



Edmondson Park South - Part 3a – Concept Plan Application

Bushfire Risk Assessment

Prepared for Landcom
August 2010

Document Details	Edmondson Park South - Part 3a - Concept Plan Application - Bushfire – E A Report 160810 Rev B
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Prepared for	Landcom
Reference no.	91275/2

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Contents		Page
1.0	Executive Summary	5
2.0	Introduction	6
2.1	The site	6-7
2.2	Concept plan	8
2.3	Project application	10-11
2.4	Planning background	11
2.4.1	Director General's requirements	12
2.4.2	Report requirements and objectives	12
2.5	Methodology	13
3.0	Bushfire Hazard	13
3.1	Bushfire prone mapping	13
3.2	Determination of bushfire hazard	15
3.2.1	Vegetation type (PBP 2006)	15
3.2.2	Vegetation classification of Edmondson Regional Park	15
3.2.3	Vegetation classification – open space corridors & reserves	15
3.3	Bushfire hazard – effective slopes	17
4.0	Proposed bushfire protection measures	20
4.1	Provision of fuel reduced asset protection zones	20
4.1.1	Residential development	20
4.1.2	Special fire protection purposes (SFPP) development	20-21
4.1.3	Commercial & industrial development	21
4.1.4	Asset protection zone standards (RFS 2005)	21
4.1.5	Management of asset protection zones (APZ)	21-22
4.2	Construction standards and design	22-23
4.3	Access standards	23-24
4.4	Public utilities	26
4.5	Landscaping	27
5	Other matters - Edmondson Regional Park	28
6	Conclusion	29
7	References	30
8	Bibliography	30
9	Appendices	31-36
Appendix 1	Liverpool City Council Bushfire prone land map sheet 4 Liverpool City Council Bushfire prone land map sheet 7 Campbelltown City Council Bushfire prone land map	
Appendix 2	NSW Rural Fire Service correspondence	

Contents		Page
Figures		
Figure 1	Site locality JBA Urban Planning Consultants	7
Figure 2	Overall masterplan J Wyndham Prince plan no: 9015/SK32	9
Figure 3	“Mapped” bushfire prone land McKinlay Morgan & Associates plan no: 91275/2F:3	14
Figure 4	Site slope analysis J Wyndham Prince plan no: 8916/SK23	18
Figure 5	Bushfire threat analysis and APZ requirements McKinlay Morgan & Assoc plan no: 91275/2Fire	19
Figure 6	Typical open space, road cross section J Wyndham Prince plan no: 9015/SK18A	25
Table		
Table 1	Minimum specifications asset protection zone requirements – Residential development	22
Table 2	Minimum specifications asset protection zone requirements – Special fire protection purposes development	23
Site photography		
	Vegetation formation west of Zouch Road	16
	Part of stage 1 development area	16
	Typical vegetation conservation area	17
	Existing perimeter access conservation area west of Zouch Road	28

1.0 Executive summary

The Edmondson Park South Part 3A application is unique with the incorporation of a Regional Park, containing sensitive and endangered vegetation communities, traversing the proposed release area and in particular the future Town Centre.

This bushfire risk assessment has made assumptions in the resultant conformation of the vegetation within this regional park in the medium term time frame. Whilst it's understood that the regional park, will include areas for passive recreation in addition to conservation management areas, it is assumed that generally the regional park would comprise bushfire prone land category 1 vegetation or vegetation buffer.

In time these assumptions may not be correct, however in the Statement of Interim Management Intent (SIMI) one of the design principles is *"to allow the park to infiltrate the town."* Whilst a fire management strategy is outlined to be prepared, for the regional park, the SIMI does outline the requirement for interface management adjacent to urban boundaries. However the principles adopted in this assessment are that the residential development should not burden the conservation area with any vegetation modification or management requirements.

The assessment further demonstrates that the concept plan in regard to the Part 3A application can be implemented in such a manner that the required asset protection zones and further bushfire protection measures can be provided so as to comply with the acceptable solutions and guidelines outlined in Planning for Bushfire Protection 2006 (PBP 2006).

In the implementation of the design principles for the regional park as outlined in the SIMI and in consideration of the existing vegetation within the proposed development area, it is considered important that any landscaping initiatives take into account the management and conformation of the vegetation in the medium term, such that the provision of the initial asset protection zones are not compromised, together with other relevant bushfire protection measures intended to be maintained for the ongoing benefit of the new community into the future.

2.0 Introduction

This Bushfire Risk Assessment has been prepared by McKinlay Morgan & Associates to accompany a Concept Plan Application under Part 3A of the Environmental Planning & Assessment Act, 1979 (EP&A Act) and a proposal for State Significant Site listing under Schedule 3 of State Environmental Planning Policy Major Development 2005 (SEPP Major Development) in relation to the former Ingleburn Army Base and certain adjoining lands within the Edmondson Park Release Area of the South West Growth Centre (referred to herein as 'Edmondson Park South').

Landcom is proposing to deliver a new diverse and sustainable urban community at Edmondson Park South. Once complete, Edmondson Park South will accommodate a mix of land uses, a diversity of housing (approximately 3,200 dwellings), a new town centre incorporating 35,000 – 45,000m² retail, business and commercial floor space with employment opportunities for 1,000 people, multi-purpose community and education facilities, a new 150 hectare Regional Park, a number of other local parks and environmental conservation areas.

The new urban community at Edmondson Park South will meet's the State Government's objectives to increase housing supply, provide community benefits and create jobs.

The purpose of the Concept Plan is to secure statutory approval for the overall planning framework for the site and to further resolve a number of remaining site-wide infrastructure delivery and land use planning issues. The Project Application (submitted concurrently with the Concept Plan) for early works, infrastructure and subdivision relating to the initial phases of the development will enable site works to begin in 2010.

2.1 The site

The subject site comprises an area of approximately 413.3 hectares and forms part of the larger Edmondson Park Release Area within the South West Growth Centre. It is located to the north-west of the M5 Motorway and lies approximately 40 km to the south west of Sydney CBD. Approximately 260.4 hectares of the site is located within the Liverpool LGA and approximately 152.9 hectares is located within the Campbelltown LGA.

The majority of the site is currently owned by the Commonwealth (Department of Defence) and was formerly used as an army camp (the Ingleburn Army Camp) up until the 1990s when it was identified as surplus to Defence requirements. Since this time it has been progressively vacated. The project is intended to be carried out once ownership or control of the former Ingleburn Army Camp land has passed to the State. Other land within the site is owned by Landcom, the Minister Administering the EP&A Act, the Minister for Education, Training and Youth Affairs, the RTA, along with several roads owned by Liverpool City Council and Campbelltown City Council.

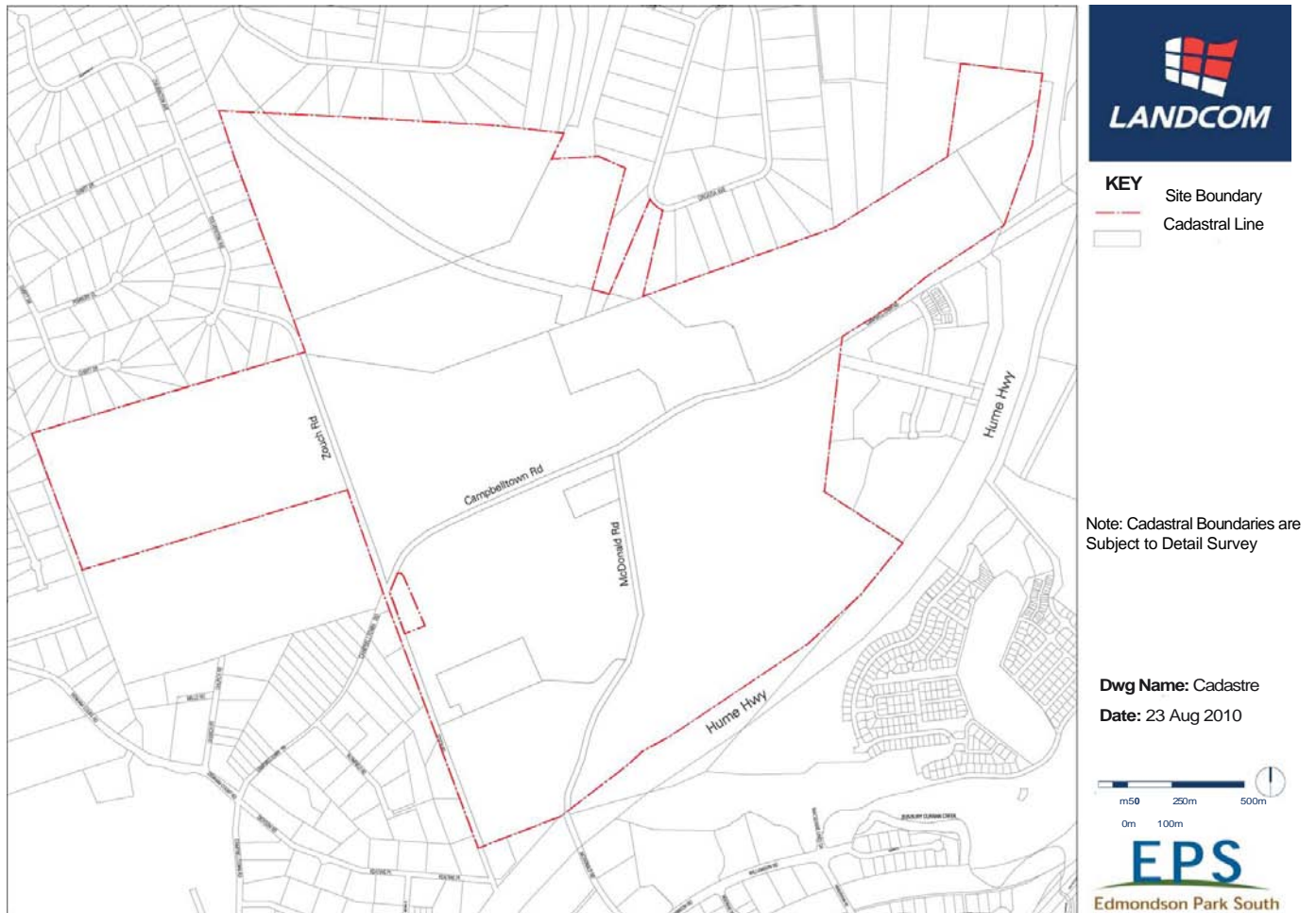
The site is largely vacant. Remnants of military facilities (i.e. cottages, former building slabs, internal roads, training facilities etc) associated with the site's former Defence use are scattered through-out the site. There are a number of cottages / houses previously used by Defence personnel in an area of the site generally referred to as "Ingleburn and Bardia Villages". The Ingleburn North Public School (1.835 hectares) is located on the southern and the Bambi Preschool on the northern side of Campbelltown Road.

The site is undulating to steep. It slopes from its highest point (80 m AHD) at the intersection of Zouch and Campbelltown Roads to its lowest point (40 m AHD) at its eastern corner and to a similar elevation adjacent to the M5 Motorway in the south-west corner. The central portion of the site along Campbelltown Road forms a ridge with gentle falls to the north and south.

The condition of existing vegetation on the site varies from exotic pasture with negligible ecological value to areas to areas of good condition vegetation with high recovery potential. The existing cleared portions of the site generally contain non native species.

The site is at the top of three catchments. Maxwell Creek, Bunbury Curran Creek and Cabramatta Creek pass through the site, with associated riparian zones and some woodland habitat (notably Cumberland Plain Woodland).

Figure 1



Locality plan

2.2 Concept plan

The Concept Plan establishes the overall planning framework for the site, including:

- land use type and distribution;
- a mix of housing types and densities (approximately 3,200 dwellings);
- concept location of and approximately 35,000 – 45,000 m² of retail / business / commercial floor space within the new Edmondson Park Town Centre;
- identification and location of open space and drainage corridors, environmental conservation lands (to form the new Regional Park), and local active and passive recreation facilities, including levels of embellishment;
- expanded Ingleburn North Primary School and new combined Primary/High School to the north of the site;
- road network layout;
- pedestrian and cycleway network layout;
- pedestrian bridge over the south western railway;
- Campbelltown Road corridor including the establishment of key intersection locations and configuration;
- utilities (including power, telecommunications and gas), infrastructure strategy, potable water strategy, sewer concept plan and water cycle management plan;
- location and dimensions of Bushfire Asset Protection Zones;
- appropriate interpretation of European and Aboriginal heritage located on the site
- erection of signage and billboards;
- remediation works;
- decommissioning of the existing Sewerage Treatment Plant (STP); and
- demolition.

The Concept Plan also sets out an approval framework that will enable the carrying out of the works necessary to remediate the site in accordance with a Remediation Strategy without the need for undertaking further environmental assessment.

A variety of housing types is proposed to be delivered. This will provide for a range of housing price points and will include moderate income housing and housing for seniors. It is proposed to develop the Edmondson Park site progressively in stages over a 15-20 year period. The Concept Plan will address the staging and delivery of the overall development having regard to the progressive delivery of necessary infrastructure, services and facilities; and market demand.

The Concept Plan is accompanied by a proposal with respect to the future developer contributions framework for the provision of local facilities and services within the Liverpool and Campbelltown LGAs as well as State Infrastructure.

2.3 Project application

The residential subdivision Project Application comprises:

- the creation of 206 residential lots, 4 super lots for future subdivision 15 Environmental Living lots and 3 lots for dedication to Campbelltown City Council as Public Reserve in 5 stages*;
- the dedication of roads to Campbelltown City Council;
- On-site works comprising:
 - tree removal;
 - earthworks including excavation, cut and fill;
 - design and construction of physical infrastructure, including roads, stormwater drainage and utility reticulation, traffic management works, establishment of open space areas;
 - retaining walls as determined during detailed design;
 - design and construction of staged stormwater water quantity and quality infrastructure to achieve objectives required by the Water Cycle Management (WCM) strategy for the greater site;
 - demolition of all existing structures;
 - erosion and sediment control to areas of roadworks and bulk earthworks including provision of temporary sedimentation ponds and diversion drains;
 - Design and construction of an ornamental pond;
 - Landscaping of road reservations;
 - erection of signage and billboards; and;
 - Embellishment of open space.
- Off-site works comprising:
 - construction of the sewer lead in from the Sydney Water carrier main at Ash Road;
 - upgrade of overhead mains and construction of electrical lead-in feeders from the existing zone substation at Prestons;
 - connection to utility services, potable and recycled water, electricity, gas and telecommunications in Campbelltown and MacDonald Roads;
 - Connection to existing stormwater drainage;
 - tree removal;
 - earthworks including excavation, cut and fill;
 - design and construction of physical infrastructure, including roads, stormwater drainage and utility reticulation, traffic management works, including the connection to the existing MacDonald Road;
 - design and construction of staged stormwater water quantity and quality infrastructure to achieve objectives required by the Water Cycle Management (WCM) strategy for the greater site;
 - erection of an acoustic wall;

- erection of signage and billboards;
- extension or relocation of existing services including potable and recycled water, gas, telecommunication, power;
- demolition of all existing structures; and;
- Proposed new intersection to existing Macdonald Road.

It is intended to seek staged Construction Certificates as necessary to facilitate the efficient delivery of each phase of, the development works.

The first stage residential Project Application will include the proposed construction of a gravity sewer line through the future Regional Park.

* A number of residue lots will be created in undertaking the Project Application, the number of lots identified in the above description relate to the ultimate number of lots that will be created in the Project Application.

2.4 Planning background

The Edmondson Park Release Area, including the site, has been the subject of broad strategic planning investigation and environmental assessment over a number of years by Liverpool and Campbelltown City Councils, the Department of Planning, the Department of Defence (the current landowner of the Ingleburn Army Camp) and Landcom (owner of certain lands).

The whole of the Edmondson Park Release Area has been released for urban development by the Minister for Planning. Part of the site; the Ingleburn Army Camp, is currently the subject of a 'delayed' rezoning for urban purposes under Liverpool Local Environmental Plan 2008 and Campbelltown (Urban Area) Local Environmental Plan 2002.

In June 2010 the Minister for Planning considered a Preliminary Assessment Report for the Edmondson Park South Project that provided justification for the planning, assessment and delivery of the project to occur under Part 3A of the EP&A Act, having regard to the demonstrated contribution that the project will have to achieving State and regional planning objectives.

Subsequently, on 23 July 2010, pursuant to Clause 6 of SEPP Major Development, the Minister for Planning formed the opinion that the Edmondson Park Project constitutes a Major Project to be assessed and determined under Part 3A of the EP&A Act, and also authorised the submission of a Concept Plan for the site. In doing so, the Minister also formed the opinion that a State Significant Site (SSS) study be undertaken to determine whether to list the site as a State Significant Site in Schedule 3 of SEPP Major Development.

The Part 3A process under the EP&A Act allows for the Edmondson Park South Project to be planned, assessed and delivered in a holistic manner, with a uniform set of planning provisions and determination by a single consent authority. Given the scale of the proposal, the Concept Plan and SSS listing provide the opportunity to identify and resolve key issues such as land use and urban form, development staging, infrastructure delivery and environmental management in an integrated and timely manner.

This report has been prepared to fulfil the Environmental Assessment Requirements issued by the Director General for the inclusion of the Edmondson Park site as a State Significant Site under SEPP Major Development, and for a Concept Plan approval for the development.

2.4.1 Director general's requirements

Specifically, this report addresses the following requirements, as determined by the Director General, Department of Planning i.e – *“(1) Provide an assessment against the current version of Planning for Bushfire Protection 2006 and identify the ongoing management arrangements of proposed Asset Protection Zones.”*

In accordance with the Director General's Requirements this assessment has been prepared following consultation with the following agency: -

New South Wales Rural Fire Service.

2.4.2 Report requirements and objectives

The bushfire risk assessment has been prepared to meet the requirements of the Director General, which are restated as: -

“(1) Provide an assessment against the current version of Planning for Bushfire Protection 2006 and identify the ongoing management arrangements of proposed Asset Protection Zones.”

These requirements have also been discussed with the New South Wales Rural Fire Service, in this regard significant areas of the site are mapped as Bushfire Prone Land and as such the subject land is identified on the “Bushfire Prone Land” (Appendix 1) maps prepared by the City of Liverpool and the City of Campbelltown.

The requirements of the Director General are consistent with the requirements of the Rural Fires Act 1997 and the Environmental Planning and Assessment Act 1979 as amended.

The objectives of the assessment are therefore to: -

- Provide a detailed analysis of the requirements of Planning for Bushfire Protection 2006 (PBP 2006) in particular, at concept plan stage in regard to the provision of Asset Protection Zones (APZ) and the requirement for the ongoing management of these APZ's. Particular emphasis is given to the consideration of existing indigenous vegetation contained within the Ingleburn Conservation Area to be known as the “Edmondson Regional Park”.
- Provide an assessment of further bushfire protection measures required to be considered by PBP 2006, including access, road hierarchy and layout, building construction standards and the provision of utility services.
- Provide guidelines for the design and ongoing management of Asset Protection Zones, including “streetscape” landscaping and adjoining open space and open space corridors.
- Provide advice for matters to be considered in the assessment of future stages of subdivision development within the release area so that guidelines can be adopted to provide overall strategies to assist the relevant authorities in the assessment of these future stages of development.

2.5 Methodology

An appropriate methodology is discussed within PBP 2006; however within the planning process an iteration of constraints is necessary so that the final proposal reflects the integration of bushfire protection measures within the development.

An overview of the approach is summarised below: -

- Review of previous studies and documents relating to project
- Determination of bushfire prone land from masterplan, post development, including, review current vegetation description and future enhancement/rehabilitation proposed, determine bushfire hazard, subsequent to site evaluation
- Formulate appropriate bushfire protection measures in regard to requirements of PBP 2006 and advise planning/design team in particular road width and likely construction standards in compliance with AS 3959-2009⁴, given available future dwelling location and likely vegetation separation.
- Further consideration to developments other than residential i.e. schools, commercial areas etc and any particular bushfire protection measures for Special Fire Protection purposes (schools etc).

3.0 Bushfire Hazard

In making an assessment of bushfire risk and compliance with PBP 2006 in the determination of an acceptable solution, an understanding is necessary of the particular vegetation type or types, which exist on the site and more particularly the likely conformation post development.

3.1 Bushfire prone land mapping

In 2002 amendments were made to the Environmental Planning and Assessment Act 1997 and the Rural Fire Act 1997. One of these amendments required Council's to map bushfire prone land. Subsequently guidelines were developed by the New South Wales Rural Fire Services (NSW RFS), for the mapping of Bushfire Prone Land.¹

Mapped Bushfire prone land for Liverpool City Council and Campbelltown City Council are shown in Appendix 1, affecting the subject site and in figure 3.

The guidelines referred to above indicate for the subject site that bushfire prone land consists of areas of specific vegetation greater than 1 hectare and that "Forests" would be included in Vegetation Category 1 and "Woodlands, Heaths and Rainforests" are mapped as Vegetation Category 2. A map has been prepared by defining the bushfire prone land post development (Figure 5) and it is noted that in areas of the future development of Edmondson Regional Park some of those lands are not mapped as bushfire prone land from the current mapping. However as the future rehabilitation and replanting of this area is not known, it is assumed that given the future conservation and passive use of the area that it is appropriate that the whole of the proposed Regional Park is considered as bushfire prone land for the purpose of this assessment.

Figure 3



3.2 Determination of bushfire hazard

The principal bushfire hazard within the site is the existing and proposed vegetation contained within the proposed Edmondson Regional Park. The existing vegetation is identified in the Conservation Agreement executed between the Federal and State Governments and which recognises the significance of the proposed regional park comprising of 150 hectares and to be managed by the Department of Environment & Climate Change (DECC).

It is noted that subsequent to development, a remnant of the existing vegetation will be located in the rectangular parcel of open space centrally located within the stage 1 site adjacent to the northern boundary of that site. Whilst this vegetation is currently mapped as “bushfire prone land” the likely area of this vegetation remaining after development is 0.6 hectares and as such would not be mapped as bushfire prone land.

3.2.1 Vegetation type (Planning for Bushfire Protection 2006)

In the determination of appropriate bushfire protection measures it is necessary that the vegetation comprising the bushfire hazard be determined in accordance with Appendix 2 PBP 2006 and more specifically Table A2.1 “Classification of Vegetation Formations” (After Keith 2004).

3.2.2 Vegetation classification of proposed Edmondson Regional Park

In consideration of Table A2.1 it is noted that the mapping associated with the Conservation Agreement referred to above, identifies that a significant part of the proposed regional park contains the endangered ecological community “Cumberland Plain Woodland” (Threatened Species Conservation Act 1995).

For the purpose of this assessment a “Woodland” vegetation classification is adopted on the basis of the dominant vegetation being identified as “Cumberland Plain Woodland”.

3.2.3 Vegetation classification – open space corridors

The open space corridors identified within Figure 5 contain remnant vegetation of the Cumberland Plain Woodland, and within the riparian environment. Whilst it is necessary that part of these corridors will be “engineered” to provide drainage flow paths, however it is understood that the cross sectional development of the proposed corridors of a total width of 45 metres the central 5 metres will be modified to provide adequate hydraulic flows, with a vegetation strip 10 metres wide on either sides of the central path, with a further 10 metre vegetation buffer to the boundary of the corridor. It is understood that considerable enhancement will occur to the existing vegetation. Whilst PBP 2006 Appendix 2, does discuss narrow bands of riparian vegetation, these are limited to 20 metres in width and being along a creek or river.

In determination of the vegetation hazards in AS3959-2009, certain clauses contain similar provisions to PBP 2006 in regard to the minimum width to be considered for Riparian vegetation.

It is considered necessary that the open space corridors located to the south of Campbelltown Road, as part of the Maxwells Creek Catchment be considered a bushfire hazard and that the appropriate vegetation classification is “Woodland” in accordance with Table A2.1, PBP 2006.

The proposed Town Centre is proposed to be bounded on the northwest and northeast by vegetation contained within a open space corridor. This vegetation is of similar form to that previously described as a remnant form of Cumberland Plain Woodland and as such is classified as “Woodland” Table A2.1, PBP 2006.



Vegetation formation west of Zouch Road



Part of stage 1 development area off England Avenue



Typical vegetation conservation area

3.3 Bushfire hazard – effective slopes

In the determination of an understanding of the bushfire potential of any vegetation considered to be a bushfire hazard, a significant characteristic of the potential fire behaviour and subsequently the potential bushfire attack upon any structure, is the influence of the effective slope of the vegetation on the bushfire behaviour and also as to whether the hazard is upslope or downslope of the point of consideration. PBP 2006 A 2.3(b) requires the following consideration: - *“Determine the gradient within the hazard (vegetation) which will significantly influence the fire behaviour of the site having regard to the vegetation class found.”*

A slope analysis of the overall site has been prepared (Figure 4). This analysis indicates that a significant part of the bushfire hazard has an effective slope of less than 5% with the balance of the hazard no greater than 9%.

A more detailed bushfire threat analysis is identified in (Figure 5) wherein the notations summarise the issues required to be determined in assessing the potential bushfire behaviour characteristics and therefore appropriate bushfire protection measures, such as asset protection zones, in compliance with PBP 2006.

Figure 4

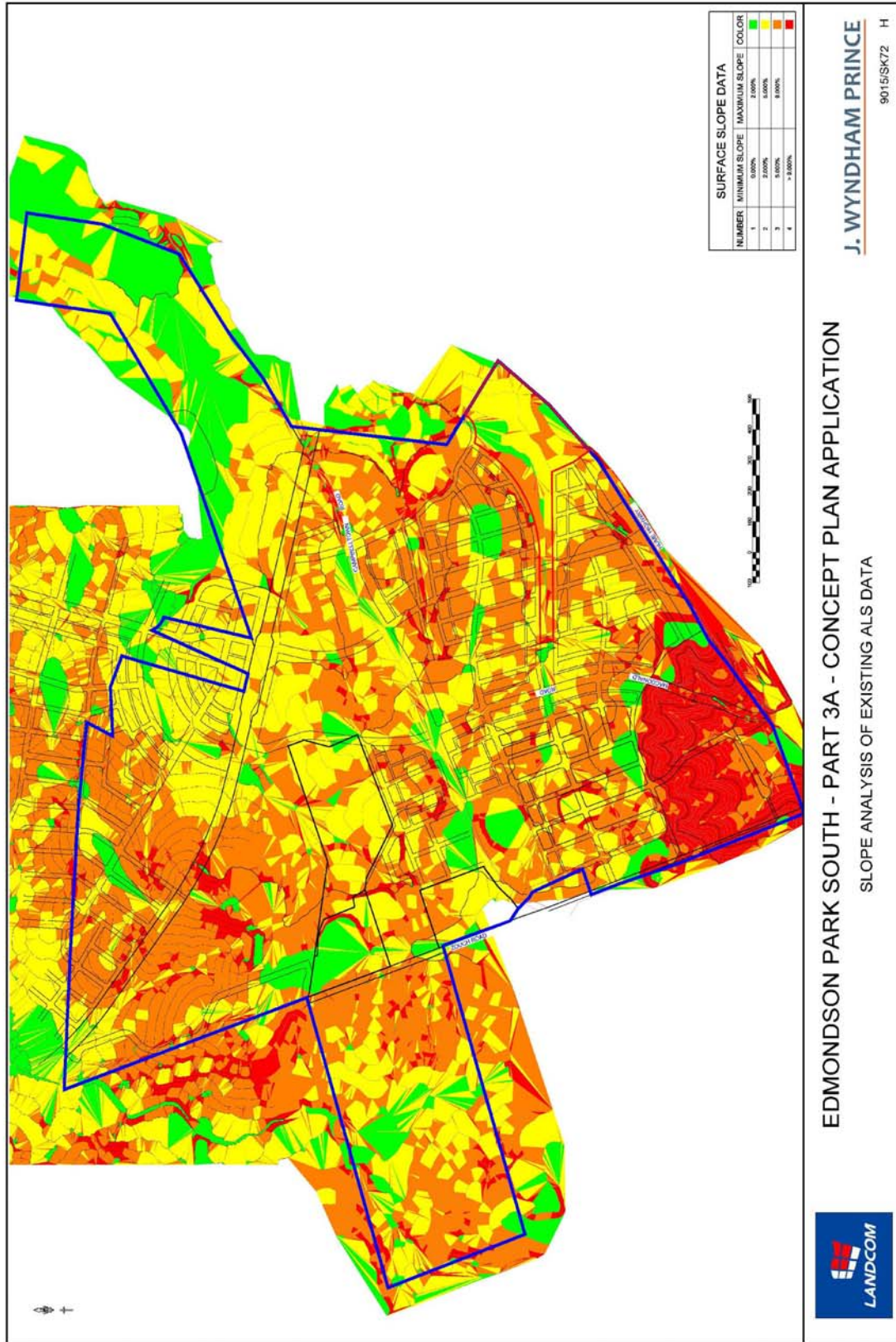
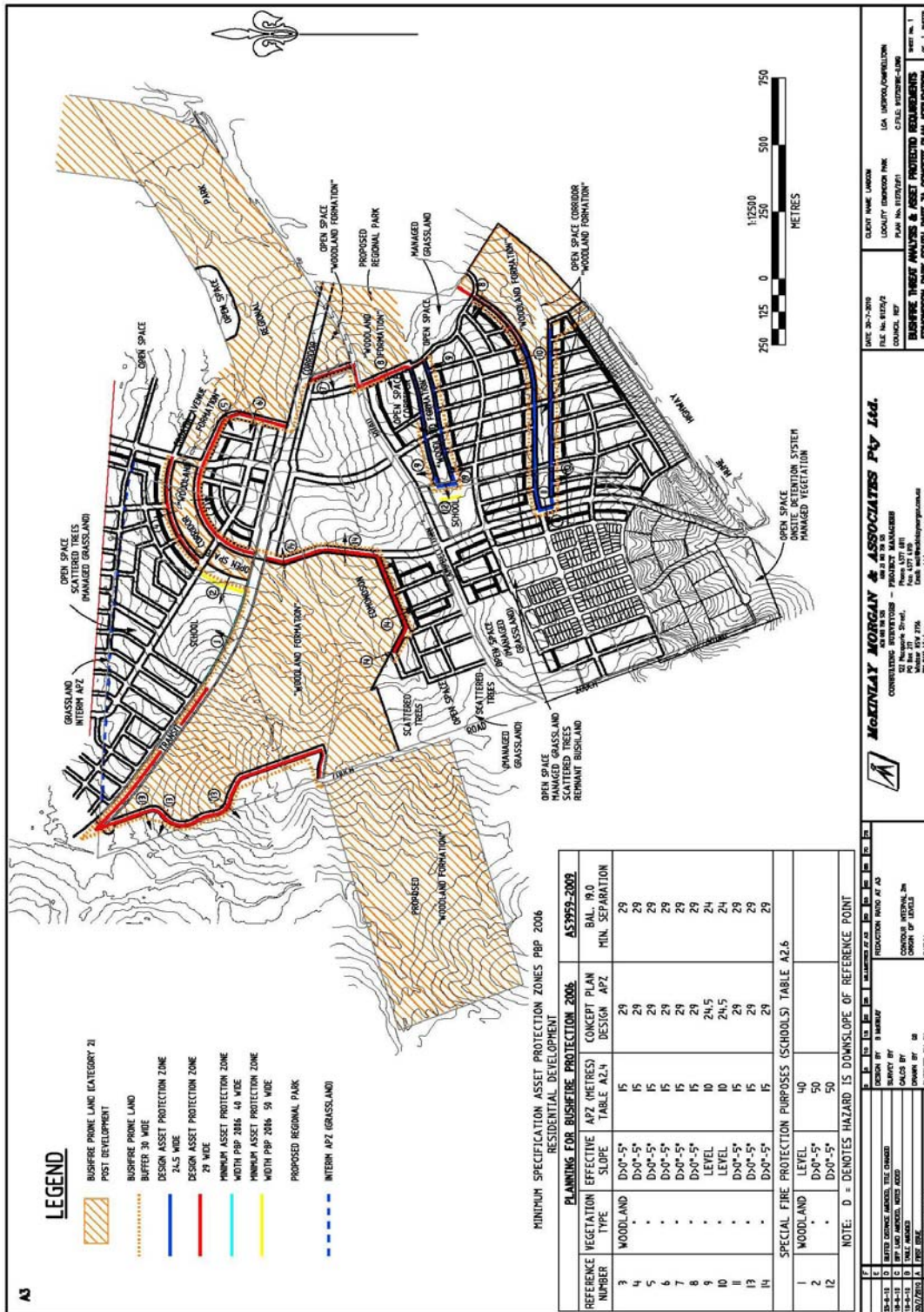


Figure 5



4.0 Bushfire Protection measures

Consideration has been given in Section 2 to define the likely bushfire hazard and the associated risk to development. PBP 2006 requires the consideration and implementation of appropriate bushfire protection measures so as to mitigate the impact of bushfire upon the community Chapter 3 PBP 2006, identifies the following key bushfire protection measures: -

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

4.1 Provision of fuel reduced asset protection zones

One of the significant measures to reduce the impact of the bushfire upon a structure is to provide adequate separation of the structures from the heat source. In simple terms, the greater the distance from the source then the transmission of radiant heat is reduced.

Whilst other forms of exposure such as ember attack may impact a structure the first step is to reduce the radiant heat that the building is being exposed too, so as to reduce the impact upon the structural integrity of the building. The provision of asset protection zones and ongoing management of surface and aerial fuels is required to provide for this immediate separation from the heat source.

PBP 2006 Appendix 2 discusses the provision of adequate asset protection zones given the nature of the vegetation and the effective slope of the bushfire hazard within particular climatic regions. PBP 2006 also requires different standards for various forms of development, residential development for Class (1) and (2) buildings relate to minimum specifications for asset protection zones outlined in Table A2.4, whereas development considered as special fire protection purpose development, is required to be considered in Table A2.6 of PBP 2006.

4.1.1 Residential development

As discussed Table A2.4 provides the minimum separation required to provide an acceptable solution for Class 1 and 2 buildings, Table 1 identifies the required minimum provisions of Table A2.4 as applied to the concept plan, given the site criteria previously established.

With regard to the application of this minimum requirement, it is linked to the construction standards provided for in AS3959-2009 (and as amended by PBP 2006) and which is discussed further in the section 4.2 of this assessment.

4.1.2 Special fire protection purposes (SFPP) development

Consideration is required by PBP 2006 for those developments where the occupants either are considered to be vulnerable i.e. aged, disabled or at risk such as schoolchildren, or those people who may be residents in a transient sense i.e. accommodation etc, whereby the residents are not aware of bushfire risk and the consequences and reactions necessary during a bushfire.

These SFPP developments are defined in the Rural Fires Act 1997 and also in PBP 2006 and are scheduled hereunder: -

In NSW, SFPPs have been identified as:

- (a) a school,
- (b) a child care centre,
- (c) a hospital (including a hospital for the mentally ill or mentally disordered),
- (d) a hotel, motel or other tourist accommodation,
- (e) a building wholly or principally used as a home or either establishment of mentally incapacitated persons,
- (f) housing for older people or people with disabilities within the meaning of SEPP No 5 Housing for Older People or People with a Disability (now SEPP Seniors Living),
- (g) a group home within the meaning of SEPP No. 9 – Group Homes,
- (h) a retirement village,
- (i) any other purpose prescribed by the regulations (Section 100B of the Rural Fires Act 1997).

As such, asset protection zones widths are considerably greater, due to the need to provide a defensible space commensurate with such a facility, and therefore to provide a reduced exposure to the structures from radiant heat, as detailed within Table 2.

4.1.3 Commercial and industrial development

Those buildings defined as Class 5-8 and 10 of the Building Code of Australia (BCA) and which include building such as offices, factories, warehouses, public car parks and other commercial or industrial facilities are not required by the BCA to provide for any bushfire specific performance requirements. The general fire safety constructions provisions are taken as acceptable solutions. However the aims and objectives of PBP 2006 apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management.

4.1.4 Asset protection zone standards (RFS 2005)

Standards for the provisions of APZ's are published to provide detailed guidelines on the construction and maintenance of an APZ. PBP 2006 4.1.3 also provides guidance in the nature and establishment of an APZ. In simple terms an APZ is that space or buffer between a building and a bushfire hazard where the vegetation is managed such that a fire is not conveyed by the vegetation within the APZ towards the structure.

Within the APZ it is necessary that the ground or surface fuels are kept to a minimum by mowing or slashing and that clear separation exists between the tree canopies such that fire is not conveyed from the bushland interface to the structure. Landscaping within the APZ should conform to the requirements and guidance identified in Appendix 5 of PBP 2006 and further discussed in standards for asset protection zones (RFS2005).

4.1.5 Management of asset protection zones

As shown in figure 1 the common strategy adopted within the concept plan is the development of perimeter access roads adjacent to the bushland/hazard interface. Whilst the minimum APZ as required by PBP 2006, may be available from the hazard towards the dwelling/structure it is necessary that all of the available distance between the dwelling and the bushfire hazard is managed as an inner protection area. The asset protection therefore is likely to be comprised of three separate tenures: -

- a) Private property being the setback from the building/dwelling to the road reserve boundary
- b) The road reserve
- c) Public open space corridor

To provide for this tenure arrangement, so that the performance of the APZ overall is not compromised, it is necessary that the private lands be burdened within a Restriction as to User/Positive Covenant that requires the ongoing management of the APZ within the burdened property and further that a Plan of Management be developed, so that the performance and provisions of the APZ within the open space corridors is maintained.

There is also a necessity that the management and maintenance of the Public Road conforms to the requirements of PBP2006 appendix 5.

In addition to the consideration of the requirements in the provision of asset protection zones within the concept plan, it is also necessary to provide an understanding firstly of the performance requirements of an APZ and secondly of the ability to provide for the ongoing management of the APZ and the responsibility for that maintenance and management.

4.2 Construction standards and design

Previously identified is the linking of the separation of the building to the hazard and the minimum specifications for the provisions of an APZ within PBP 2006. These requirements form the basis of assessment of compliance with PBP 2006, however further bushfire protection measures are necessary, one being the recently adopted for New South Wales, Australian Standard for "Building in Bushfire Prone Lands" AS 3959-2009 and further amended by PBP 2006 Appendix 3.

*"This standard is primarily concerned with improving the ability of buildings to withstand attack from bushfire thus giving a measure of protection to the building occupants (until the front passes) as well as to the building itself."*²

In the context of the concept plan, the provision of APZ's in compliance with PBP 2006, is not the only consideration for the protection of any adjacent structures, an understanding of the intent and requirements of AS 3959-2009, is also necessary so as to optimise the outcome for future residents by considering at the concept plan stage likely levels of construction necessary so as to satisfy the interpretation of AS 3959-2009 and the addendum to Appendix 3 of PBP 2006.

This optimisation relates to the consideration of building setback within the property, road reservation width and location and management of any abutting bushfire hazard, so that the effect to the cost of construction of any future dwelling may be minimized.

The determination of the appropriate level of Bushfire Attack Level (BAL) is made from table A2.4.2 within the above standard, and subsequently the applicable level of construction to be applied to the building.

Table 1

Minimum Specifications Asset Protection Zones – Residential Development

(Refer to figure 4 for location of refer no.)

AS 3959-2009 Table A2.4.2

Ref No.	PBP 2006 Vegetation Type Table A 2.1	Effective Slopes	PBP 2006 APZ Table A2.4 (metres)	Concept Plan Design APZ	Bal 19.0 Min. separation
3	Woodland	D >0°->5°	15	29	29
4	Woodland	D >0°->5°	15	29	29
5	Woodland	D >0°->5°	15	29	29
6	Woodland	D >0°->5°	15	29	29
7	Woodland	D >0°->5°	15	29	29
8	Woodland	D >0°->5°	15	29	29
9	Woodland	Level	10	24.5	24
10	Woodland	Level	10	24.5	24
11	Woodland	D >0°->5°	15	29	29
13	Woodland	D >0°->5°	15	29	29

Table 2

Minimum Specifications Asset Protection Zones - Special Fire Protection Purposes (etc Schools)

Ref No.	PBP 2006 Vegetation Type Table A2.1	Effective Slopes	PBP 2006 APZ Table A2.6 (metres)
1	Woodland	Level	40
2	Woodland	D >0°->5°	50
12	Woodland	D >0°->5°	50

“D” = denotes hazard is downslope of reference point

“Bal” = building attack level expressed as kw/m²

4.3 Access standards

The intent of the bushfire protection measures within PBP 2006, in this regard is to “provide safe operational access to structures and water supply for emergency services while residents are seeking to evacuate from an area.”

The performance criteria to be satisfied within PBP 2006, is that: - “Public road widths and design that allows safe access for firefighters while residents are evacuating an area.”

To provide ongoing advice within this assessment the following information is outlined in PBP 2006, Chapter 4: -

PBP 2006 Extract – Public Road Acceptable Solutions

- Public roads are two-wheel drive, all weather roads.
- Urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb) allowing traffic to pass in opposite directions. Roads that are not perimeter roads can comply with the road widths within Table 4 below.
- The perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas.
- Traffic management devices are constructed to facilitate access by emergency services vehicles.
- Public roads have a cross fall not exceeding 3 degrees.
- Public roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres out radius turning circle and are clearly sign posted as a dead end and direct traffic away from the hazard.
- Curves of roads (other than perimeter roads) are a minimum inner radius of six metres and minimal in number, to allow for rapid access and egress.
- The minimum distance between inner and outer curves is 6 metres.
- Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.
- There is a minimum vertical clearance to a height of 4 metres above the road at all times.
- The capacity of road surfaces and bridges is sufficient to carry full loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicated load rating.
- Public roads greater than 6.5 metres wide to located hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression.
- Public roads between 6.5 metres and 8 metres wide are “No Parking” on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.
- Public roads up to 6.5 metres wide provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.

- *One-way only public access roads are no less than 3.5 metres wide and provide parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.*
- *Parking bays are a minimum of 2.6 metres wide from kerb to kerb edge to road pavement. No services or hydrants are located within the parking bays.*
- *Parking road directly interfacing the bushfire hazard vegetation provide roll top kerbing to the hazard side.*

Table 4.1 PBP 2006, provides the following criteria for the minimum width of roads that are not perimeter road for the safe access of firefighting vehicles in urban areas: -

Table 4.1 PBP 2006

Curve radius (inside edge)	Swept path width	Single lane width	Two way width
< 40m	3.5 m	4.5 m	8.0 m
40-69 m	3.0 m	3.9 m	7.5 m
70-100 m	2.7 m	3.6 m	6.9 m
> 100 m	2.5 m	3.5 m	6.5 m

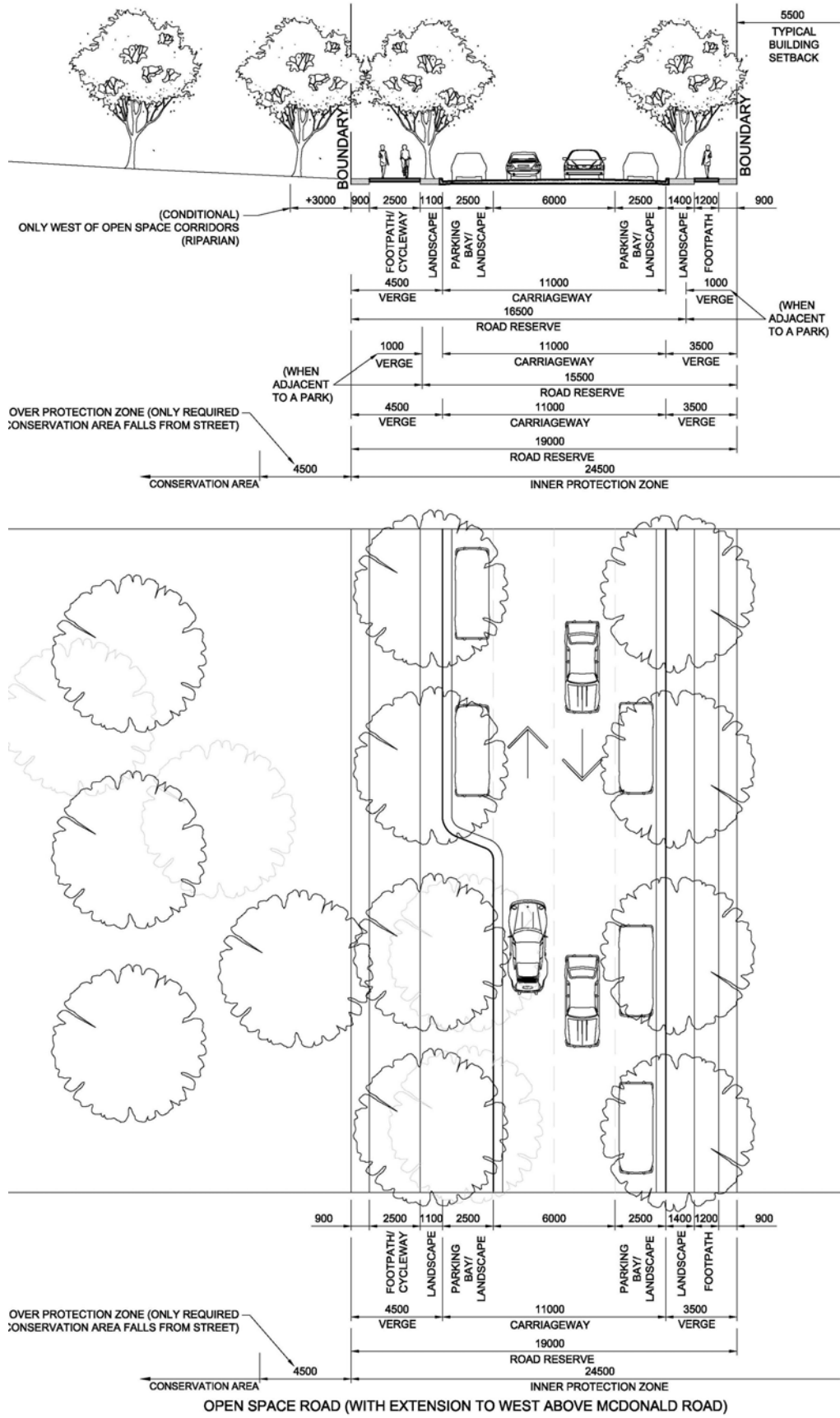
The concept plan provides for a typical cross section for perimeter roads is shown as Figure 6 and which defines the relationship and available separation distances between the bushfire hazard and any proposed dwelling in compliance with the acceptable solutions outlined in PBP 2006.

It is noted that the access to service the rural residential component off Zouch Road in the north western sector of the concept plan is shown as a blind access. Advice has been given that this road will be extended in the future to link to the future road network, and therefore meet the objectives of PBP 2006.

With regard to the proposed rural residential development adjacent to MacDonald's Road in the southern corner of the development, emergency access has been provided from the road network, westerly to Zouch Road.

J Wyndham Prince plan SK18

Figure 6



4.4 Public utilities

The provision of utilities services during a bushfire emergency is essential in supporting firefighting operations and the protection of residents. The provision of services such as gas and electricity should not contribute to the risk of fire to buildings.

The performance criteria and acceptable solutions outlined in PBP 2006 Chapter 4 and relevant to the development are: -

Performance Criteria	Acceptable solutions
<p>Reticulated water supplies</p> <ul style="list-style-type: none"> Water supplies are easily accessible and located at regular intervals 	<ul style="list-style-type: none"> Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads. Fire hydrant spacing, sizing and pressures comply with AS2419.1-2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases the location, number and sizing of hydrants shall be determined using fire engineering principles. Hydrants are not located within any road carriageway all above ground water and gas service pipes external to the building are metal, including and up to any taps. The provisions of parking on public roads are met.
<p>Electricity services</p> <ul style="list-style-type: none"> Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings 	<ul style="list-style-type: none"> Where practicable, electricity transmission lines are underground.
<p>Gas services</p> <ul style="list-style-type: none"> Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings 	<ul style="list-style-type: none"> Reticulated or bottled gas is installed and maintained in accordance with AS1596 and the requirements of relevant authorities. Metal piping is to be used. Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.

With regard to the Part 3A application it is understood that all services to be provided comply with the acceptable solutions outlined above. Reference is made to the provisions contained within PBP2006 in regard to the access to water reticulation and previously discussed in section 4.3 of this report.

It is considered necessary that during the detailed design stage, access to the Regional Park from the perimeter road network should be considered in regard to bushfire suppression and mitigation strategies and as a consequence water hydrants be provided adjacent to these access points, so as to limit the movement of vehicles during such operations.

4.5 Landscaping

The implementation and management of appropriately designed and managed landscaping within the APZ and adjacent to the building can assist in mitigating the impact of fire and reduce the potential for fire to be conveyed to the building and its immediate curtilage. The provision of such landscaping as a bushfire protection measure is outlined in Appendix 5 of PBP 2006.

The principles outlined in A5.3 PBP 2006 are: -

“The principles of landscaping for bushfire protection are to: -

- *Prevent flame infringement on the building*
- *Provide a defensible space for property protection*
- *Reduce fire spread*
- *Deflect and filter embers*
- *Provide shelter from radiant heat and reduce wind spread”*

Caird Ramsey & Lisle Rudolph in the publication “Landscape & Building Design for Bushfire Areas” 2003 defines fourteen attributes of vegetation which affect such fire attack. In summary these attributes are: -

- Moisture content of leaves
- Volatile oil content of leaves
- Mineral content of leaves
- Leaf firmness
- Density of foliage
- Community of plant form
- Height of lowest foliage above ground
- Size of plant
- Dead foliage on the plant
- Bark texture
- Quantity of ground fuels
- Fineness of ground fuels
- Compaction ability of ground fuels and
- Mineral content of ground fuels

With regard to the concept plan and the perimeter road designed within it these matters are considered significant in the plantings within the asset protection zones previously discussed. The performance of the APZ is therefore most dependant upon plantings not only within private property, but within the streetscape and enhancement plantings within adjoining open space, in particular, consideration is also necessary with regard to the type and application of mulches within the APZ. The design of any planting should consider not only the immediate presentation, but the plant formation in the context of the separation of tree canopies and the ability to act as a conduit for fire to traverse from any adjoining bushfire hazard, to the development, in years to come.

5.0 Other matters – Edmondson Regional Park

The SIMI in regard to the proposed Regional Park identifies bushfire management strategies and the need to prepare a fire management plan, whilst the management strategies indicate fuel management strategies within the regional park. It is assumed that these strategies will be linked to the protection and enhancement of biodiversity initiatives and the identified conservation values, and recreational needs.

In the preparation of the management plan, it is considered essential that for the orderly implementation of suppression and mitigation strategies that consideration is given to the provision of perimeter access within the regional park and the integration of such access within the residential neighbourhood.



Existing perimeter access, conservation area, west of Zouch Road

6.0 Conclusion

This bushfire risk assessment seeks to identify those matters, which require initiatives of the concept plan to comply with the requirements of the Director General of the Department of Planning in regard to bushfire risk.

Identified within the assessment is the determination of asset protection zones in accordance with the methodology and principles outlined in PBP 2006 and the ability and intent of the concept plan to comply with the provisions required by this determination. In addition an assessment is also made of the ongoing management of the particular asset protection zones.

The concept plan provides for a perimeter road system adjacent to open space and the proposed regional park so as to provide a separation of any proposed dwelling to the bushfire hazard of some 24 metres where the effective slope of the hazard is level and some 29 metres where the effective slope is downslope, as identified in figure 6 and Table 1.

This separation provides a likely construction level in accordance with AS 3959-2009 of BAL 19 with the available asset protection zone in excess of the minimum specification of PBP 2006.

The ability to provide further bushfire protection measures is also examined within the assessment and the compliance of the development in the provision of those measures is outlined in particular the requirements for landscaping and vegetation enhancement to comply with guidelines contained within Appendix 5, PBP 2006.

The NSW Rural Fire Service in a response to the Department of Planning, dated 5 August 2010 (Appendix 2), identified that in addition to the Director General's specific requirements in regard to compliance with PBP 2006, the Service has also commented on the ongoing management of the vegetation within the bushfire prone land adjoining the development, which does include open space corridors and the Edmondson Regional Park.

As discussed within the SIMI relating to the regional park, a bushfire management plan is required to be prepared and implemented for the Regional Park, and that in the plan of management for open space areas the inclusion of bushfire management measures will be required.

It is considered that the concept plan and the proposed development within that plan, are to be implemented in such a manner so as to comply with the requirements of PBP 2006 and hence the requirements of the Director General in this regard.

Guidelines are also discussed for ongoing consideration of the development stages of the release area, particularly the relationship between any proposed dwellings and the separation distance to the bushfire hazard in the determination of appropriate construction standards so as to comply with AS 3959-2009, and the Addendum to Appendix 3 of PBP 2006.

Brian L McKinlay *AFSM, GDip UWS, MISAust*
Surveyor Registered under the Surveying
& Spatial Information Act 2002

7.0 References

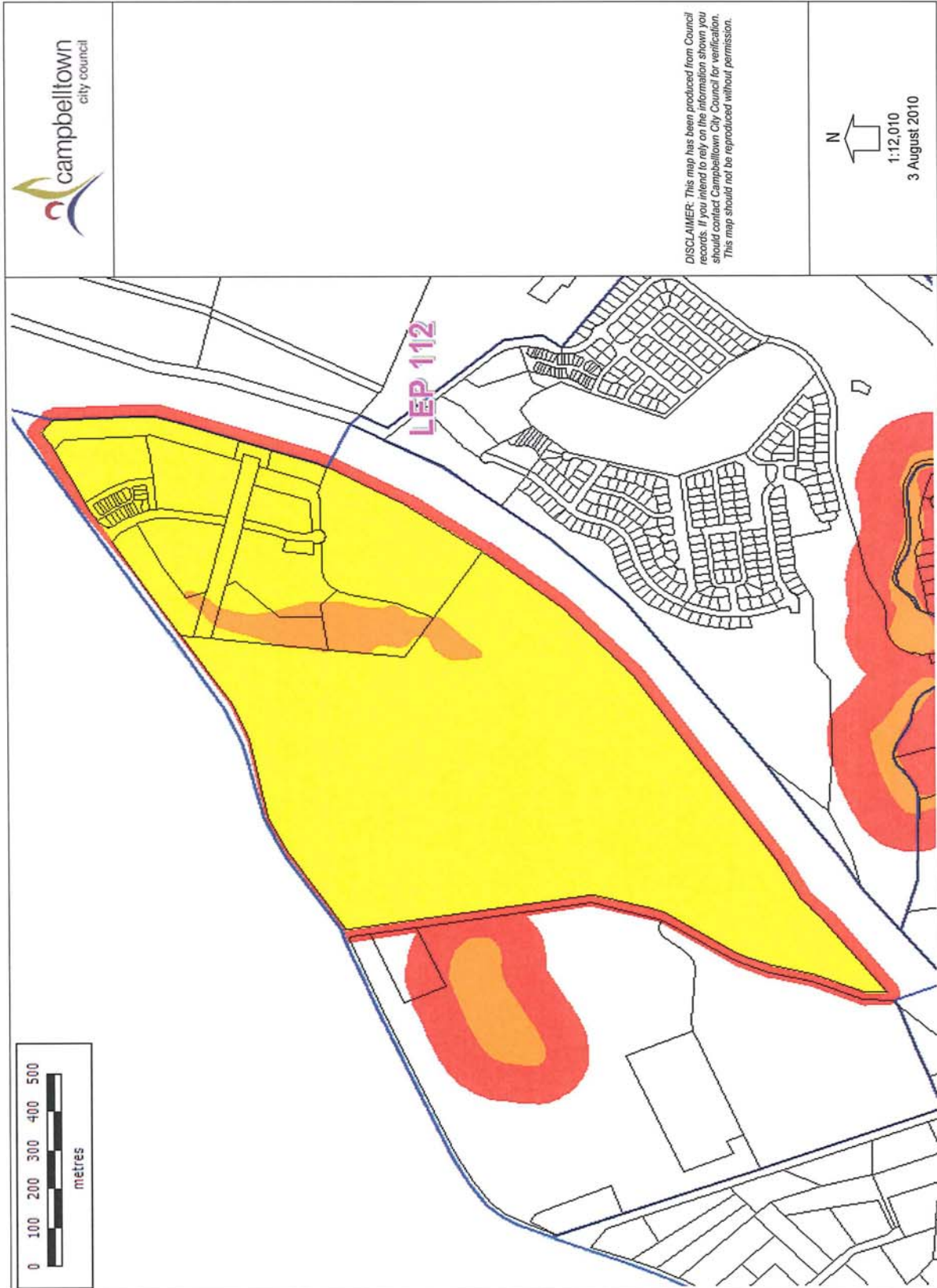
1. NSW RFS 2005 –Guidelines for the Mapping of Bushfire Prone Land
2. NSW RFS 2006 - Planning for Bushfire Protection, including addendum to Appendix 3
3. GC Ramsay, LS Rudolph 2003-Landscape and Building Design for Bushfire Areas
4. Standards Australia AS3959-2009 Construction of Buildings in Bushfire-Prone Areas

8.0 Bibliography

Rural Fires Act 1997
Environmental Planning and Assessment Act 1979
Keith 2004, Ocean Shores to Desert Dunes

Appendix 1

Liverpool City Council Bushfire prone land map sheet 4
Liverpool City Council Bushfire prone land map sheet 7
Campbelltown City Council Bushfire prone land map



Created by ccc on Wednesday, 28 July 2010

Appendix 2

NSW Rural Fire Service correspondence

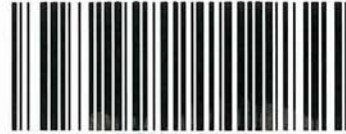
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PCU013378

Our Ref:

S10/0010
DA 10072271224

Transport Construction Authority
Department of Planning
GPO Box 39
SYDNEY NSW 2001

Attention: Anna Johnston

5 August 2010

Dear Ms Johnston,

Re: Edmondson Park

I refer to your letter dated 7 July 2010 seeking the NSW Rural Fire Service (RFS) requirements regarding bush fire protection for the preparation of Director General Requirements for the development at the above property.

The RFS has reviewed the preferred project plan and provides the following advice:

The RFS notes that a significant portion of the Edmondson Park site is identified as bush fire prone land on various Council bush fire prone land maps. The RFS advises that any proposed rezoning shall be undertaken with foresight that ensures future development will be able to meet the requirements of *Planning for Bush Fire Protection 2006* (PBP). Particular attention should be given to the proposed residential areas in the early planning stages to ensure compliance with asset protection zones, adequate provision of water, vehicle access/egress and supply of services such as gas and electricity is achievable for future development.

Additionally, fuel management within the Bush Fire Prone Areas should be carefully considered to combine protection from bush fire for the population of Edmondson Park whilst preventing the loss of endangered ecological communities that may be vulnerable to certain fuel management strategies.

For any enquiries regarding this correspondence please contact Doug Stevens.

Yours faithfully,

Nika Fomin
Team Leader - Development Assessment & Planning

