requirements for the development and approval of a bushfire operational plan (BOP) under the Emergencies Act 2004. The BOPs are to be reviewed every 5 years.

It calls for undertaking a planned, whole-of-property approach to reduce the risk of bushfire in addition to considering the risk of fires starting and spreading. Through this approach, identified actions should:

- Complement activities undertaken on adjacent rural or government-managed lands;
- Consider safety as a priority, as well as environmental and legal issues, and long-term sustainability; and
- Consider bushfire recovery.

Property level fire management plans developed under the Farm Firewise Program will meet the requirements for BOPs according to the SBMP Version 3.

The SBMP Version 3 also highlighted the Broad area bushfire fuel reduction across the natural and rural landscape through the use of Strategic Firefighting Advantage Zones (SFAZs). These have the objective of reducing the intensity and spread of fires across large landscape units contributing to the success of firefighting under moderate weather conditions and reducing impacts of unplanned fires on catchment values.

In these areas, specific actions amongst others include:

- Land managers preparing BOPs that detail fuel that detail fuel management works in SFAZs to meet the standards in the ACT Bushfire Management Standards with the BOPs audited and assessed to ensure compliance;

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- The implementation of landscape fuel management treatments will be reported on a cumulative basis;

- The location and timing of fuel reduction activities in SFAZs for the period 2019-24 will be developed.

The ESA and TaMS measure the IAPZ width from the back of kerb on the block side to the IAPZ/SFAZ interface where an edge road is provided. The LDA on the other hand measures the width to the block boundary which is easy to define on the ground whereas roads and road verges can be of variable widths and variable distances from the block boundaries.

Note that TaMS does not consider the road verge on the block side of an edge road in the IAPZ to be part of their management responsibility. Note however, that lessees are not responsible for the management of road verges as they are unleased Territory land. Hence, for example, a 60m IAPZ from the ACT Bushfire Management Standards would result in a distance of 67 to 70m to the block boundary.

However, the LDA through discussion in the Working Group have support from the ESA for consideration of a 50m IAPZ (measured from back of kerb where an edge road will be provided). So, a 50m IAPZ would result in a total width of 60m to the block boundary.

Where no edge road will be provided, there is a possibility that the width of the IAPZ will be unaltered at 50m and this corresponds to the block boundary with those blocks are serviced from the side or rear.

The reference to an IAPZ width of 60m in the remaining parts of this document is the ESA suggested 50m plus 7.5 to 10m of verge to the block boundary.

Plans outlining the urban edge outcomes are at **Attachment C**. Note that they contain an aerial photograph image including contours and the agreed position of the urban edge boundary.

Refer to **Figure 6** on page 39 for locations of the mitigation measures.

The following section details the Working Groups' recommendations.

3.2. North-western edge to Molonglo Stage 3:

1) There shall be established and maintained a minimum 60.0 metre wide Inner Asset Protection Zone to the north-western edge of the urban development, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3.

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This zone shall contain an edge road and also a gravel fire trail located adjacent to the eastern boundary of Kama and shall include stormwater treatment ponds, cycleway/pedestrian access and electrical power lines, as required.

2) There shall be established and maintained, over the whole of Kama Nature Reserve, a Strategic Fire Advantage Zone, cyclically managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3;

3) There shall be established and maintained a six [6] metre wide fire break located inside the eastern boundary of Kama Nature Reserve;

4) The existing access/fire trails within Kama Nature Reserve shall be upgraded and maintained to provide access for management works and fire-fighting operations.

3.3 North-western/Western edge to Denman Prospect:

1) There shall be established and maintained a minimum 60.0 metre wide Inner Asset Protection Zone to the north-western and western edge of the urban development within Denman Prospect, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. This zone shall include an edge road and where provided, stormwater treatment ponds and shall also include cycleway/ pedestrian access as required – refer to Denman Prospect Figure 7 on Page 25.

2) There shall be established and maintained, to the location as shown on **Figure 6** on Page 39, an Outer Asset Protection Zone of varying widths, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3;

3) There shall be established and maintained to the area as shown on **Figure 6** on Page 39, a series of Strategic Fire Advantage Zones, cyclically managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3 and in accordance with the recommendations contained in the *Analysis of Vegetation Structure and Fire Risk* report prepared by Umwelt - 2015;

4) There shall be established a series of Fire Trails, generally as located as shown on **Figure 6** on Page 39 – also refer to the *Analysis of Vegetation Structure and Fire Risk* report prepared by Umwelt - 2015. These trails shall be maintained to provide access for management works and fire-fighting operations.

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3.4 Molonglo River Park:

1) There shall be established and maintained a minimum 60.0 metre wide Inner Asset Protection Zone to the north and south of the Molonglo River Park, to the extent detailed on **Figure 6** on Page 39, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. This zone shall include an edge road and where provided the managed easement for services [sewer / water / electricity], stormwater treatment ponds and shall also include cycleway/pedestrian access as required. **Note on the south side of the river the locations of the IAPZs will be determined at the EDP stages**;

2) There shall be established and maintained, to the area as shown on **Figure 6** on Page 39, a series of Strategic Fire Advantage Zones, cyclically managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. **Note on the south side of the river, the locations of the SFAZs will be determined at the EDP stages**;

3) There shall be provided, to the locations as shown on **Figure 6** on Page 39, a Landscape Fire Management Zone of varying width to each side of the Molonglo River.

Fuel management standards do not apply to this zone;

4) The existing fire trail/access roads within the river corridor shall be maintained to provide access for management works and fire-fighting operations.

5) There shall be established and maintained access for management works and fire-fighting operations within the Group Centre precinct.

6) The recommendations provided in the Molonglo River Concept Plan report prepared by Hassell, in respect to the establishment of a community facility in the location of the Sludge Ponds and the western end of the Molonglo River Park shall be included in the Park Management Plan.

3.5 Molonglo Stage 3 – Northern and Eastern Edges:

1) To the northern edge of the Molonglo Stage 3 precinct the full width of the William Hovell Drive carriageway shall be maintained as an Inner Asset Protection Zone, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3;

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2) To the eastern edge of the Molonglo Stage 3 precinct, adjacent to the National Arboretum, there shall be provided an Inner Asset Protection Zone having a minimum width of 40 metres, managed to the prescriptions as detailed in the ACT Strategic Fire Management Plan 2014 – Version 3. This zone shall include an edge road and where provided, the managed easement for services [sewer/water/electricity], stormwater treatment ponds and shall also include cycleway/pedestrian access as required.

3.6 Bushfire Construction Standards to Buildings.

Except for the future buildings within Denman Prospect, all buildings located within 100 metres of land that is subject to, or likely to be subject to, bushfire attack [bushfire prone land] shall be constructed to comply with the standards required by Australian Standard A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.*

Note: Refer to the ACT Strategic Bushfire Management Plan for the location of Bushfire Prone Land.

The minimum level of construction for buildings located adjacent to the Inner Asset Protection Zone shall be BAL 29 for the first row of houses adjacent to the IAPZ. The minimum construction standard of all other buildings located within 100 metres of bushfire prone land shall be BAL 12.5.

For Denman Prospect, all buildings located within 400 metres of the forest/woodland vegetation on the land to the northwest and west of Denman Prospect shall be constructed to comply with the standards required by Australian Standard A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.* The minimum level of construction for buildings located adjacent to the Inner Asset Protection Zone shall be BAL 29 for the first row of houses adjacent to the IAPZ. The minimum construction standard of all other buildings located within 400 metres of bushfire prone land shall be BAL 12.5.

3.7 Support Infrastructure.

3.7.1 Access for fire-fighting Operations:

Edge roads shall be designed to comply with the access code for heavy rigid and articulated vehicles and the ACT Bushfire Management Standards under SBMP Version 3.

3.7.2 Water Supplies for Fire Fighting Operations:

A fire-fighting water supply shall be installed to comply with F4 and the standards agreed by ACTEW and ACT Fire & Rescue. Type F5 standard 45 l/s single hydrants at 60 metre intervals shall be installed within the Edge Road.

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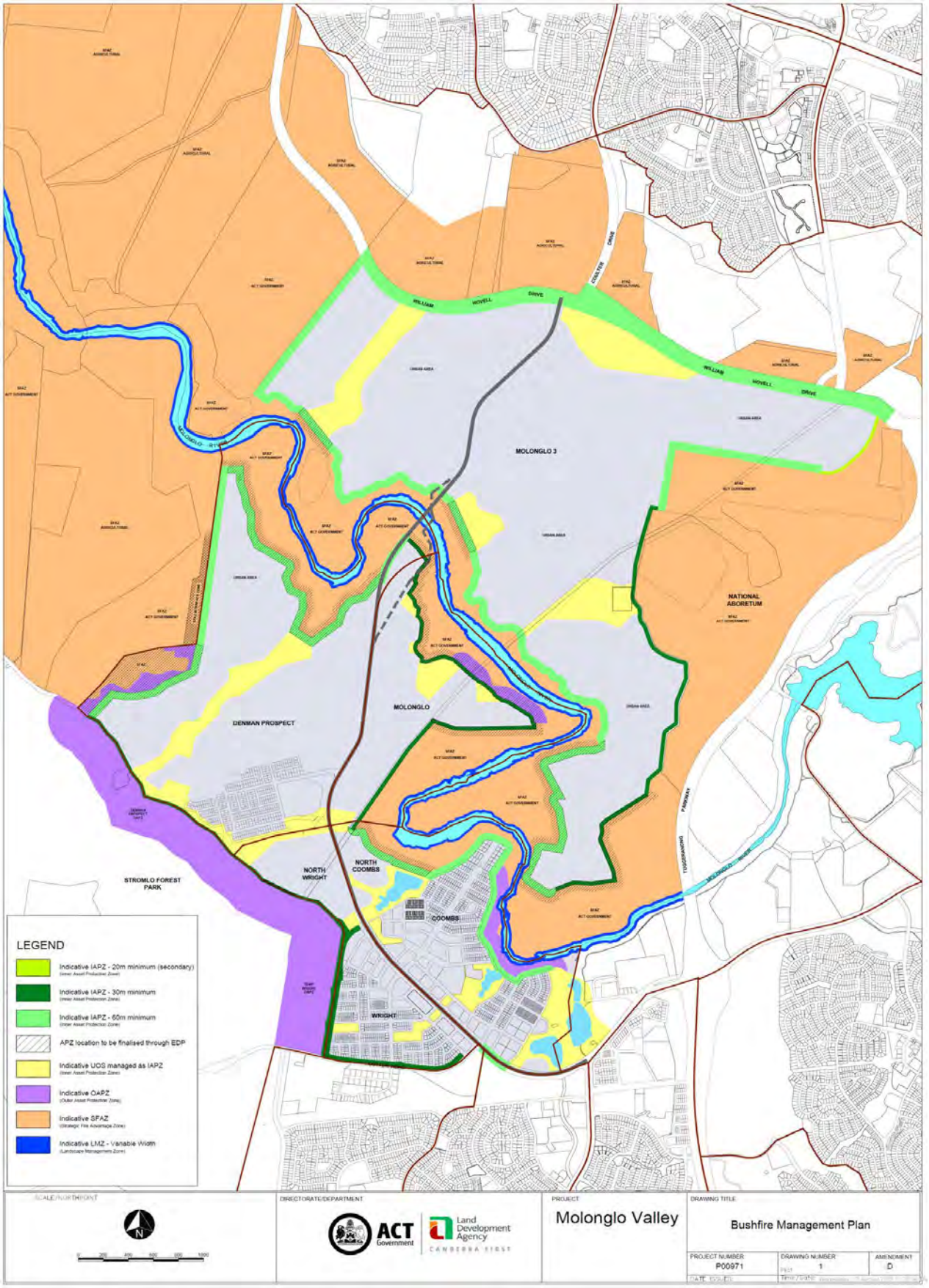
Figure 6 – Bushfire Risk Strategy showing Management Outcomes



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SECTION 4

FUNDING FOR BUSHFIRE MANAGEMENT WORKS

4.1 General.

Residential and infrastructure development in the Molonglo Valley is proceeding in accordance with the Government's Indicative Land Release Programs and associated budget appropriations for capital works funding to support land release.

Subdivision construction is continuing in Molonglo Stage 1 (Coombs) over the life of the Program with the first releases in Molonglo Stage 2 (Denman Prospect) in 2014-15. Molonglo Stage 3 on the north side of the Molonglo River is programmed to commence in 2018-19.

The LDA/EDD are undertaking due diligence assessment investigations based on the approved Molonglo Valley Structure Plan and other documentation across a range of significant issues in Molonglo Stage 2 and Stage 3 including but not limited to ecological, contamination, infrastructure provision, UXO and bushfire risk. These assessments, especially bushfire in conjunction with TaMS, can materially influence the location of land use boundaries due to impacts and responsibilities for cost efficient land management.

Multiple directorates/agencies are involved with overseeing different parts of the Molonglo Valley. It could be argued that this has led to less than adequate decision-making and a lack of understanding of past and present processes and Government expectations.

This in turn leads to developing less than a whole-of-Government position to achieve the perceived outcomes. Other directorates however may have other parameters to meet while including the need to implement Government policies.

The TaMS has a management parameter to manage all the Government's assets. This includes managing the ever increasing asset base such as new roads, urban open space associated with Greenfield development.

Bushfire risk and the associated mitigation measures can have a significant impact on ecological, economic and social parameters.

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Since the 2003 Canberra bushfire, there has been a significant shift in the increase of the awareness and delivery of bushfire mitigation measures across Government. This commenced immediately after the bushfire with changes to subdivision design and the introduction of edge roads and specific controls within asset protection zones both within the urban area and outside it. This in turn has led to revisions of standards, guidelines, expectations and responsibilities both public and private.

It has also increased the responsibility of TaMS to manage a large proportion of the asset protection zones possibly to higher standards than was necessary before the bushfire.

4.2 Typical Cross Section of Zones at the Urban/Non-urban Interface.

A typical cross section at the urban/non-urban interface today would include:

- House asset protection zone – extending from the front of the residential block boundary into the suburb for distances up to 100m or more depending on risk and mitigating against ember attack. This requires housing design and construction (and landscaping) to meet specific Bushfire Attack Levels (BALs) under the Australian Standard. Management of this area lies partly with TaMS (public open space and roads including verges) and individual block owners.

- Inner asset protection zone – extends from the front of the residential block boundary to the edge of the urban/non-urban interface. Distances vary depending on risk and management requirements. A usual width would be a minimum of 30 to 40m and include significant infrastructure such as subdivision edge road, fire trail, stock proof fencing at the urban/non-urban interface, stormwater cut-off drains, hydraulic services for fire fighting, and street trees on the block side of the edge road. Management includes control of fuel loads by slashing. Management of this area lies with TaMS.

- Outer asset protection zone or Strategic fire fighting advantage zone – extends into the non-urban area for some distance depending on risk and management requirements. These could be 100m to around 300m in width and contain fire trails to aid management. Management methods depend on fuel loads and may include thinning of existing inappropriate vegetation, weed management, grazing or other ecological controls that ensures fuel loads are not exceeded during the fire season. Management of this area lies with TaMS and may be on a private lease.

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4.3 Current Process of Conversion of Rural Land to Urban Land.

The development/management process that transforms rural land to urban land is typically set out below:

- Rural land and Canberra Nature Parks including Nature Reserves are managed by TaMS as the land custodian;

- LDA/EDD undertakes due diligence assessments to gain necessary approvals to clear the way to proceed to preparation of individual Estate Development Plans (EDPs) and gain budget approvals for the delivery of infrastructure associated with land delivery;

- LDA/EDD prepares EDP and capital works program. Note capital works may have started ahead of the EDP preparation by as much as a couple of years but may not be required to deliver some items for years after land development and block occupation is complete - i.e. staged infrastructure;

- Land custodianship transferred from TaMS to LDA usually prior to lodging EDP for approval;

- EDP lodged for final circulation and approval as a DA. Note EDP usually contains site specific Bushfire risk assessment. Note however that in the case of Molonglo Stages 2 and 3, the western edge and river corridor bushfire risk assessment is designed to cover the whole of the remaining development. In the meantime detailed design has commenced and readied for submitting to TaMS for design approval;

- DA approved by EPD followed by design approval by TaMS;

- Construction commences and includes the provision of bushfire mitigation measures;

- Blocks sold by the LDA but settlement is delayed until after consolidation is complete;

- Construction finishes and consolidation period commences;

- Consolidation period ends;

- Blocks in private ownership after settlement;

- Other areas handed back to Government (usually TaMS) for continuation of approved management including bushfire risk mitigation measures and management of public open space, roads and other land.

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- TaMS prepares budget bids to maintain management on a year-by-year basis within the constraints of the ACT Government budget parameters.

4.4 Issues with the Current Process.

There are a significant number of issues with the current process. In the case of development in the Molonglo Valley, these include:

- There is a need for a whole-of-Government outcome for the delivery of Molonglo 2 and 3 and the Molonglo River Corridor;

- The NES Plan and Adaptive Management Strategy, while agreed with the Commonwealth, were not "road tested" to prove data or feasibility of implementation ahead of gaining approval from the Commonwealth;

- Competing budget bids delaying or diluting funding for management of assets including bushfire mitigation obligations including the provision of resources;

- Diversion of budget funding to other competing priorities at both Treasury and TaMS levels;

- A partial solution could be that initial funding be provided by the LDA or a private developer for a period associated with construction timing for the implementation of management regimes but with a sunset clause on when TaMS would be required to take over responsibility including funding;

  For example, LDA or a private developer could construct and implement bushfire mitigation management regimes while land development is proceeding generally adjacent to the non-urban edge. The issue is how long a time period would LDA or a private developer be practically required to fund and manage such an arrangement and when TaMS would be expected to take over. While this could be a set period of time, there is an issue when or if there is a slowdown in the private sector development or there is a reduction in the demand for new housing. This could mean that the LDA or a private developer would need to be involved for a longer period of time;

- Remember the issue of requiring bushfire mitigation management measures is not restricted to the Molonglo Valley – it encompasses on-going management at the edges of all development areas at the interface with the rural or broadacre land use zones in Canberra. As the urban area expands, so too does the bushfire mitigation management issue requiring increases in funding.

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4.5 Funding Options.

A number of funding options were discussed in the preparation of this assessment. However, it was agreed the existing arrangements met the overall strategies and objectives of Government.

A difficulty with this funding method is that it leaves Treasury in final control of management funding of bushfire mitigation measures. Funding is therefore dependent on dividing up the budget and competing against other bids on a year by year basis.

It does not allow the guarantee of prioritising critical management to protect residents and assets from bushfire risk on a season by season basis.

Even when yearly funding is made available to directorates with management responsibilities, there is no guarantee in return to Treasury that all the available funding will be used against bushfire mitigation purposes.

Where the allocated guaranteed funding is not all used (because perhaps a lessening of bushfire risk did not require as much management work to be undertaken) any excess would be expected to be returned to Treasury.

However, there is a distinct risk that the subsequent year or years may require extra funding which would have to be guaranteed by Treasury regardless.

As part of the guarantee mentioned above, a solution is suggested that Treasury may require, at a minimum, an agreed rolling bushfire mitigation management document for say a 5 year period to plan ahead for Budget predictions. This may allow for expenditure variations such as changing seasonal needs and the reaction to catastrophic events. This could be “signed off” by the responsible directorate after agreement at Directors-General level and Treasury.

Public land management agencies are continuously pressed and express public concern that they are expected to do more with fewer resources.

A funding framework, or tweaking of the existing funding arrangements, may be needed that ensures ongoing protection to the public given that Government agencies may be reluctant to shoulder the ongoing cost responsibility.

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The ubiquitous and often-stated challenge is securing funding for the long-term, 'in perpetuity' costs to maintain and in some cases enhance the biodiversity values for which the asset was originally protected.

After consultation with other members of the Working Group, it was agreed that the existing funding arrangements based on annual budget bids to Treasury would continue to be the method to fund recurrent bushfire risk mitigation work.

These arrangements do not stop the possibility of adding the 'flexibility' mentioned above to the existing funding methodology.

4.6 Costs.

In line with the discussion in this chapter, the LDA would expect to put in place and fund bushfire mitigation measures including management regimes while land development is proceeding. This includes:

- the use and management of temporary asset protection zones while stages of estates are gradually advancing to the final edge of development;
- the development of the IAPZs, OAPZs and more recently, SFAZs to the point of handover to TaMS for continued management after asset acceptance;
- OAPZs on privately leased land such as at Bonner in Gungahlin where on-going management is required to be undertaken by the lessee in accordance with a Land Management Agreement after asset acceptance.

In the case of Molonglo Stage 3 western edge, the LDA, or a developer in the case of an englobo sale, will put in place and fund the development infrastructure associated within the IAPZ adjacent to Kama Nature Reserve.

This will include to the requirements of the ACT Bushfire Management Standards:

- The public edge road to the estates;
- Fire trails along the entire western edge of the development areas with connection to Kama;
- Utility services infrastructure including water supply for fire fighting purposes;

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- Storm water cut-off drains;
- Fencing the IAPZ at the outer edge of the zone including gates to the Kama boundary;
- Establishing and initially managing the IAPZ to the required fuel management standards;
- Providing opportunities for the location of other infrastructure services as required.

Once the estates are accepted at asset acceptance stage, the entire IAPZ will become the management responsibility of TaMS including recurrent funding.

In the case of Denman Prospect at the western edge of Molonglo Stage 2, the LDA, or a developer in the case of an englobo sale, will put in place and fund the development infrastructure associated within the IAPZ, the OAPZ and the SFAZs adjacent to suburb boundary. This will include, to the requirements of the ACT Bushfire Management Standards:

- The public edge road to the estates;
- Fire trails along the entire western edge of the development areas with connection to area to the west;
- Utility services infrastructure including water supply for fire-fighting purposes;
- Storm water cut-off drains;
- Fencing the suburb boundary including gates to the western edge;
- Establishing and initially managing the IAPZ, OAPZ and SFAZs to the required fuel management standards;
- Providing opportunities for the location of other infrastructure services as required.

Once the estates are accepted at asset acceptance stage, the entire IAPZ, OAPZ and SFAZs will become the management responsibility of TaMS including recurrent funding.

In the case of Kama Nature Reserve, the area is being managed already to the standard required for an SFAZ and this has been occurring for a number of years and is acknowledged on the ESA website.

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The LDA, or a developer in the case of an englobo sale for the land opposite Kama, will fund the initial upgrading of firetrails within Kama Nature Reserve to the satisfaction of TaMS Fire Management Unit. The responsibility for other management within Kama remains with TaMS.

In the case of Denman Prospect, the area immediately to the west of the suburb boundary on TaMS land, has been assessed as being capable of being managed as a series of SFAZs. Here the LDA or a developer in the case of an englobo sale, will assist TaMS in setting up the SFAZs by funding for a two year period their initial development to the requirements of the ACT Bushfire Management Standards. This is expected to include:

- Fire trails around and separating each of the SFAZs;
- Establishing the initial management of the SFAZs.

After that period of time the ongoing management of the SFAZs will pass to TaMS.

4.7 Costs of Implementing the 60m IAPZ.

The LDA has investigated the costs of setting blocks back from the edge of Kama Nature Reserve and the western edge of Denman Prospect in order to comply with the Strategic Bushfire Management Plan version 3 where OAPZs are not supported in the non-urban land.

In order to identify the quantum of costs associated with implementing the bushfire risk strategy recommendations, the LDA engaged Coleman Engineering Services. The investigation specifically targeted the bushfire mitigation measures and developing urban infrastructure along the boundaries of Kama Nature Reserve and the suburb of Denman Prospect over and above the costs to service other comparable subdivisions in the ACT but keeping in mind the requirements of version 3 of the Strategic Bushfire Management Plan and the associated standards.

This latter point is important to note because the standards allowable for IAPZs have been revised to reflect the combinations of IAPZs, OAPZs and SFAZs now considered acceptable by the ESA but point out that the applications of the zones require approval by the ESA in each circumstance.

Also, it should be noted that ESA expects individual land managers to manage their land for bushfire management.

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The use of SFAZs does allow the management for biodiversity to be protected where other APZs would not meet that requirement.

For example, for an IAPZ in combination with an OAPZ on a primary interface for forest and woodland, the respective widths should be 30m and a minimum of 200m (target 300m). Where an OAPZ is not achievable, such as within a nature reserve, the IAPZ should be widened to 60m to compensate.

In the case of Molonglo, Kama Nature Reserve is already managed as an SFAZ or multiple SFAZs and it is the intention that the area to the west of Denman Prospect also be managed as a series of SFAZs.

Section 8 of the Coleman report sets out the likely establishment and recurrent costs to put in place the IAPZ and the SFAZs along the western edge of Denman Prospect and adjacent to and within Kama Nature Reserve. The following table encapsulates those expected costs.

Coleman material

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SECTION 5

CONCLUSION

The bushfire protection measures detailed in Section 3 of this report have been determined by the Working Group with the aim of mitigating the potential bushfire risk to the future development within Molonglo Stage 3, Denman Prospect and the development precincts which adjoin the Molonglo River Park.

However, a level of residual risk will remain as not all of the bushfire threat can be completely removed – only managed to reduce fuel loads.

Another matter that will influence the level of risk reduction, and therefore residual risk, is the commitment for ongoing management of the recommended bushfire protection zones and funding of these works in perpetuity.

Bushfire Operations Plans [BOPs] will be required to be prepared annually, by TaMS, for the works and there will be an expectation that Government will meet the funding requirements to enable the BOPs to be undertaken.

For Molonglo 3, Denman Prospect and the Molonglo River corridor, the initial establishment of the recommended fire protection measures shall be funded by the developer of the land – i.e. LDA or private developer or joint venture partners with LDA.

The initial funding shall be made available for the construction and maintenance of fire trails and fire breaks, the provision of fencing and access gates and initial clearing and establishment of the Asset Protection Zones.

LDA, or the private developer, shall provide initial seed funding to TaMS for hazard reduction and land management activities such as the establishment of the Strategic Fire Advantage Zones.

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25.8.2015

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APPENDIX A – PRECISE OF REPORTS REVIEWED

Bushfire Risk Assessments prepared by ABPP [2005 & 2006]:

Australian Bushfire Protection Planners Pty Limited was commissioned to undertake a study of bushfire risk for the preparation of the Molonglo Structure Plan and produced a Bushfire Risk Assessment, dated 19.07.2005, for the ACT Planning Authority [ACTPLA].

An extract from this report states under 'Summary of Bushfire Risk' – [Page 28]:

"Major bushfires have occurred in the Molonglo Valley in 1926, 1939, 1952, 1991, 1994, 2001 and 2003.

The topography and landform of the valley predisposes the valley to impacts of fires burning under north-westerly and westerly wind influences and to a slightly lesser extent, south-westerly wind influences.

The slope of the valley to the north-west and the ridgelines/ gullies will influence the spread of fire from the northwest, west and south west and result in sporadic fire runs.

Fuel loads within the retained Habitat Corridors and Parklands, Nature Reserves and Lease Holdings, unless managed, will promulgate future bushfires up to the urban edge and into the vegetated corridors within the urban precinct.

Whilst the Overall Fuel Hazard for the vegetation within the valley is Very High there is, due to the fire history, topography, aspect, wind influence and climatic conditions within the valley, an extreme risk of damaging bushfires impacting the north western, western and south western edges of the West 1 and West 2 Precincts, the north western edge of the East Precinct and a high risk of damaging bushfires impacting the south western edge of the East Precinct".

Figure 12 on Page 42 provides an extract from the Molonglo Concept Plan Bushfire Risk Assessment Report 2005 identifying the Study Area;

Figure 13 on Page 43 provides an extract from the Molonglo Concept Plan Bushfire Risk Assessment Report 2005 identifying the potential north-westerly fire path;

Figure 14 on Page 44 provides an extract from the Molonglo Concept Plan Bushfire Risk Assessment Report 2005 identifying the potential westerly fire path; and

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Figure 12 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report 2005 showing the study areas

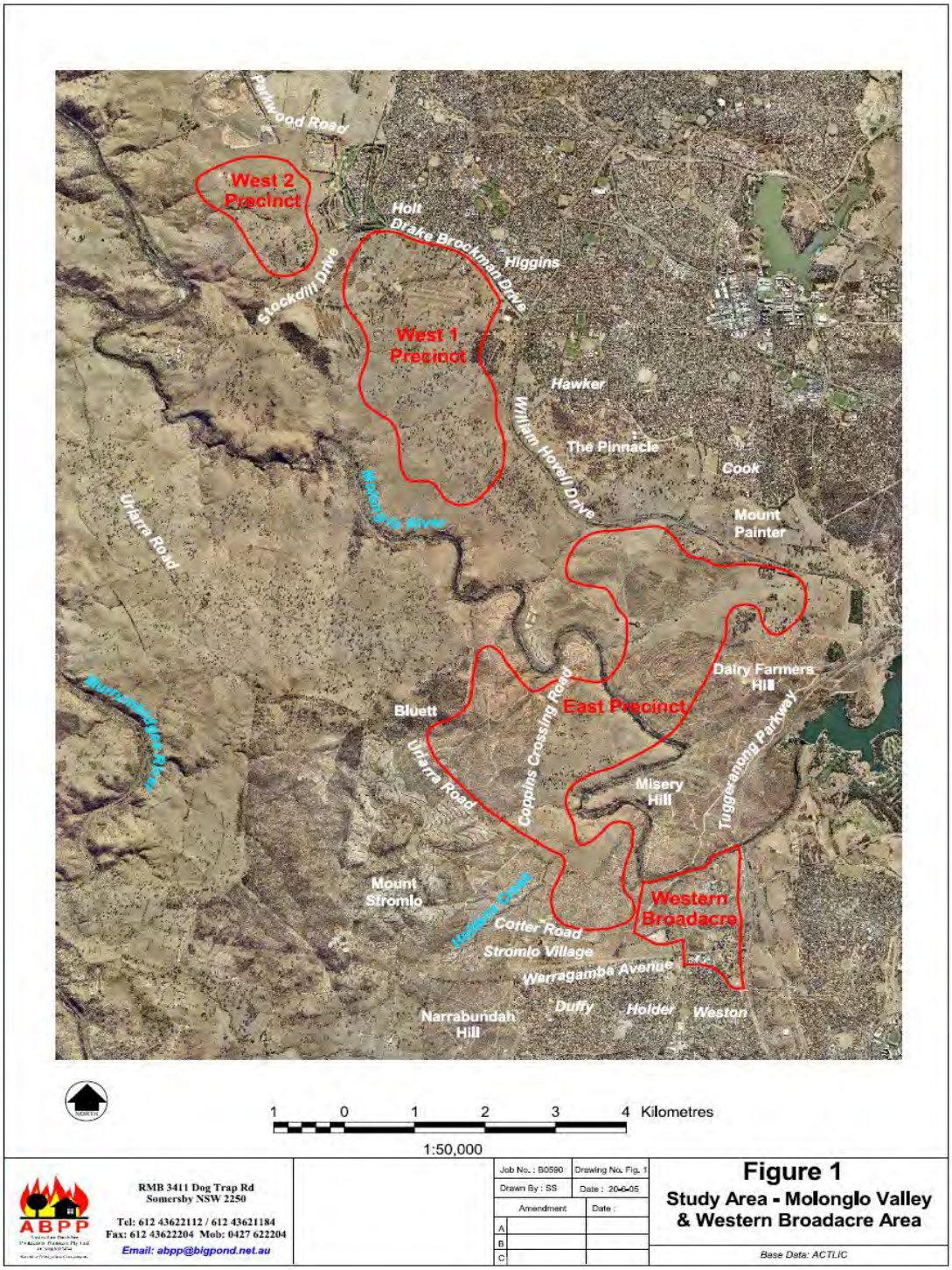
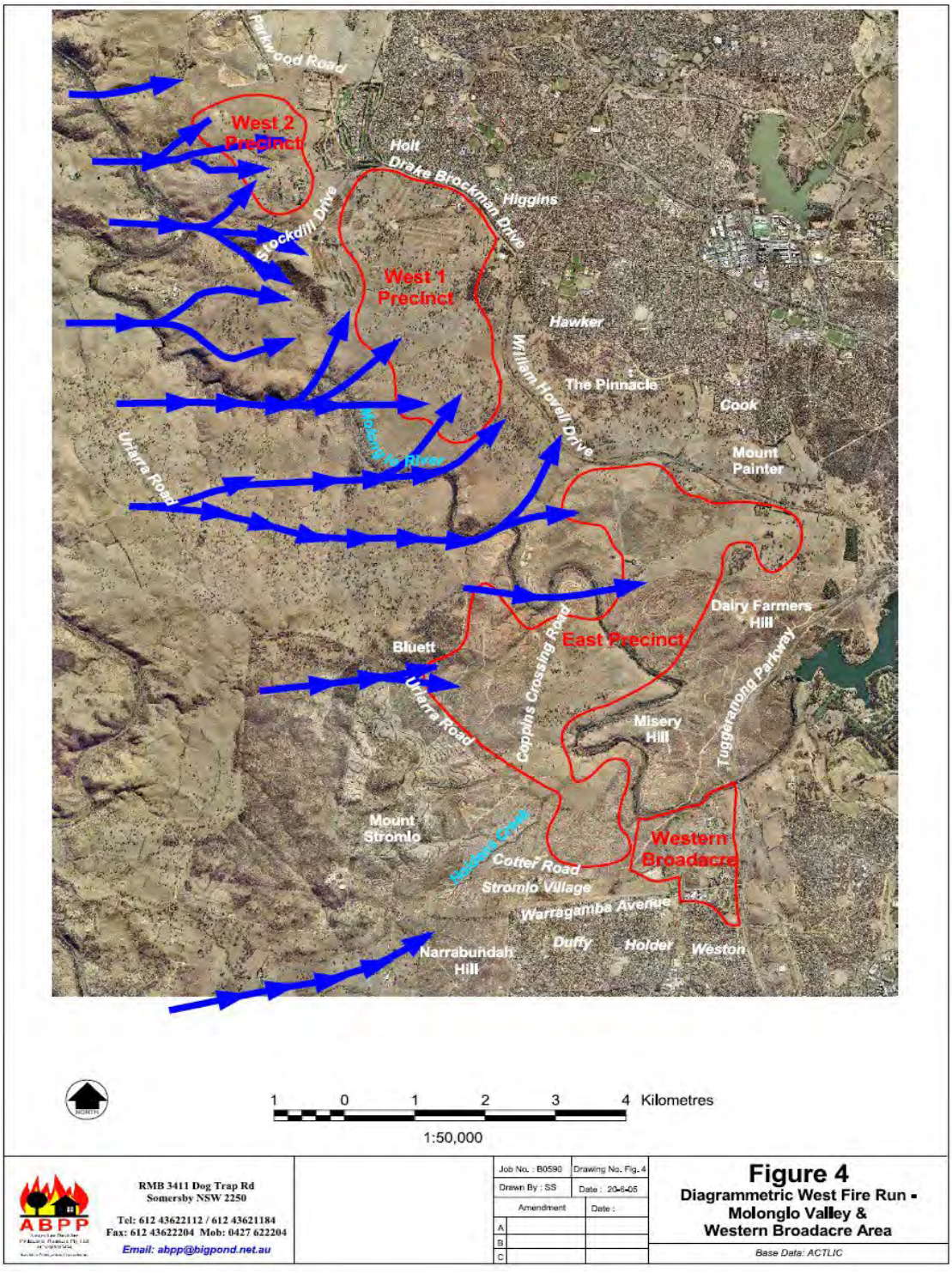


Figure 13 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report 2005 showing the Diagrammatic Northwest fire run

Figure 14 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report 2005 showing the Diagrammatic West fire run



Under Section 6.1 Management of the Vegetation beyond the Urban Interface the ABPP report states:

"The Strategic Bushfire Management Plan for the ACT (Version1) states:

"Under the Emergencies Act 2004 the ESA has declared an area of the ACT to be a Bushfire Abatement Zone. The purpose of the Bushfire Abatement Zone is to reduce the impact of bushfires on the built up areas within the ACT.

Bushfire preparation within the BAZ requires collaborative development of fuel management guidelines and the provision of advice to land managers consistent with land use. Guidelines for bushfire management must achieve a reasonable balance between the increasing community demands on ACT lands for recreation and existing use for farming, forestry and conservation".

"Bushfire fuel hazard is the only factor of bushfire behaviour that can be influenced by land managers and residents. However, fuel management alone is not the panacea for bushfire protection and it ***will not eliminate future severe bushfires.***

"The use of fire in land management requires land managers to make decisions about complex balances and trade-offs between bushfire protection and often-divergent social, environmental and economic requirements".

Heavy emphasis has been placed on the effectiveness of hazard reduction burning as the most cost effective means of management within the Abatement – Zone, however the Strategic Bushfire Management Plan states :

"The opportunity to schedule and implement prescribed burning within a desirable window of favourable conditions is relatively limited".

"Land managers and owners must take into account the potentially limited number of days and the possible interaction with air quality guidelines in the development, costing and implementation of prescribed burning programs".

Therefore the viability of maintaining the urban edge protection by hazard reduction burning and / or mechanical means needs to be established to guarantee the integrity of the Molonglo and Western Broadacre urban edge against damaging fire impact.

Under 6.2 – Shape of the Development Precincts [Page 32] the ABPP reports states:

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East Precinct.

"The long exposure of the north-western edge of the precinct to uphill burning fires, influenced by hot, dry, strong north-westerly winds, will result in significant fire impact either directly or indirectly from ember attack, depending on the level of protection provided by active management of the fuels within the river corridor.

Similar impacts may also occur to the western / south western edge from westerly and south-westerly wind-driven fires and the influence of wind turbulence in the Mount Stromlo area.

The northern edge will be impacted by fires burning within the habitat corridor, north of William Hovell Drive.

The Molonglo River Corridor will separate the eastern development node from the western development node and therefore provide a direct fire path into the suburbs adjoining the corridor and to the International Arboretum to the south east".

Under Section 6.4 – Habitat Corridors – Gazetted Nature Parks the ABPP report states:

"The Landscape and Environmental Analysis Plan in the Molonglo Valley Suitability Study identifies habitat connectivity for wildlife movement corridors from The Pinnacle to the north-west and alternate and /or additional Habitat Corridors between the three development precincts.

If the Habitat Corridor identified extending to the north-west of The Pinnacle remains it will allow fire to enter the West 1 Precinct and expose the adjoining urban development to fire impact.

The alternative Habitat Corridors will allow fires to penetrate between the development precincts. Management of these corridors for Habitat Protection and ecological protection will conflict with the need to provide active management of fuel hazards within the abatement zones to the perimeters of the urban precincts.

The Lower Molonglo River Nature Reserve will provide a direct northwest fire path for future bushfires to impact the central portion of the north western edge of the East Precinct and the return edges to the north east and south west of the Reserve".

Section 10.1 – Conclusion – Molonglo Valley [Page 43] of the ABPP report states:

"The orientation of the Molonglo Valley and the ability for northwest, west and south-west wind-driven fires to impact the proposed development edge will continue the extreme level of risk to any development proposed in the valley with the potential to cause major damage to buildings and infrastructure.

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Whilst the McLeod Report recommendation was for implementation of an Abatement Zone to the west and south-west of the City, the extent of the zone and the management abilities of those responsible for the fuel maintenance measures recommended, may not provide a level of defence which will remove the risk of devastating fires impacting to the north-western edge of the Molonglo East Precinct and the north-western, western and south-western edge of the Molonglo West 1 and West 2 Precincts".

It is therefore recommended that for development to proceed, the primary protection against the impact of fires to the north-western edge of Molonglo East and the north-western, western and south-western edge of Molonglo West 1 should be provided by the provision of a land use that creates a Critical Management Zone which is permanently fuel-managed by the nature of the land use. (i.e. vineyards / sporting grounds).

"The Molonglo River Corridor through the East Precinct should be actively managed as a Village Park to prevent fire extension into the precinct".

Figure 15 on Page 47 provides an extract from the Molonglo Concept Plan Bushfire Risk Assessment Report 2005 identifying the recommended bushfire protection measures.

Subsequent to the preparation of the original Bushfire Risk Assessment Report [19.7.2005] an updated report was prepared by ABPP, dated 26.4.2006. The Executive Summary of this report states:

The Molonglo Stage 2 Bushfire Risk Assessment quantifies the current level of risk to future development within the Molonglo Valley, prior to the implementation of mitigation measures as ***Extreme.***

Mitigation measures which have been identified within the report as necessary to reduce the level of potential risk to future development include the creation and permanent management of a Critical Management Zone to the north-western edge of the East Molonglo Precinct and to the western and south-western edge of the Central Molonglo Precinct.

The provision of the Critical Management Zone (CMZ) replaces the Outer Asset Protection Zone, as defined in the Strategic Bushfire Management Plan for the ACT and the management of this zone, in accordance with the performance standards defined in this report, are considered to be a mandatory requirement in the reduction of the bushfire risk to the future development within the Molonglo Valley.

In addition to the provision of a Critical Management Zone to the north-western edge of East Molonglo Precinct, this report recommends, due to the risk of fire over-run along the Molonglo River corridor and into the future suburb, the damming of the Molonglo River below Coppins Crossing and the creation of Lake Molonglo".

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Figure 15 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report 2005 showing the recommended Bushfire Protection Strategies.

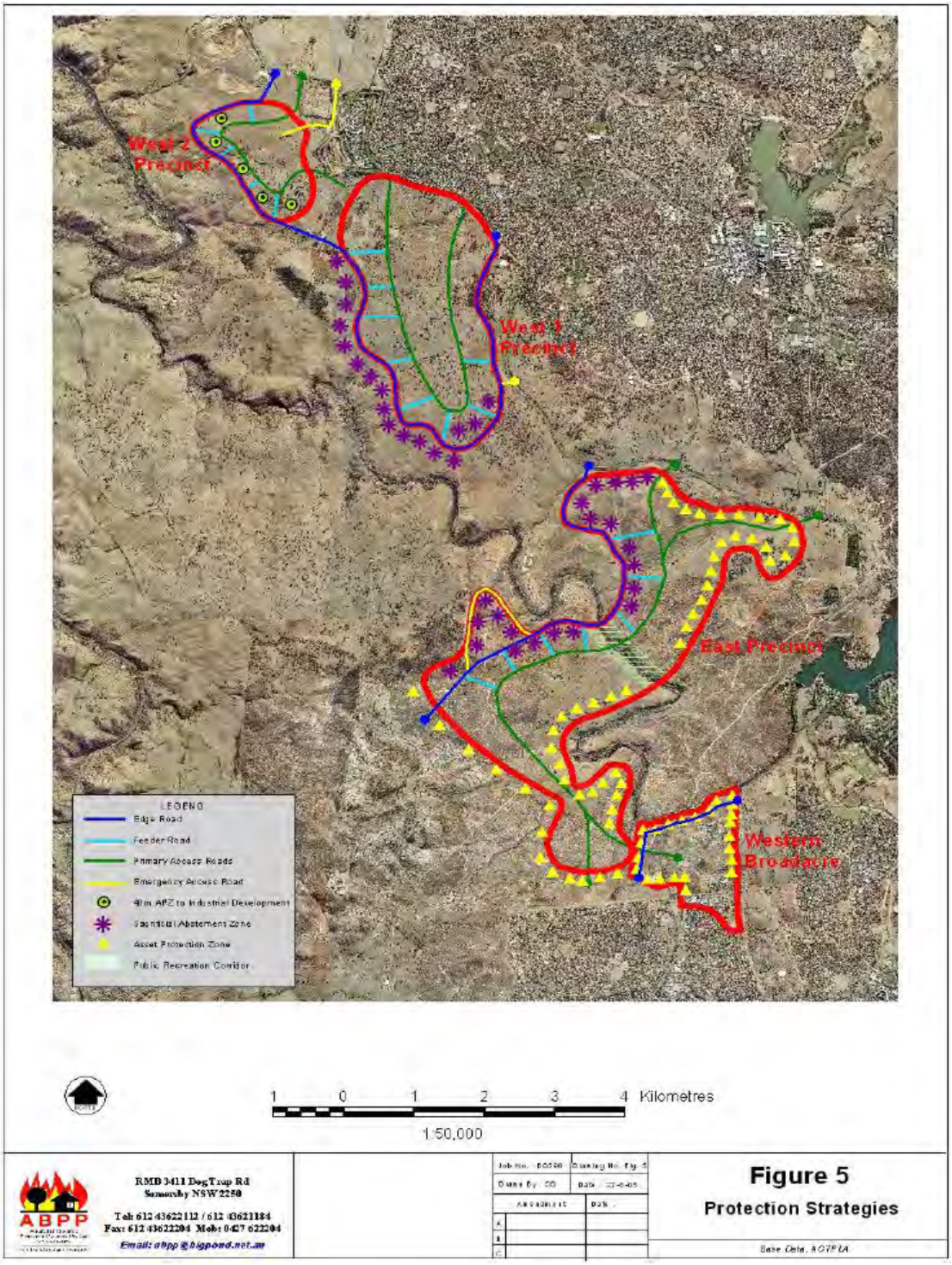
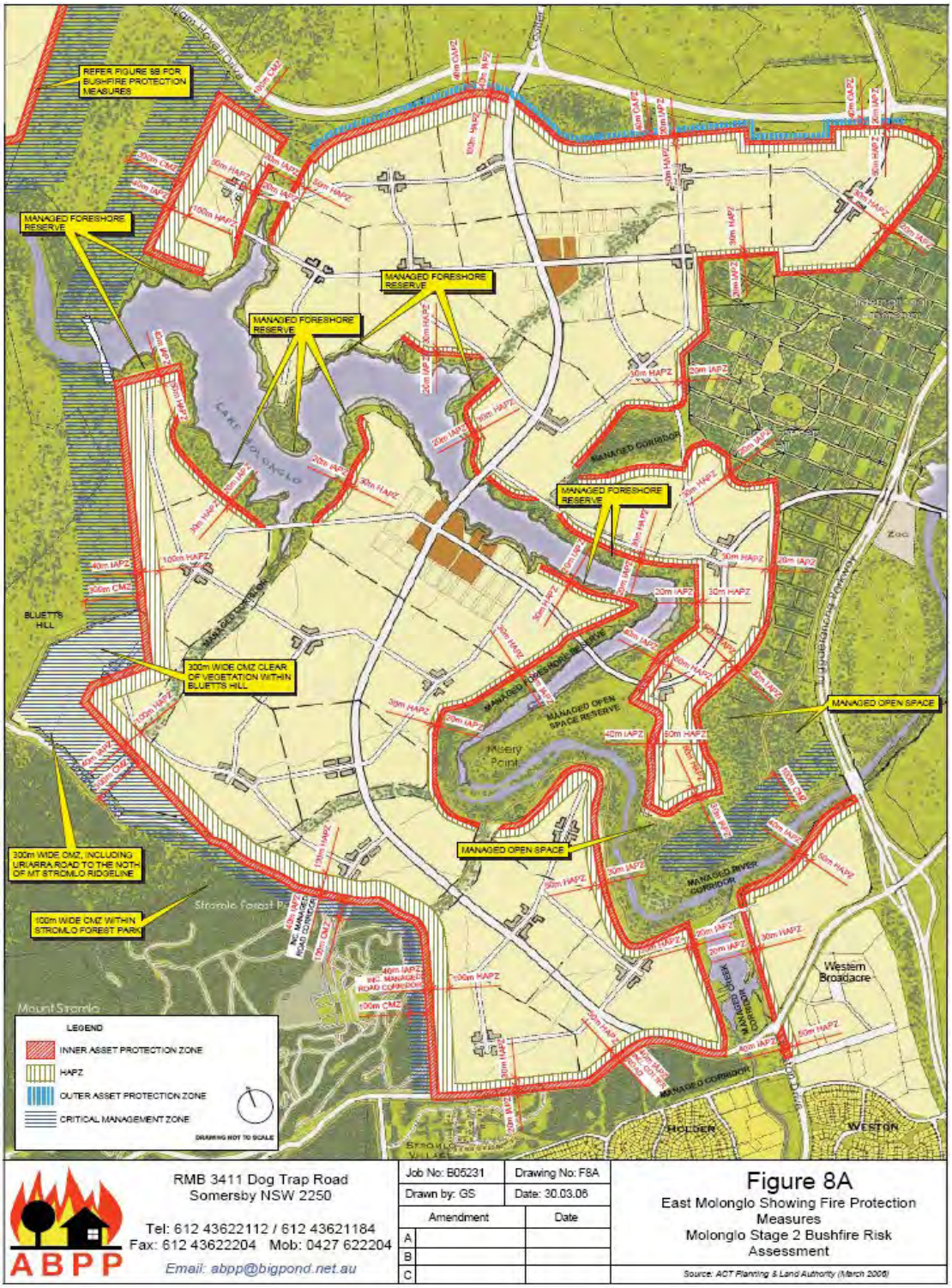


Figure 16 – Extract from the Molonglo River Structure Plan Bushfire Risk Assessment Report Stage 2 - 2006 showing the recommended Bushfire Protection Strategies



The recommendation contained within the latter report that damming of the Molonglo River below Coppins Crossing should occur to remove the bushfire risk along the river corridor was originally implemented in the Strategic Planning process, however is now not included in the Territory Plan.

The comments about the level of risk to the north-western edge and the risk posed by the retention of vegetation within the river corridor therefore defaults back to the original Bushfire Risk Assessment [19.7.2005] [refer to Figure 4 on Page 10] which recommended the implementation and management of a Critical Management Zone of at least 300 metres to the north-western edge of the new suburb and that the *"Molonglo River Corridor through the East Precinct should be actively managed as a Village Park to prevent fire extension into the precinct".*

Molonglo Valley Plan for Protection of Matters of National Environmental Significance – NES Plan (2011):

A review of the Molonglo Valley Plan for Protection of Matters of National Environmental Significance – NES Plan – September 2011 prepared by ACT Planning & Land Authority has identified that the aim of this document is to enhance the areas of Box Gum Woodland not only within the Molonglo River corridor but also within the Kama Nature Reserve and pockets of retained vegetation within the Molonglo Stage 3 precinct.

The document provides, under Section 2.3 – Bushfire Management Framework a 'motherhood' statement about bushfire management which reads:

"Within the strategic assessment area fire management will be aimed at protection of both built assets and MNES values. This will be achieved through the identification of appropriate asset protection zones and application of hazard reduction techniques that will both:

- *Ensure that the standards for fuel loads in the SBMP are met; and*
- *Protection MNES values through the use of sympathetic management techniques".*

The aim of this document does not address the recommendation that the river corridor is managed as a *'Village Park'* or the land to the west of Molonglo 3 and Denman Prospect is managed to mitigate the impact of fire on the north-western edge of the future urban development and from a fire spreading along the river corridor.

In the document under Management and offsetting it called for the establishment of a buffer outside of the Kama Nature Reserve on its eastern side to protect the ecological values of the reserve. It went on under Commitments to MNES:

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"Establish a buffer outside the Kama Nature Reserve between the reserve and the proposed development area, and allow for appropriate uses consistent with nature conservation uses of the reserve. The buffer will be developed to ensure that fire management is undertaken outside of the Kama Nature Reserve and will provide protection against urban edge effects."

The NES Plan recommends that the following reports be prepared:

1. 'Molonglo River Park Concept Plan';
2. Kama Management Plan;
3. Management Plan for Patch GG; and
4. Management Plans for High and Moderate PTWL habitat.

Molonglo River Park – Concept Plan prepared by Hassall (2012):

This document was prepared by Hassell in 2011 and finalised in 2012 and states that one of the primary objectives of the plan is to manage bushfire risk and details the need to provide Inner and Outer Asset Protection Zones as required by the *Strategic Bushfire Management Plan for the ACT 2009* with the Inner Asset Protection Zone located within the urban envelope and the Outer Asset Protection Zone and Strategic Fire Advantage Zone [SFAZ] located within the park.

Section 3 – Investigation Summary of the Concept Plan states:

"Risk assessments completed for Coombs and Stage 2 urban development areas identified a high to extreme bushfire risk for future urban areas. The most significant risk is that of a fire moving from the west or northwest, from which it would not only threaten the peripheral urban development in these areas but also potentially penetrate deeper onto the development area by moving up the Molonglo River corridor".

Under 'Additional Strategies' the report suggests that relevant group(s) further investigate the establishment of a 300 metre wide 'Critical Management Zone' to the northwest of the site – extending in a downstream direction from the north west limit of the park.

The table on Page 63 is an extract from the Concept Plan identifying the Fire Management Objectives and Strategies.

Figure 17 (13) on Page 54 shows the Molonglo River Park Illustrative Concept Plan prepared by Hassell.

Figure 18 on Page 55 shows the Molonglo River Park Illustrative Landscape setting Plan

prepared by Hassell.

Figure 19 on Page 56 shows the Molonglo River Park Fire Management Plan concept prepared by Hassell.

Objectives and strategies

Objectives of fire management	Strategies
Mitigate bush fire hazard.	Active management of fuels associated with vegetation within the park.
Mitigate the potential for the riparian area to have a 'wicking' effect that could carry a fire deep into the urban area.	Creation of a mosaic landscape in which the potential for long runs of fire fuels are minimised.
Afford the occupants of the urban areas adjacent to the park protection from exposure to a bushfire.	Development and maintenance of an outer APZ that complies with ACT Emergency Services Agency (ESA) standards. (ACT SBMP)
Provide defendable space and adequate separation to minimise the chance of direct flame contact and material ignition, for any assets that could be vulnerable to a fire, which would be located within the park lands.	
Provide for the ongoing maintenance of fuel loads and vegetation continuity within the outer APZ and parklands.	
Ensure that emergency service personnel and parkland users have access to adequate access and egress in the event of a bush fire.	Development and maintenance of a network of roads and fire trails that meet emergency services access requirements.
Ensure that utility services, particularly water supplies, are adequate to meet the needs of fire fighters.	Provide water supplies suitable for use during fire and fuel management exercises.

The Molonglo River Park Concept Plan Report's focus of the 'Fire Management Theme' is on strategies for the control of vegetative fuels within the following specific areas:

- Critical Management Zone [CMZ] to the west of the park;

- Strategic discontinuity zones within the riparian corridor which aim to reduce the ability of a fire to move continuously up the corridor and into the urban areas, and provide access for defence and fuel management;

- Outer APZ adjacent to the urban interface [Inner APZ within the statutory urban area, not in the riparian parkland].

The Molonglo River Park Concept Plan Report states that the Critical Management Zone forms a key component of the overall strategy to reduce the potential for a fire to move up the riparian parkland and into the urban areas.

"The Critical Management Zone is a 300 metre wide zone extending from the western

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boundary of the proposed urban areas and the riparian parkland, in a downstream direction. This area would be managed to provide a strategic fire break or control line to reduce the impact of a fire moving from the west/northwest, towards the urban areas".

The report continues with advice on the strategic discontinuity zones and states that these zones "would be located at intervals within the parkland to reduce the potential for a fire to move continuously along the riparian corridor and potentially fuel an intense fire that could have catastrophic effects on the adjacent urban areas".

"The development of strategic discontinuities within the riparian parkland responds to the significant hazard potentially affecting this area, which is located on the north-west fringe of Canberra and is therefore directly exposed to extreme fire weather and the potential fire hazard associated".

"This strategy also responds to the potential of the riparian corridor itself to act as a 'wick', funnelling a fire, driven by hot, dry, north-westerly winds, onto the heart of the urban area. This risk is a function of the physical location and the orientation of the river corridor itself".

"The discontinuity areas would be located:

- At the northwest extreme of the riparian area;
- Around, and to the west of Coppins Crossing, from the proposed sewer line crossing to the proposed extension of John Gordon Drive crossing the river;
- At Misery Point.

These areas would be characterised by more concentrated vehicle access and intense location of recreational facilities such as playing fields, parking areas, irrigated gardens and picnic areas. Alternatively, they would comprise open woodland/grassland habitat".

"Vegetation in the recreation areas would have the following characteristics:

- Large areas of groomed grassland maintained to a height of less than 100mm;
- Scattered tree planting;
- Formal parks and gardens with irrigated plantings.

"Generally fuels in these areas would be maintained by mechanical mowing/slashing. Where areas of PTWL habitat occur, fuels would be managed in accordance with the TAMS *Pinked Tail Worm Lizard Fuel & Fire Suppression Guidelines [TAMS 2011]".*

"Outer Asset Protection Zones would be developed in accordance with ESA standards and the following OAPZ are required: Primary asset interface classification – 100m; Secondary asset interface classification – 0 metres.

All vegetation within the riparian zone would be maintained as grassland or open woodland.

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Figure 17 – Molonglo River Park Illustrative Concept Plan – Hassell.

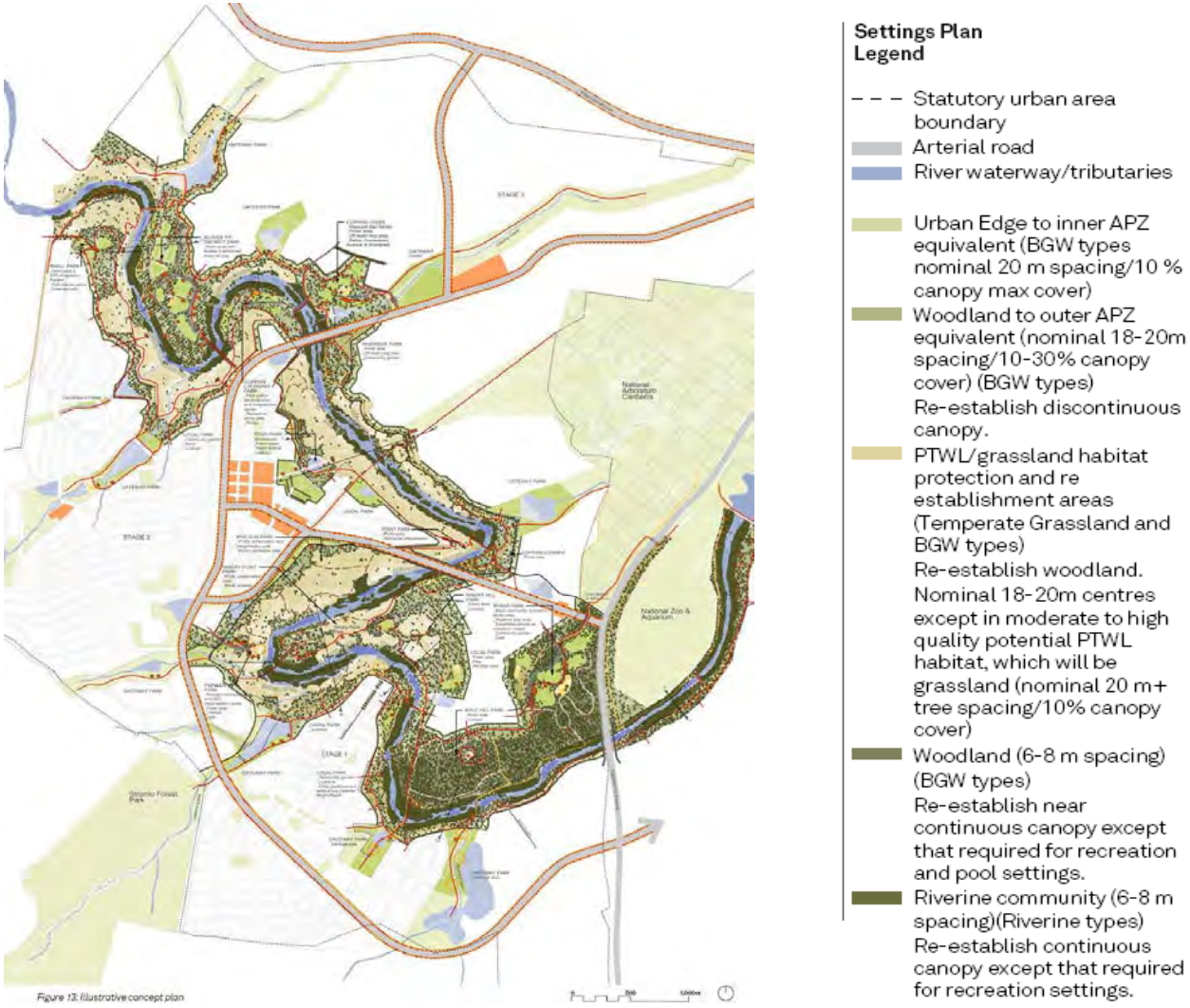

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Figure 18 – Molonglo River Park Illustrative Landscape settings Plan – Hassell.

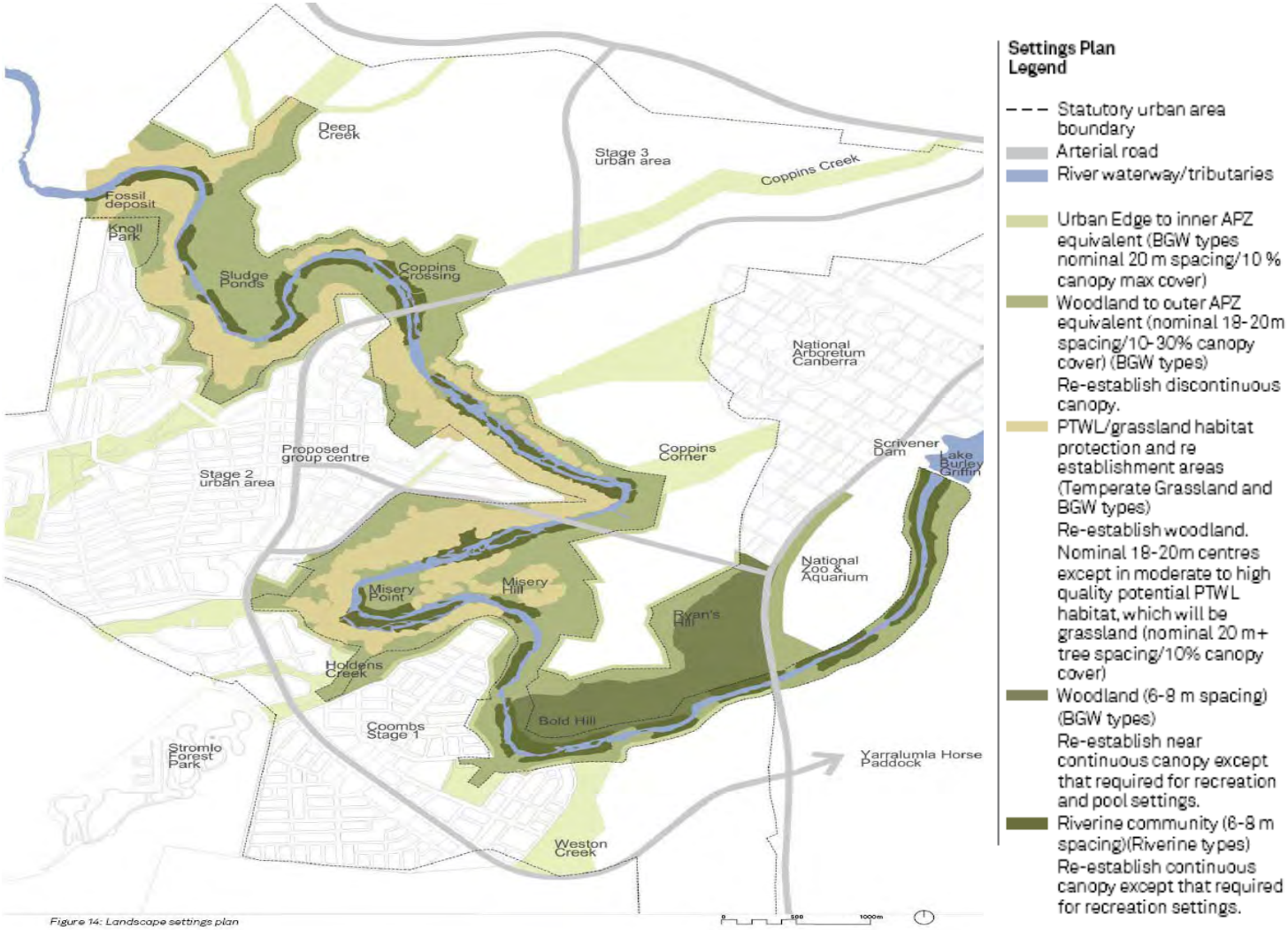

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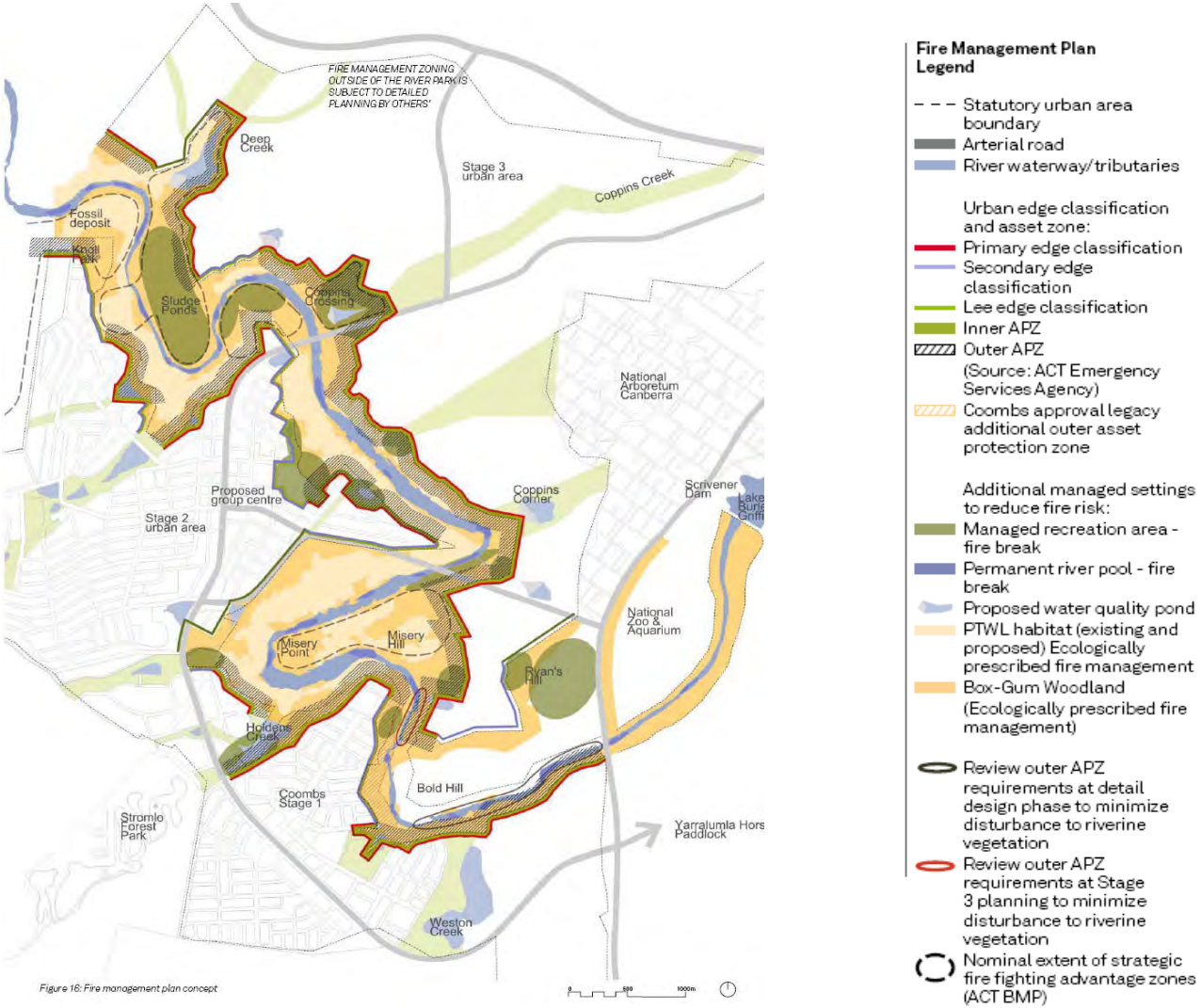
Figure 19 – Molonglo River Park Fire Management Plan Concept – Hassell.



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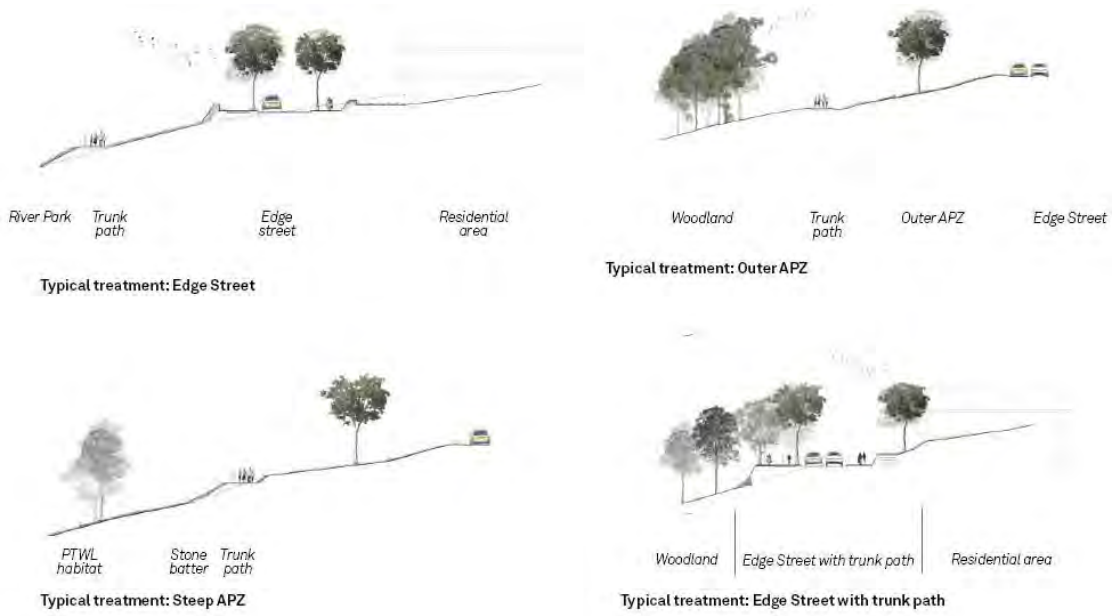
Section 7 of the Concept Plan also provides recommendations on the provision of access and egress and states:

'In addition to recreational access, where required within the park area, access and egress would be provided for emergency purposes and the maintenance of fire protection infrastructure. Road and trail standards would be designed in consultation with local emergency services to enable the traffic of emergency service vehicles and their access to adjacent, more natural areas of vegetation".

Figure 20 below provides sectional details of the location of Trunk Paths/Emergency Service access.

Figure 20 – Molonglo River Park – access – Hassell.



Section 7 – Concept Plan – Fire Management Theme states:

"Under the ACT Strategic Bushfire Management Plan, a Fire Management Plan would be developed for the Molonglo Valley in accordance with Emergency Services Agency [ESA] standards. The plan would take into account consideration of the recommendations of the existing bushfire hazard assessments for the proposed adjacent urban areas. The Molonglo Valley Fire Management Plan would provide the basis for the development of an overarching Plan of Management for the riparian area and annual Operations Plan [BOP]".

Molonglo Adaptive Management Strategy – ESDD – (2013):

The Molonglo Adaptive Management Strategy (AMS) was a key commitment from the NES Plan. Its purpose was to define a set of measures designed to achieve the conservation outcomes and performance targets for MNES in Molonglo strategic assessment area.

One of the outcomes of the baseline condition assessment was that an assessment of the buffer zone consisting of patches O2, O3 and O4 located to the east of Kama Nature Reserve found that these patches were not representative of a Threatened Ecological Community.

Under Management Objectives for fire, the document makes the statement that fire management activities for the purposes of protecting the urban development east of Kama Nature Reserve will be undertaken outside Kama Nature Reserve. It goes on to mention:

"The prescribed eastern buffer zone for Kama Nature Reserve is to ensure that fire management is undertaken outside of the Reserve and will provide protection against edge effects."

There are no dimensions provided in the AMS that defines the width of the buffer to Kama Nature Reserve.

The document does not address the potential bushfire risk potential to the future development adjacent to Kama Nature Reserve.

Draft Fire Management Plan – Molonglo River Corridor – TaMS – (2015):

Figure 21, below, is a copy of the 'Indicative Fire Management Strategy – Urban Area prepared by TaMS.

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Figure 21 – Indicative Fire Management Strategy – Urban Area [TaMS 2015]

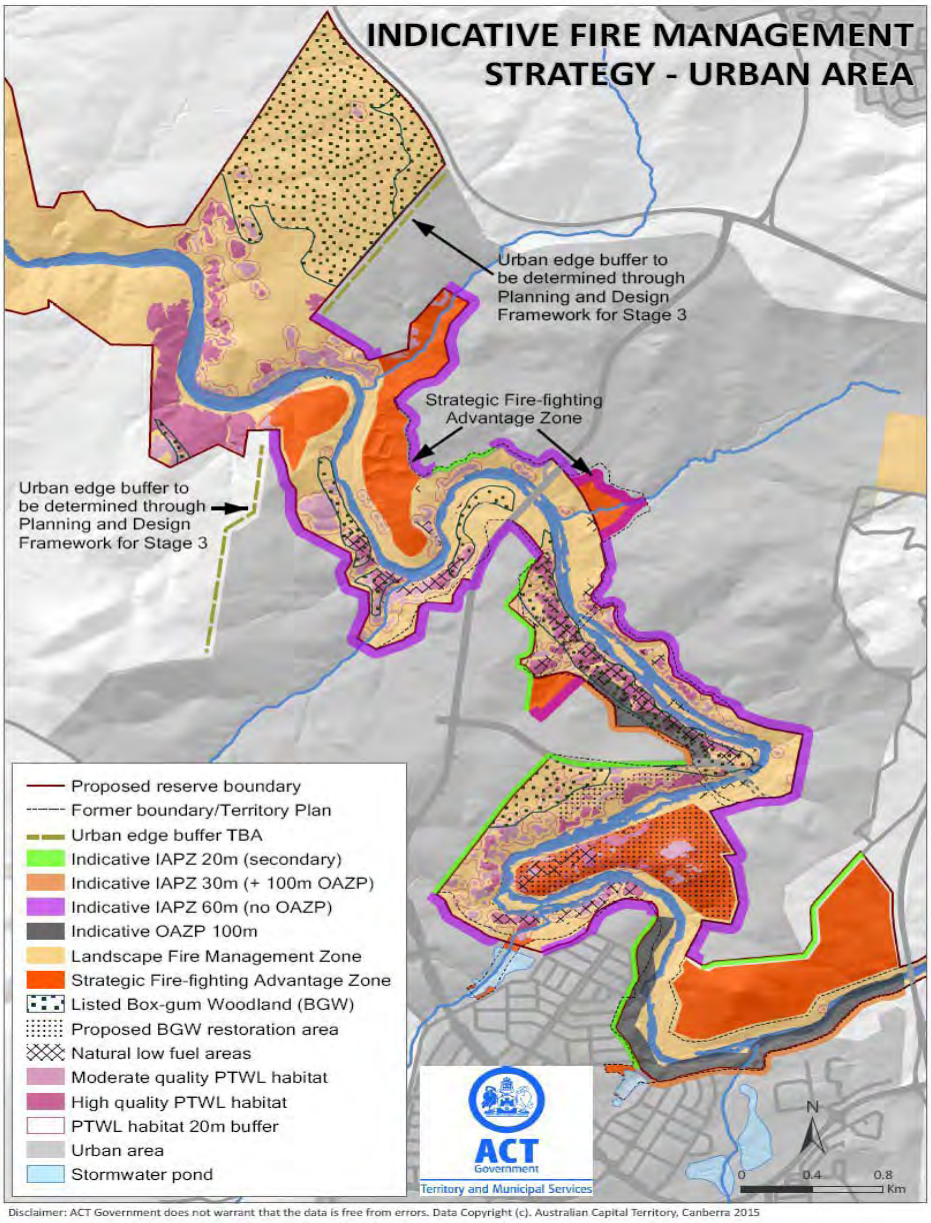

Figure 22 provides a copy of the Indicative Fire Management Strategy – Molonglo Valley prepared by TaMS.

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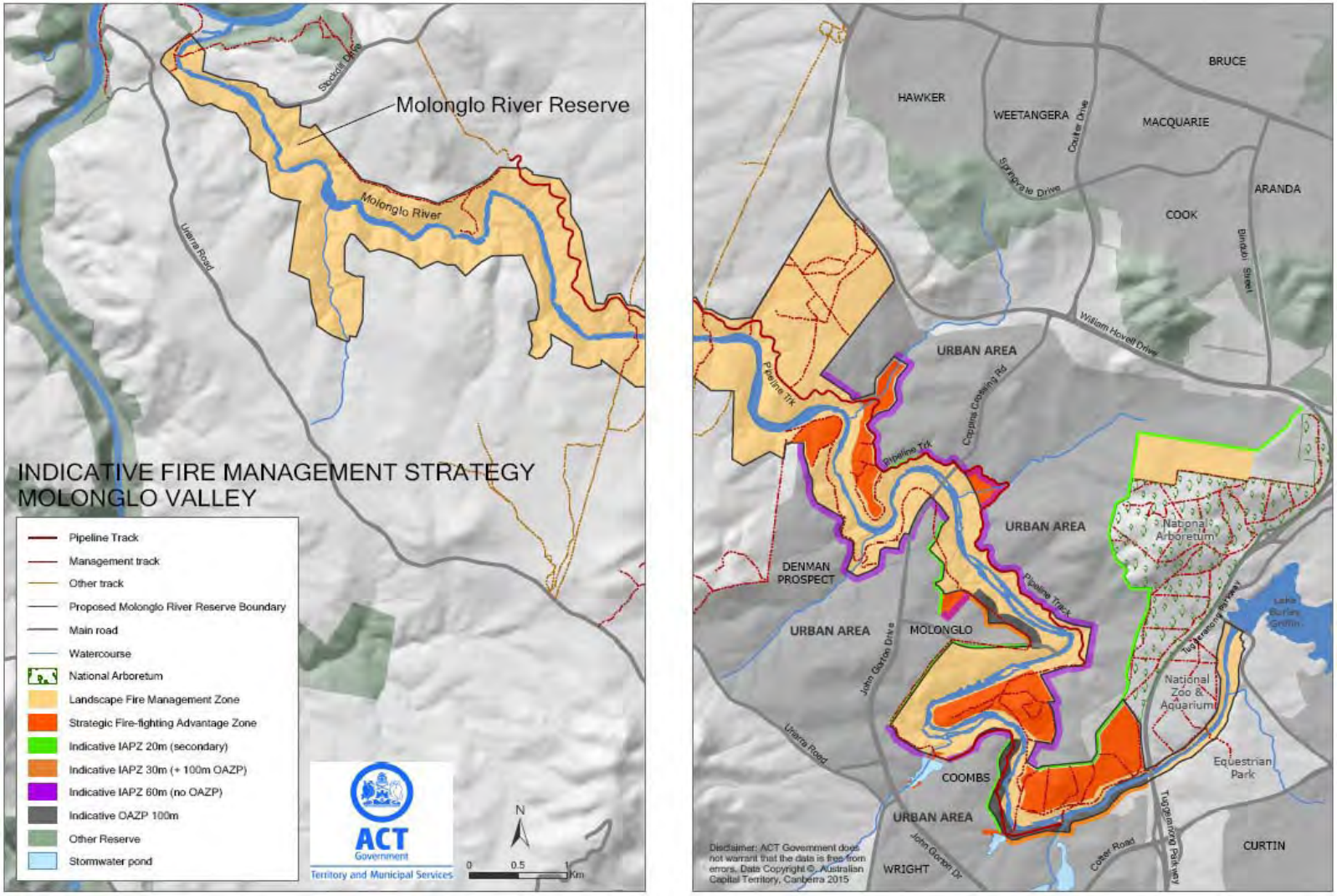
Figure 22 – Indicative Fire Management Strategy – Molonglo Valley [TaMS 2015]



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APPENDIX B – WORKING GROUP - MEETING DATES, LIST OF ATTENDEES & RESOLUTIONS

In late 2013 – early 2014, the Land Development Agency [LDA] identified the need to bring together a working group to examine the outstanding issues relating to the bushfire risk to the north- western edge of Molonglo 3; Denman Prospect and the Molonglo River Corridor.

Initially the Working Group consisted of representatives of LDA, ABPP and Umwelt to discuss issues and the way forward.

The brief of the Working Group was widened to bring together all Government Agencies involved in the development of the Molonglo East precinct to enable examination of previous studies, undertake site inspections and consider all options available so as to develop a report that establishes the principles, processes and funding required to address the bushfire risk.

Representatives of Government Agencies included:

- Dave Richardson [LDA];
- Kerry Browning [LDA];
- Adam Carmody [LDA];
- Dylan Kendall [TaMS];
- Adam Leavesley [TaMS];
- Nick Lhuede [ESA];
- Greg Potts [ACT RFS];
- Conrad Barr [Acting Chief Officer] ACT Fire & Rescue;
- Andrew Starke – Commissioner ACT Rural Fire Service;
- Ros Ransome [TaMS];
- Steven Gianakis [EPD];
- Daniel Iglesias [TaMS];
- Tony Corrigan [TaMS]; and
- Stuart McKenzie [EPD]

Two external companies were commissioned to provide assistance to the Working Group, Umwelt to undertake a peer review of the previous ecological studies and additional ecological investigations and ABBP to provide advice on bushfire risk, fire protection strategies and the preparation of a Bushfire Mitigation Strategy Report.

These companies were represented by;

- Peter Cowper Armstrong [Umwelt];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

TaMS was invited to a second workshop on the 28th May 2014 with the aim to establish initial understanding of ecological values and management requirements and development of feasible options to manage bushfire risk. Attendees included:

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- Dave Richardson [LDA];
- Kerry Browning [LDA];
- Adam Carmody [LDA];
- Dylan Kendall [TaMS];
- Peter Cowper Armstrong [Umwelt];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

Umwelt was commissioned to review the existing reports/studies and undertake field surveys and investigation into the vegetation and ecological values in Kama.

The results of this study are contained in the separate document attached as Attachment A.

Initial findings on the extent of the ecological value of the vegetation within Kama varied from the previous studies.

A third workshop was held on the 29th July 2014 with the aim to undertake a wider consultation with key fire planners within TaMS and ESA; establish a broader understanding of ecological values and management requirements and further development of feasible options to manage fire risk. Attendees were:

- Dave Richardson [LDA];
- Daniel Santosuosso [LDA];
- Adam Carmody [LDA];
- Dylan Kendall [TaMS];
- Adam Leavesley [TaMS];
- Nick Lhuede [ESA],
- Greg Potts [ACT RFS];
- Conrad Barr [Acting Chief Officer] ACT Fire & Rescue;
- Peter Cowper [Umwelt];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

Various options were considered in the methods of providing protection to the north-western edge of Molonglo 3 including support for the provision of an Asset Protection Zone within Molonglo 3 with the vegetation within Kama managed as a Strategic Fire Advantage Zone [SFAZ], provided that adequate on-going funding was available to support the management works in perpetuity.

Following discussions on the protection measures for Denman Prospect, Umwelt were commissioned to review the existing reports/studies and undertake field surveys and investigation into the vegetation and ecological values of the vegetation within the north-western portion of Denman Prospect and the adjoining land to the northwest.

A fourth workshop was held on the 21st October 2014 with the aim of confirming the proposed management of the north-western edge of Molonglo 3 and examining options for fire management of the western edge to Denman Prospect and the Molonglo River Corridor.

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Attendees were:

- Dave Richardson [LDA];
- Daniel Santosuosso [LDA];
- Adam Carmody [LDA];
- Adam Leavesley [TaMS];
- Greg Potts [ACT RFS] & Conrad Barr [Acting Chief Officer ACT Fire & Rescue];
- Peter Cowper & Rob Armstrong [Umwelt];
- Ros Ransome [TaMS]; and
- Graham Swain [ABPP].

At this meeting it was agreed that to the north-western edge of Molonglo 3 the proposed fire management zones would consist of:

1. A 60 metre wide Inner Asset Protection Zone, located inside the western edge to the Molonglo Stage 3 precinct;

2. A Fire Trail would be constructed along the boundary with Kama – inside the Molonglo Stage 3 precinct;

3. A managed fire break would be provided in Kama, adjacent to the boundary with Molonglo Stage 3;

4. That the vegetation within Kama would be managed in a series of Strategic Fire Advantage Zones, in accordance with the prescriptions provided by the *Strategic Bushfire Management Plan for the ACT* – 2009 – refer to Appendix C – Plan of proposed Bushfire Management Strategies – Kama/Molonglo 3 Western Edge.

   Existing access trails would be maintained and managed to provide edges to the Strategic Fire Advantage Zones – refer to Appendix C – Plan of proposed Bushfire Management Strategies – Kama/Molonglo 3 western edge.

5. The proposed management strategies were supported by ESA provided adequate on-going funding was available to support the works in perpetuity.

The meeting also resolved to examine the fire management options for Denman Prospect provided by ABPP and to assess these options in the field.

It was also agreed to inspect the line of the Asset Protection Zone to the north of the river corridor, as determined by TaMS. This inspection was attended by Dave Richardson; Nick Lhuede; Adam Leavesley and Daniel Santosuosso and agreement reached that a 60 metre wide Inner Asset Protection Zone [IAPZ] be provided to the full length of the river corridor, measured from the outside (or riverside) of the existing Sewer Access Track.

Where stormwater management ponds occurred, the IAPZ will include these facilities.

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The acceptance by ESA of the 60 metre wide IAPZ was predicated on the vegetation within the river corridor being managed as a Strategic Fire Advantage Zone which is to be maintained to the standards prescribed by the *Strategic Bushfire Management Plan for the ACT – 2014 – Version 3.*

An inspection of the western edge of Denman Prospect and adjoining land to the northwest was undertaken on the 28th November 2014. Attendees were:

- Dave Richardson [LDA];
- Daniel Santosuosso [LDA];
- Adam Leavesley [TaMS];
- Nick Lhuede [ESA],
- Greg Potts [ACT RFS];
- Conrad Barr [ESA][Acting Chief Officer ACT Fire & Rescue],
- Andrew Starke – Commissioner ACT Rural Fire Service;
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

General consensus was reached on the location of the proposed fire protection measures which include the provision of a 60 metre wide IAPZ to the full length of the urban edge; management of a varying width Outer Asset Protection Zone [OAPZ] between the IAPZ and the retained forest vegetation within Denman Prospect and the management of the Territory Land to the northwest and west of the fire protection zones as a series of Strategic Fire Advantage Zones.

Whilst this consensus was broadly spread across the group concern was raised by ESA over the Strategic Fire Advantage Zone extending beyond the boundary of the Denman Prospect precinct and that this issue needed to be addressed before the final support of ESA would be considered.

Another matter raised by ESA related to the environmental consequences of the management of the proposed Outer Asset Protection Zones and SFAZs and the cost of the ongoing management and the long term funding of the management program.

To address the matter of possible environmental consequences of the management of the proposed SFAZs, Umwelt were commissioned to undertake further studies to determine the location of vegetation communities, threatened species and the viability of management of the vegetation to achieve the fuel loads required in a SFAZ.

The results of the study are contained in the Umwelt Report attached as Attachment B.

The Umwelt report identifies an increase in the extent of Box Woodland, confirms the location of Pink Tailed Worm Lizard habitat and also confirms that the management of the SFAZs by hazard reduction burning is ecologically sustainable.

The Umwelt report was reviewed by Adam Leavesley from the Fire Management Unit of TaMS.

An inspection of the southern side of the Molonglo River corridor was undertaken on the 19th March 2015.

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Attendees were:

- Dave Richardson [LDA];
- Daniel Santosuosso [LDA];
- Adam Leavesley [TaMS];
- Rob Armstrong [Umwelt]; and
- Graham Swain [ABPP].

This inspection examined the bushfire risk to the western edge of the Molonglo River Park and the fire paths/vegetation along the river corridor to the bend in the river, east of the Group Centre precinct.

Consensus was reached that the fire protection principle developed for the northern edge of the corridor [60 metre wide IAPZ within the urban development and management of the river corridor as a SFAZ] would be applied along the southern edge of river corridor.

It was noted that the position of the interface between any IAPZ and SFAZ would be identified at the time of developing EDPs for the length of this corridor in Denman Prospect.

It should be noted that the LDA is undertaking a review of the EPD Group Centre Concept Plan east of John Gorton Drive and south of the river. The review is examining the layout and dwelling densities against rational market expectations.

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ATTACHMENT A – BRIEFING NOTE

UMWELT – 15th October 2013.

KAMA NATURE RESERVE INTERFACE

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umwelt

Inspired People.
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Quality Outcomes.

Briefing Note

To:	Daniel Santosuosso, ACT Land Development Agency
cc:	Dave Richardson, ACT Land Development Agency
From:	Peter Cowper, Umwelt (Australia) Pty. Limited
Author:	Rob Armstrong, Umwelt (Australia) Pty. Limited
Date:	15th October 2013
Subject:	Ecological values of the Kama Nature Reserve – Molonglo Stage 3 outer asset protection zone

Purpose

The purpose of this briefing note is to inform the ACT land development agency of the ecological values of the outer asset protection zone for the interface between Kama Nature Reserve and the Molonglo Stage 3 development.

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4.0	**Conclusions & Recommendations**	**6**
5.0	**Site Photographs**	**7**
6.0	**References**	**9**

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1.0 Site location

Based on advice from the ACT Land development Agency, the areas which may be managed as part of the outer asset protection zone may include an area of 200 metres either side of the eastern boundary of Kama Nature Reserve. The location of this area is shown in **Figure 3.1**.

2.0 Methods

While undertaking a broader ecological assessment of Kama Nature Reserve and the Molonglo stage 3 development area on 24 September 2013 as part of the review of the draft Environmental Offsets Calculator (Umwelt 2013)[1], Umwelt ecologists undertook a meandering search to verify the ecological assessment undertaken as part of the Molonglo NES plan. Meandering searches considered general condition, the presence of a native understorey, the potential presence and condition of threatened ecological communities and potential habitat for threatened species.

Additionally, one 20x20 full-floristic quadrat which was assessed as part of subsequent condition assessment undertaken by Eco Logical Australia (2013)[2] was surveyed in order to validate findings of this report.

Vegetation survey

Meandering search: Unsystematic wandering across the entire block to supplement floristic information from plot assessment, gain an understanding of species distribution, characterise vegetation communities and determine habitat values.

Full-floristic quadrat sampling: Plot survey to recording cover and abundance of each plant within a defined area. To ensure assessment is in line with ACT Government (2013)[3], a 20x20 metre (0.04 hectare) plot size was chosen to collect species richness data, with habitat variables and cover variables assessed within a 20x50 metre plot and along a 50 metre line-intersect transect respectively.

3.0 Findings

3.1 Area within Kama Nature Reserve

The ecological condition of the 200 metre area inside the eastern boundary of Kama Nature Reserve is variable, comprised of a mosaic of high condition box-gum woodland, low condition natural temperate grassland and low condition scribbly gum woodland. The ecological condition of each vegetation type is outlined in **Table 3.1** and shown in **Figure 3.1**.

Table 3.1 – Ecological condition of vegetation within the eastern 200 metre strip of Kama Nature Reserve

Vegetation zone	Ecological condition
Natural temperate grassland (VT3)	The natural temperate grassland area is characterised by a high cover of kangaroo grass (*Themeda triandra*) and tall speargrass (*Austrostipa bigeniculata*), with few inter-tussock spaces and a low diversity of native forbs. There are few uncommon native species and some disturbance tolerant species in addition to a high cover of the invasive St John's wort (**Hypericum perforatum*). The area has been subjected to moderate alteration through historic grazing management. The area was assessed in line with the Botanical Significance Rating (BSR) for natural temperate grassland as defined by the ACT lowland native grassland conservation strategy (ACT Government 2005)[4]. At present, the area is considered to be a mosaic of moderate (BSR 3) and low (BSR 4) condition. With an appropriate level of active

[1] Umwelt (2013a) Review of ACT Environmental Offsets Calculator. Stage 2. Draft July 2013. Prepared by Umwelt (Australia) Pty Limited on behalf of ACT Land Development Agency.

[2] Eco Logical Australia (2013) Molonglo valley vegetation survey: baseline condition assessment. Prepared for Design & Development, Territory & Municipal Services Directorate (ACT Government), 1 July 2013.

[3] ACT Government (2013) Environmental Offsets Calculator Operational Manual. ACT Environment and Sustainable Development Directorate. Version 20130301.

[4] ACT Government (2005) A vision splendid of the grassy plains extended: ACT lowland native grassland conservation strategy. Action Plan No. 28 (Arts, Heritage and Environment, Canberra).

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	management to reduce biomass and maintain inter-tussock spaces, the area is likely to be of moderate (BSR 3) value. The area is considered to be part of the 'natural temperate grassland of the Southern Tablelands of NSW and the Australian Capital Territory' endangered ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and 'natural temperate grassland' endangered ecological community under the ACT *Nature Conservation Act 1980*. Using condition criteria of ACT Government (2013), this area is in 'moderate/good' condition on the basis that if vegetation is not typified by the presence of paddock trees or native pasture (low condition) then it is in moderate to good condition.
Blakely's red gum - yellow box grassy woodland (box-gum) (partially cleared) (VT1a)	The partially cleared box-gum woodland area is characterised by an open woodland overstorey of Blakely's red gum (*Eucalyptus blakelyi*) which is likely to be have been historically thinned for grazing or other agricultural and land management purposes. The understorey is a mosaic of a moderate to high cover of tussock grasses as per the natural temperate grassland, with approximately 30-40% of the area dominated by exotic pasture patches including wild oats (**Avena* spp.), barley grass (**Hordeum* spp.) and rat's-tail fescue (**Vulpia myuros*), as well as St John's wort and sweet briar (**Rosa rubiginosa*). In native areas there are species which indicate high condition such as blue devil (*Eryngium ovinum*) and early nancy (*Wurmbea dioica* subsp. *dioica*). However, the understorey is not as diverse as box-gum remnants in the central and western portions of Kama Nature Reserve. The area was assessed in line with condition categories in the ACT lowland woodland conservation strategy (ACT Government 2004)[5]. The area is considered to be 'moderately modified lowland woodland'. The area is considered to be part of the 'white box-yellow box-Blakely's red gum grassy woodland and derived native grassland' critically endangered ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and 'yellow box – red gum grassy woodland' endangered ecological community under the ACT *Nature Conservation Act 1980*. Using condition criteria of ACT Government (2013), this area is in 'paddock trees' condition. Native over-storey percent foliage cover is less than 25% of the lower value of the overstorey percent foliage cover benchmark for the relevant vegetation type and less than 50% of ground cover perennial vegetation is indigenous species.
Blakely's red gum - yellow box grassy woodland (box-gum) (VT1)	The box-gum woodland area is characterised by a woodland overstorey of Blakely's red gum and yellow box (*E. melliodora*). The understorey is considered to be in high condition, with a suite of native grasses such as kangaroo grass (*Themeda triandra*), wallaby grasses (*Rytidosperma* spp.) weeping grass (*Microlaena stipoides* var. *stipoides*) and *Aristida vagans*, and forbs including blue devil, early nancy, common sunray (*Triptilodiscus pygmaeus*), scaly buttons (*Leptorhynchos squamatus*), and the native small St John's wort (*Hypericum gramineum*). The area was assessed in line with condition categories in the ACT lowland woodland conservation strategy (ACT Government 2004). The area is considered to be 'partially modified lowland woodland'. As a result of the ground layer vegetation diversity and floristic composition, the area is considered to be relatively good quality example of the 'white box-yellow box-Blakely's red gum grassy woodland and derived native grassland' critically endangered ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and 'yellow box – red gum grassy woodland' endangered ecological community under the ACT *Nature Conservation Act 1980*. Using condition criteria of ACT Government (2013), this area is in 'moderate/good'

[5] ACT Government (2004) Woodlands for wildlife: ACT lowland woodland conservation strategy. Action Plan No. 27 (Environment ACT, Canberra).

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	condition. If vegetation is not in low condition on the basis that if vegetation is not typified by the presence of paddock trees or native pasture (low condition) then it is in moderate to good condition.
Scribbly gum grassy open forest (partially cleared) (VT2a)	The scribbly gum grassy open forest area is characterised by isolated scribbly gum (*Eucalyptus rossii*) and less frequently, red stringybark (*E. macrorhyncha*), broad-leaved peppermint (*E. dives*) and Blakely's red gum. Like VT2 below, the dominance of scribbly gum is possibly due to reduced fertility and soil depth associated with areas at higher elevations within the reserve. The understorey is highly degraded, and dominated by wild oats (*Avena* spp.), brome (*Bromus* spp.) and ryegrass (*Lolium* spp.). Some patches are dominated by native grasses including tall speargrass, wallaby grasses (*Rytidosperma* spp.) and red-leg grass (*Bothriochloa macra*). Exotic forbs such as Paterson's curse (*Echium plantagineum*) and St John's wort are common. The area was assessed in line with condition categories in the ACT lowland woodland conservation strategy (ACT Government 2004). The area is considered to be 'substantially modified lowland woodland'. Using condition criteria of ACT Government (2013), this area is in 'paddock trees' condition. Native over-storey percent foliage cover is less than 25% of the lower value of the overstorey percent foliage cover benchmark for the relevant vegetation type and less than 50% of ground cover perennial vegetation is indigenous species
Scribbly gum grassy open forest (VT2)	The scribbly gum grassy open forest area is characterised by scribbly gum (*Eucalyptus rossii*) and occasional Blakely's red gum. The dominance of scribbly gum is possibly due to reduced fertility and soil depth associated with areas at higher elevations within the reserve. The understorey is in reasonable condition and is floristically similar to VT1. Dominant species include rough speargrass (*Austrostipa scabra* subsp. *falcata*), short wallaby grass (*Rytidosperma carphoides*), ringed wallaby grass (*R. caespitosum*), kangaroo grass and a range of forbs including scaly buttons, stinking pennywort (*Hydrocotyle laxiflora*), spoon cudweed (*Stuartina muelleri*), wood sorrel (*Oxalis perennans*) and Austral stonecrop (*Crassula sieberiana*). The area was assessed in line with condition categories in the ACT lowland woodland conservation strategy (ACT Government 2004). The area is considered to be 'partially modified lowland woodland'. Using condition criteria of ACT Government (2013), this area is in 'moderate/good' condition. If vegetation is not in low condition (paddock trees or native pasture) then it is in moderate to good condition.

3.2 Area within the Molonglo stage 3 development

The ecological condition of the 300 metre area of the western boundary of Molonglo stage 3 development (adjoining Kama Nature Reserve) is generally low, consisting of degraded exotic pastures, and an area containing scattered Blakely's red gum with an exotic understorey. Vegetation type and condition mapping undertaken by ELA (2013) provides a fair representation of ecological values. As requested in project brief, a full-floristic plot surveyed by ELA (2013) (plot O3-01) was surveyed, confirming that the area is dominated by exotic pasture grasses.

The only feature of ecological significance is the presence of five potential pink-tailed worm lizard (*Aprasia parapulchella*) habitat areas. One of these (location PTWL1) is within a patch of diverse native grasses, whereas the others are of moderate to low value due to a higher abundance of Phalaris (*Phalaris aquatica*) and wild oats (*Avena* spp.) These areas are mapped as moderate habitat quality by Osborne & Wong (2010)[6].

[6] Osborne W & Wong D (2010) Extent of potential pink-tailed worm-lizard (Aprasia parapulchella) habitat in the Stage 2 Investigation Area – East Molonglo downstream of Coppins Crossing. Report commissioned by ACTPLA.

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The location of these potential areas is shown in **Figure 3.1**.

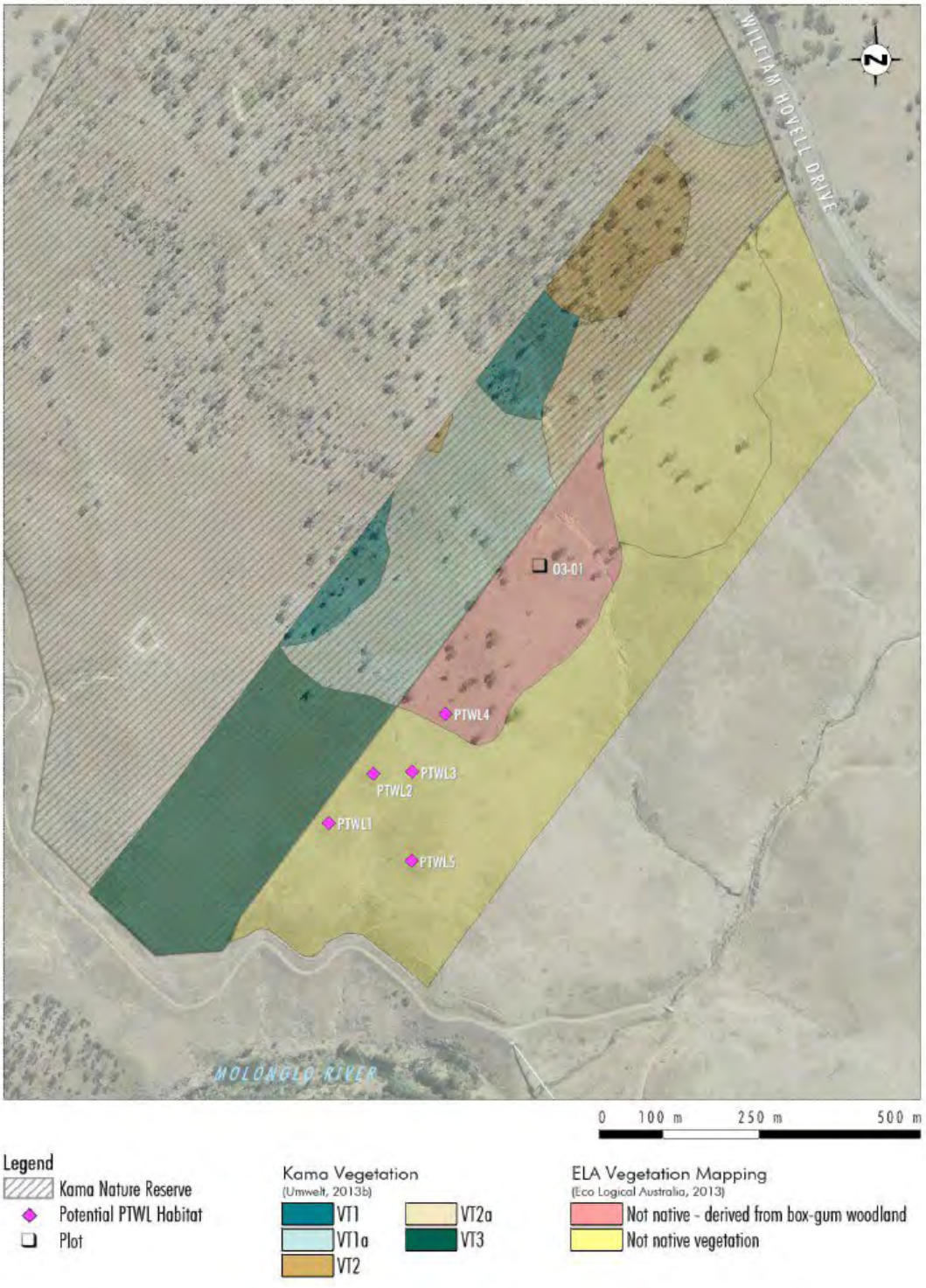

Figure 3.1 - Ecological assets of the outer asset protection zone including potential pink-tailed worm lizard habitat.

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Vegetation types within Kama Nature Reserve are as follows (Umwelt 2013b)[7]:

VT1:	Blakely's red gum - yellow box grassy woodland
VT1a:	Derived mixed exotic and native grassland (derived from VT1)
VT2:	Scribbly gum grassy open forest
VT2a:	Scribbly gum grassy open forest (partially cleared)
VT3:	Natural temperate grassland

4.0 Conclusions & Recommendations

- The ecological condition of the eastern 200 metres of Kama Nature Reserve are generally moderate to high within areas of 'box-gum' woodland and natural temperate grassland. While there are patches dominated by exotic flora which are likely to be improved with some active management. Specifically, the natural temperate grassland and box-gum areas could benefit from active St John's wort control both in areas adjacent to the Molonglo stage 3 development, and broadly across the reserve.

- The ecological condition of the scribbly gum woodland is generally low due to a dominance of exotic perennial grasses. It may be difficult to restore these areas to their former value, although supplementary tree planting may assist in a move towards this by reducing the available sunlight to the exotic grasses.

- There are at least five potential pink-tailed worm lizard habitat areas within areas identified as the Molonglo stage 3 outer asset protection zone; there may be additional based on findings by Osborne & Wong (2010). It is recommended that these be considered in the context of the Molonglo Valley NES Plan and associated implications for development in meeting obligations under the approved strategic assessment.

[7] Umwelt (2013b) Briefing note: vegetation mapping for Kama Nature Reserve, Molonglo. Prepared by Umwelt Pty Limited for Daniel Santosuosso, ACT Land Development Agency. 11 October 2013.

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5.0 Site Photographs

Photo 1: Natural temperate grassland in the south-eastern corner of Kama Nature Reserve, with considerable cover of exotic St John's Wort.

Photo 2: Blakely's red gum - yellow box grassy woodland (box-gum) (partially cleared) (VT1a), inside Kama Nature Reserve.

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Photo 3: Scribbly gum grassy open forest (partially cleared), with a mosaic of native and perennial exotic grass understorey, inside Kama Nature Reserve.

Photo 4: Exotic Phalaris and wild oats dominated pastures, inside the Molonglo stage 3 development area.

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ATTACHMENT B – ANALYSIS OF VEGETATION STRUCTURE AND FIRE RISK – WEST DENMAN PROSPECT

UMWELT – April 2015.

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