Town Planning Management Engineering

LANDCORP

Cockburn Central West

Fire Hazard Assessment

town planning
management
engineering
environmental

Research, Design & Delivery of Sustainable Development

14001P
June 2014
Version D

Town Planning Management Engineering Pty Ltd

DOCUMENT CONTROL

Project Number: 14105P

Project Name: Cockburn Central West Fire Hazard Assessment

Author: Geoffrey Lush

Date Created: 28th April 2014

Disclaimer
The measures contained in this report do not guarantee that a building will not be damaged in a bush fire. The ultimate level of protection will be dependent upon the design and construction of the buildings; the landowners' level of fire preparedness and the ongoing maintenance of the properties and reserves. The severity of a bush fire will depend upon the vegetation fuel loadings; the prevailing weather conditions and the implementation of appropriate fire management measures.

REVISION TABLE

Revision	Date	Purpose Issued For
A	7 May 2014	Draft for review
B	20 May 2014	Staging
C	26 June 2014	Wetland Concept Plan
D	27 June 2014	Stage 1A Plan

CONTENTS

FIGURES

1.0 Introduction

1.1 Background

TME Town Planning, Management, Engineering Pty Ltd has been engaged by LandCorp to prepare a fire hazard assessment and to provide preliminary bush fire management advice for the Cockburn Central West Structure Plan area.

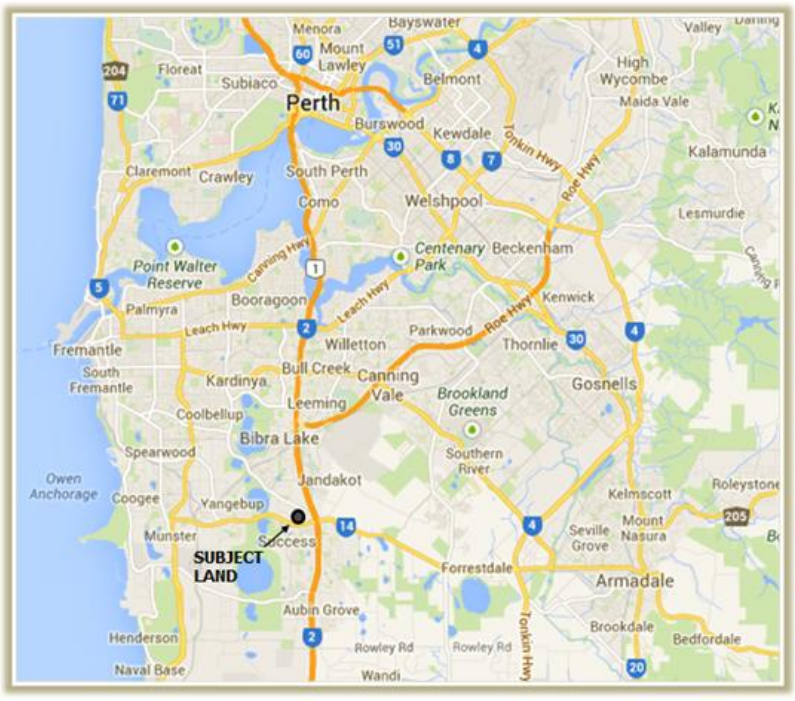
The subject land is located approximately 19 kilometres south of the Perth CBD and immediately to the west of Cockburn Central Town Centre as shown in Figure 1. It is bounded by Beeliar Drive; North Lake Road; Midgegooroo Avenue and Poletti Road.

The Cockburn Central West development will contain a variety of land uses; open space, recreational and mixed use (residential, commercial and retail) development consistent with being adjacent to the Cockburn Central Town Centre.

A key feature is the proposed Integrated Regional Recreational Facility to be developed by the City of Cockburn. This will be a purpose built facility with strong linkages to the adjacent primary AFL oval and the multi-purpose community open space area that will be shared with other sporting and tertiary education institutions. It will deliver a range of facilities, in particular an indoor and outdoor aquatic centre (1).

This report has been prepared to demonstrate that appropriate regard has been given to Planning for Bush Fire Protection Guidelines (2010) in the design and development of the subdivision. The aim is to reduce the threat of bush fires to the defined assets, the employees, visitors, the general public and fire fighters in the event of a fire within or adjacent to the subject land.

Figure 1 Location Plan



1 Cardno (2013) Draft Cockburn Central West Structure Plan Page (iv)

2.0 Existing Conditions

2.1 Existing Development

The subject land contains six allotments with a total area of 32.54 hectares as shown in Table 1. The existing conditions are shown in Figure 2 and the following photographs.

The site is currently undeveloped and with vegetated areas and a seasonal wetland located in the eastern portion of the site. There is a Western Power HV easement along the western boundary.

The Cockburn Central Town Centre is located to the east of the site and is still being developed. The land to the north currently consists of rural residential development which will be developed as high density residential/mixed use in the future.

The Gateways Shopping Centre precinct is located to the south east of the subject land. Land to the west of the site has been developed for mixed industrial purposes with residential development to the south west.

Table 1 Land Details

Lot	Plan	Owner	Area (ha)
1	D13057	WAPC	1.6902
53	P9782	WAPC	1.5327
54	P9782	WAPC	3.8228
55	D13057	WAPC	0.6106
804	P35222	WAPC	1.4581
1001	D83944	City of Cockburn	0.2524
9504	P57009	WAPC	21.419
Closed road			1.7554
Total			32.5412

2.2 Access

The site is accessible from multiple directions. It is situated in proximity to the Kwinana Freeway with access from Beeliar Drive and North Lake Road. Secondary access is also provided via Poletti Road.

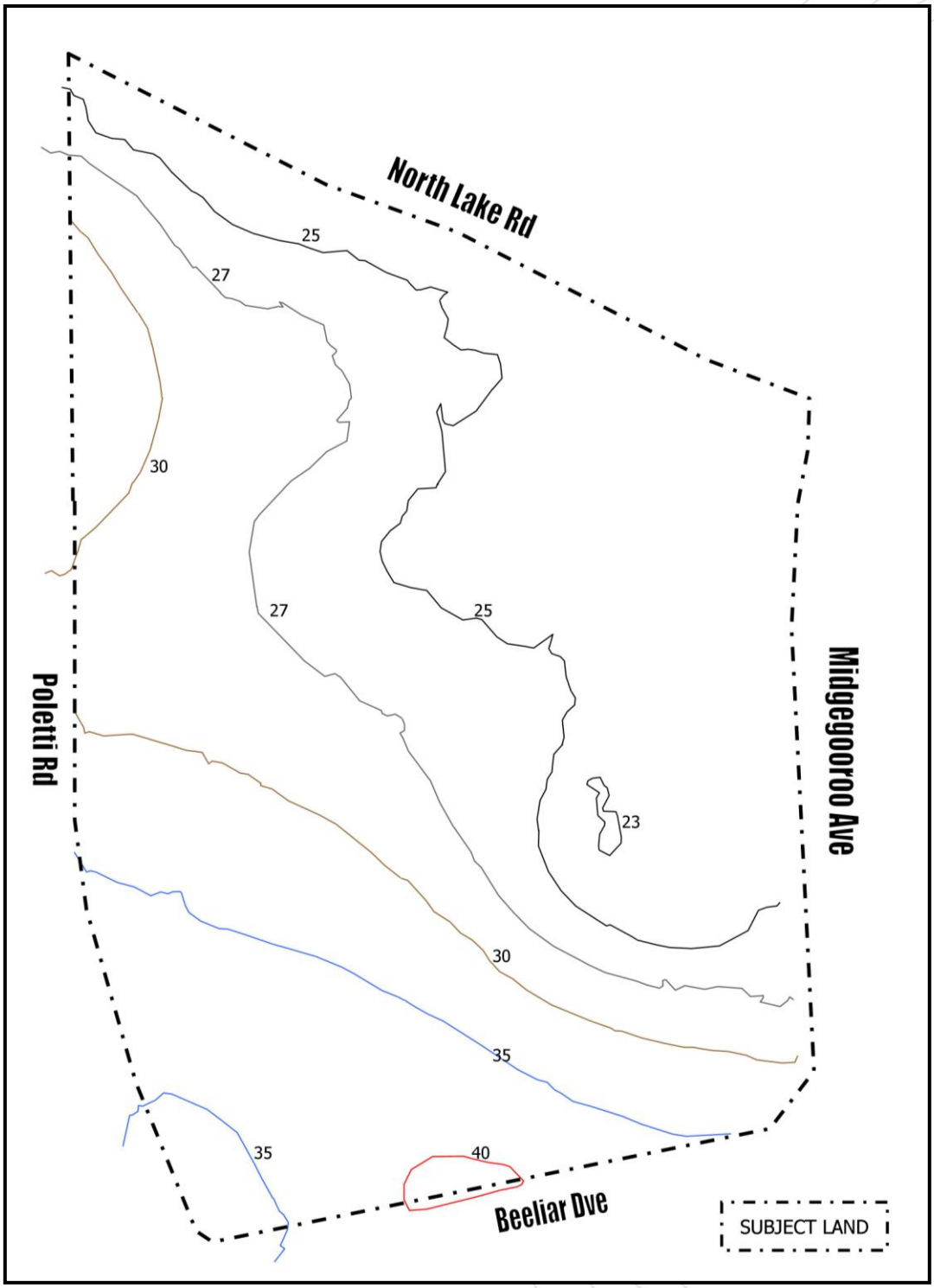
2.3 Topography

The contour levels for the site are shown in Figure 3. The site has an elevation of approximately 40m AHD in the south west corner decreasing to 23m AHD in the north eastern portion adjacent to Midgegooroo Avenue.

The gradients on the site are low with the majority of the site being relatively flat. The gradient then increases to the west and south western corner of the site and is less than 5 degrees.

Figure 2 Existing Conditions

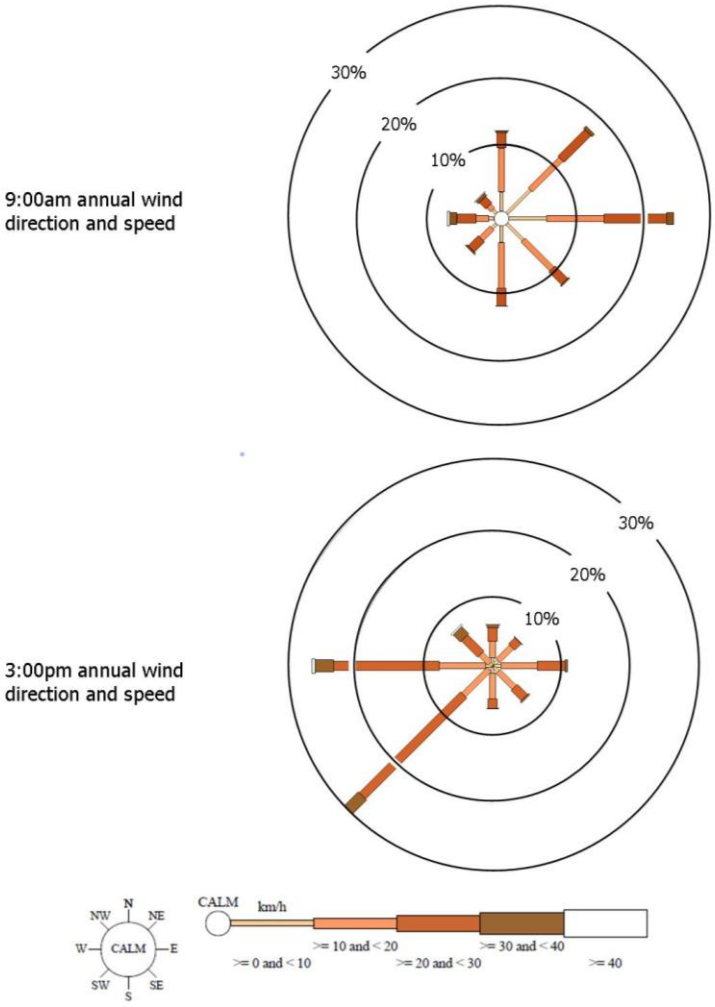
Figure 3 Contour Plan



2.4 Climate

The locality has a Mediterranean climate, which is characterised by hot dry summers and mild wet winters. The mean maximum temperature ranges from 17.8C in July to 31.5C in February. The mean minimum temperature ranges from 6.8C in July to 17C in February(2). There is an annual average rainfall of 826 mm.

The wind direction at 9:00am is generally from the east and at 3:00pm it is from the west and south west. Wind speeds are typically from 10 to 30 kph in the mornings and 25 to 40 kph in the afternoon. Strong sea breezes occur during late November to early March.



Source: Bureau of Meteorology Jandakot weather station (Site No 009172)

Figure 4 Annual Wind

2 Bureau of Meteorology – Jandakot Weather Station

2.5 Vegetation

A flora survey (3) was carried out at the site in 2011 and this identified eight vegetation units. The vegetation types were described using Keighery's (1994) vegetation structural classes as follows:

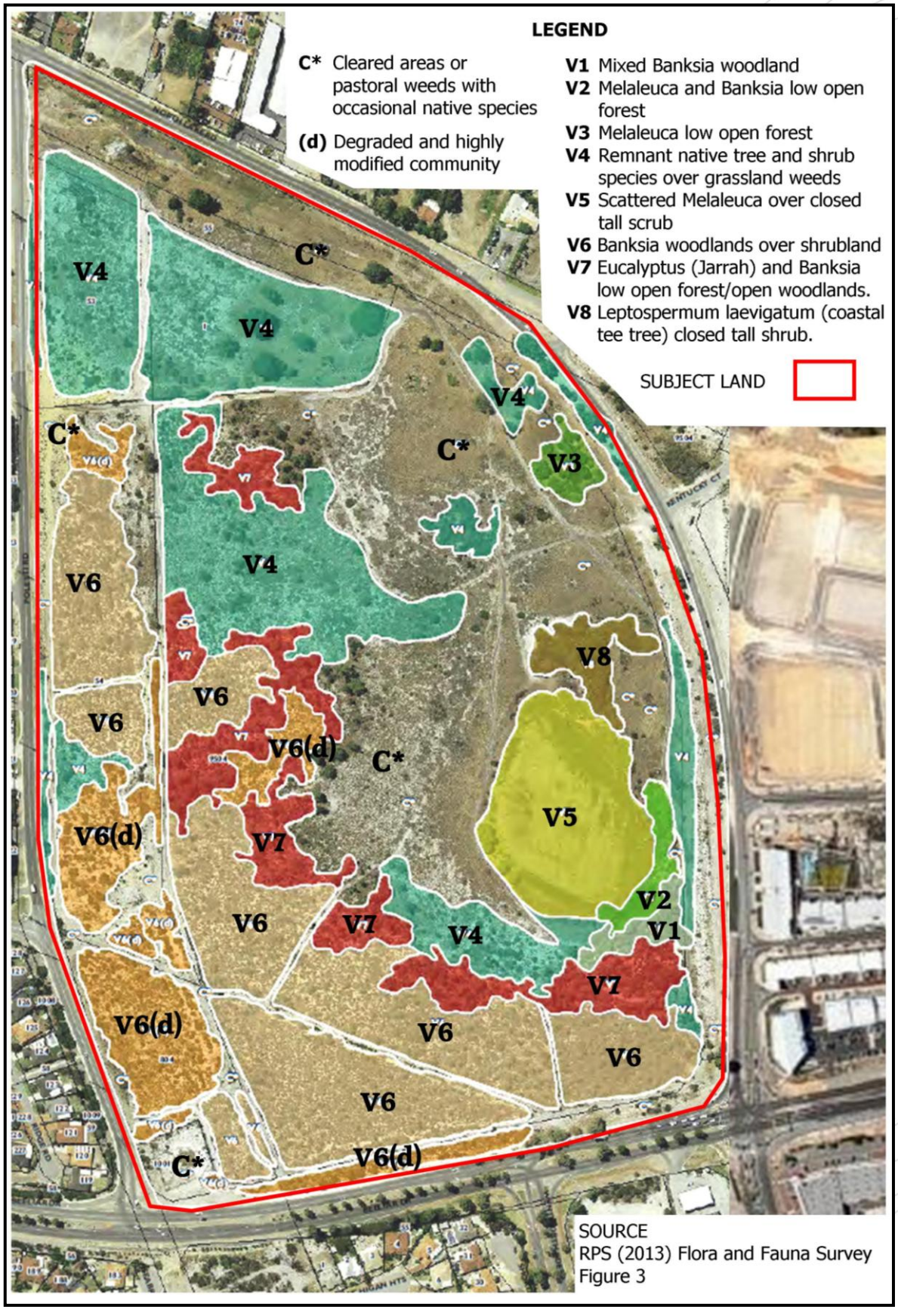
- Mixed *Banksia* spp. woodlands;
- *Melaleuca preissii* and *Banksia littoralis* low open forest;
- *Melaleuca rhaphiophylla* low open forest;
- Remnant native tree and shrub species over grassland weeds;
- Scattered *Melaleuca preisssiana* over closed tall scrub of *Astartea scoparia* and sedges;
- *Banksia* woodlands over shrubland;
- *Eucalyptus marginata* and *Banksia menziesii* low open forest/open woodlands; and
- *Leptospermum laevigatum* (weed) closed tall shrub.

The vegetation units are shown in Figure 5 and the survey report (page 21) describes the vegetation as:

> The majority of the project area is characterised by isolated native shrubs and or trees over weed species, areas consisting of remnant tree and or tall shrub species over grassland of *Ehrharta calycina, and cleared areas.
>
> These areas were rated Completely Degraded because the vegetation had no structure, was no longer intact and high densities of weed species were present. There are numerous historical sand tracks dissecting the project area which are cleared and almost devoid of vegetation or show limited signs of regeneration from natural recruitment of endemic species.
>
> The western extent of the project area has been previously disturbed by earthwork activities during the construction of overhead electrical transmission lines. Vegetation structure in this section of the project area was observed to be fragmented with the exception of an area of Banksia low woodland which was structurally intact and in Excellent condition. The Banksia woodlands (vegetation type V6) located in the southern portion of the project area were also considered to be in Excellent to Very Good condition. Weed species were generally in low densities and the diversity of native species was moderately high. It appears the southern area was also recently disturbed by fire (perhaps two to five years ago). Rejuvenation and recruitment of native species has been strong however several isolated tree deaths in this area may suggest the potential presence of dieback.
>
> The condition of the riparian vegetation surrounding the RE wetland was considered Disturbed. Weed densities were relatively high at some locations and aggressive exotic (weed) tall shrubs such as *Acacia longifolia and *Leptospermum laevigatum were recorded.

3 RPS (2013) Flora and Fauna Survey Report: Lots 1, 53 and 55 North Lake Road, Lot 54 Poletti Road and Lots 54, 804 and 9504 Beeliar Drive, Cockburn Central

Figure 5 Vegetation



Looking south west from North Lake Road noting the recent fire damage.

Looking east from Poletti Road

Banksia woodland adjacent to Poletti Road

2.6 Fire Services

The Success Fire Station is located approximately 2.5kms to the south of the site on Hammond Road opposite Frankenia Turn.

The principal method for implementing fire measures on developed land is through Council's annual Fire Control Order which requires the occupiers of all land to undertake fire prevention work as set out in the notice. The Order states that:

> Land, which is greater than 2032m^2 in area, shall have a trafficable firebreak three metres in width cleared to mineral earth and the property is to be maintained to the standard so stated for the duration of the period 30 November to 31 March of each year; subject to the following requirements:
>
> (a) immediately inside all external boundaries of the land; and
>
> (b) immediately surrounding all buildings (if any) situated on the land; and
>
> (c) immediately surrounding all fuel dumps and ramps (if any) on the land.

3.0 Policy Framework

3.1 Bush Fires Act 1954

The legal obligations of a landowner for fire management are contained within the Bush Fires Act 1954. Section 28 requires a landowner to take "all possible measures" to extinguish a bush fire occurring on their property.

Section 33 provides that a local government may require occupier of land to plough cultivate, scarify, burn or otherwise clear fire-breaks in such manner, at such places, of such dimensions, and to such number, and thereafter to maintain the fire-breaks clear of inflammable matter. This is commonly referred to as Council's Firebreak or Bush Fire Notice.

The Bush Fires Act is presently being reviewed by the State Government and a discussion paper has been released which in part promotes the need for land managers to have greater responsibility for hazard management on their land (4).

3.2 Risk Management

Emergency management in Western Australia is based upon four principal components being prevention, preparedness, response and recovery. The State Emergency Management Plan for Bushfire (5) summaries these as follows:

Prevention and Mitigation	Prevention activities eliminate or reduce the probability of occurrence and impact of bushfire.
Preparedness	Preparedness activities focus on essential emergency response capabilities through the development of plans, procedures, organisation and management of resources, training and public education.
Response	Response activities combat and contain the effects of the event, provide emergency assistance for casualties, help reduce further damage and help speed recovery operations. The highest priority in any response activity will be given to the preservation and protection of human life.
Recovery	Recovery activities, support emergency affected communities in reconstruction of the physical infrastructure and restoration of emotional, social, economic and physical wellbeing.

The main elements of the emergency risk management process are to establish the context, identify risks, analyse risks, evaluate risks (including acceptability of residual risk) and treat risks. Underpinning the process is a requirement for communication and consultation, as well as monitoring and review (6).

The approaches used to manage risk can include:-

- Risk avoidance by, for example, controlling where development occurs;
- Modifying the risk by, for example, using building design and construction guidelines:
- Spreading the risk by raising community awareness; and
- Managing the environment by, for example, fuel reduction and maintenance programs.

---

4 DFES (2014) Concept Paper: Review of the Emergency Service Acts.
5 SEMC (2010) Westplan – State Bushfire Emergency Management Plan page 11
6 Emergency Management Australia (2002) Planning Safer Communities – Land Use Planning for Natural Hazards Canberra, Emergency Management Australia Page 16

The City of Cockburn has a local emergency management plan (7) which documents emergency management arrangements and ensure an understanding between agencies and stakeholders involved in managing emergencies within the City.

Bushfires are identified as one of the highest priorities for emergency management planning.

3.3 SPP 3.4 Natural Hazards and Disasters

State Planning Policy 3.4 Natural Hazards and Disasters applies to the fire management of the proposed development. It will be considered by the Western Australian Planning Commission in the assessment of structure plans, amendments to Town Planning Schemes and subdivision applications.

The policy is based upon the principles contained in the report Planning Safer Communities prepared by Emergency Management Australia (8). It applies the principles of emergency risk management to land use planning.

State Planning Policy 3.4 incorporates by reference the provisions and requirements contained in the Planning for Bush Fire Protection Guidelines (2010).

3.4 Draft Bushfire Risk Management Framework

On the 2nd May 2014 the WAPC released a revised Bushfire Risk Management Framework which is comprised of a number of documents including:

a) State Planning Policy No. 3.7: Planning for Bushfire Risk Management; and

b) The Planning for Bushfire Risk Management Guidelines.

This policy will apply to all planning proposals located in bushfire-prone areas. Bushfire-prone areas may be identified in one of the following ways:

- When identified on a local government bushfire map, or
- When identified on the State Bushfire-Prone Area Map; or
- In the absence of either local or State Government maps, any land within 100 metres of an area of bushfire-prone vegetation equal to or greater than one hectare.

The policy promotes that it is critical for bushfire risk to be formally assessed as part of any amendment to rezone land, including the impact of any proposed bushfire management mechanisms. New development should provide the highest achievable level of protection from bushfire.

The Bushfire Risk Management Guidelines contain similar provisions to the current Planning for Bush Fire Protection Guidelines.

New bushfire regulations are proposed to be made under section 256 of the Planning and Development Act 2005 and these will apply to all planning schemes. These will establish uniform planning requirements to:

- Establish a designation power in local planning schemes for the purpose of implementing Australian Standard 3959;
- Provide a reference to the State Bushfire-Prone Area Map;
- Define "bushfire-prone area" to include land within 100m of an area of bushfire-prone vegetation equal to or greater than one hectare; and
- Modify existing planning exemptions in bushfire-prone areas to require that proposals for habitable development on land in a bushfire-prone area will be required to lodge a planning application where a Bushfire Attack Level of 40 or Flame Zone applies.

---

7 City of Cockburn (2009) Community Emergency Risk Management.

8 Emergency Management Australia (2002) Planning Safer Communities – Land Use Planning for Natural Hazards Canberra, Emergency Management Australia

3.5 Planning Bulletin 111

In December 2013 the Western Australian Planning Commission released Planning Bulletin 111 Planning for Bushfire. This is an interim bulletin pending the finalisation of the proposed State Planning Policy. The Bulletin reinforces:

- The need to apply the Planning for Bush Fire Protection Guidelines to planning strategies; schemes and amendments; structure plans; subdivision and development applications;
- The presumption against development in areas with an extreme fire hazard rating; and
- That the use of BAL- 40 and BAL – FZ construction standards is not acceptable.

The Bulletin also documents that many current practices are not suitable methods for applying AS3959 Construction standards. These include reference in a fire management plan; as a condition of development approval; as a local planning policy or in the firebreak notice.

3.6 Planning for Bush Fire Protection Guidelines

Planning for Bush Fire Protection (DFES & WAPC - 2010) is the principal reference document in Western Australia for fire management in subdivisions and related development in rural and in urban/rural communities.

Planning for Bush Fire Protection promotes five key principles which are summarised below:

Principle 1 Bush fire hazards must be considered in planning decisions at all stages of the planning process to avoid increased fire risk to life and property through inappropriately located or designed land use and development.

Principle 2 Local governments are to identify bush fire hazard levels in their structure plans, local planning strategies and local planning schemes, based on the bush fire hazard assessment methodology in the guidelines.

Principle 3 Subdivision and development in areas with an extreme bush fire hazard level or a bush fire attack level between BAL- 40 and BAL- FZ, is to be avoided unless specific fire protection requirements can be implemented to the satisfaction of the WAPC, DFES and/or the local government.

Principle 4 In areas with an extreme bush fire hazard level where more intensive subdivision/development is considered unavoidable, permanent hazard reduction measures need to be implemented to reduce the hazard level to low or moderate or bush fire attack levels between BAL- Low and BAL- 29.

Principle 5 Structure plans, subdivision and development in areas with a moderate to extreme bush fire hazard level needs to be supported by an assessment of the bush fire risk and compliance with the performance criteria and acceptable solutions set out in these guidelines.

The guidelines contain a set of performance criteria and acceptable solutions that new subdivision and developments are required to meet in bush fire prone areas. The main elements relate to:

1.0 Location:- hazard rating.

2.0 Vehicular access:- two access routes; public road design; cul-de-sacs; Battleaxes; private driveways; emergency accessways; fire access routes; gates; firebreaks and signs.

3.0 Water supply:- reticulated areas; non reticulated areas; and dams.

4.0 Siting of development:- hazard separation zones; AS3959 construction standards; building protection zones; and shielding.

5.0 Design of development:- compliant and non compliant development.

3.7 Australian Standard AS3959 (2009)

AS3959 Construction of Building in Bush Fire Prone Areas (9) provides measures for improving the ability of buildings to withstand burning debris, radiant heat and flame contact during a bush fire. The lower the separation distance from bushfire prone vegetation, the higher the standard of construction is required for buildings. The construction requirements relate to:-

- Subfloor Supports;
- Floor;
- External Walls;
- External Elements and Doors
- Roofs;
- Verandas, Decks, Steps; and
- Water and gas pipes.

The Standard contains six Bushfire Attack Levels (BAL) categories as follows:

BAL Low	The risk is considered to be very low and does not warrant any specific construction requirements.
BAL 12.5	The risk is considered to be low but there is still a risk of ember attack.
BAL 19	The risk is considered to be moderate. There is risk of ember attack and burning debris by wind borne embers and a likelihood of exposure to radiant heat.
BAL 29	The risk is considered to be high. There is an increased risk of ember attack and burning debris by wind borne embers and a likelihood of exposure to an increased level of radiant heat.
BAL 40	The risk is considered to be very high.
BAL FZ	The risk is considered to be extreme.

9 Standards Australia (2009) *AS 3959 – Construction of Buildings in Bush Fire Prone Areas.* Sydney. Standards Australia International Ltd.

4.0 Proposed Development (Assets)

The proposed subdivision of the land is shown in Figure 6. This shows twenty lots plus public open space and a community purpose reserve. There will potentially be 1,000 dwellings and the land use areas are as follows (10):

Mixed Use – residential, retail and commercial	8.3ha
Mixed Use – residential and commercial	3.5ha
Mixed Use – retail and commercial	0.5ha
Public Purpose – community integrated facility	2.6ha
Public purpose – utilities and infrastructure	6.5ha
Park recreation and conservation – public open space	5.8ha
Park recreation and conservation – drainage	1.2ha

It is envisaged that the majority of mixed use development over the site will be residential in nature (approximately 70-80%) with retail and commercial land uses located in some areas.

The Integrated Facility will be a purpose-built regional recreational with the following facilities:

- Professional sporting club administration and training facilities;
- Community indoor and outdoor aquatic centre incorporating aquatic recovery;
- Community gym;
- Indoor elite training centre/indoor community sporting courts;
- Tertiary facilities, specifically health sciences facilities;
- Conference centre; and
- Other commercial/community facilities aligned to the overall facility purpose (i.e. café and creche).

The proposed staging of the development is shown in Figure 6 and the landscape concept plan is shown in Figure 7. The proposed development plan for the wetland is shown in Figure 8.

Stage 1A is the first stage of the development for City of Cockburn's Recreational Facility over the central eastern portion of the site, adjacent to the public purposes reserve. This area will be cleared of all vegetation and earthwork to the appropriate levels. It is proposed that car parking will be constructed under Western Power's easement, with associated landscaping which will be maintained by the City.

Stage 1B covers the north west portion of the site with mixed use residential, retail and commercial developments. It will be cleared and earthworked at the same time as Stage 1A. The Western Power easement area is earmarked to contain both car parking for Cockburn's recreational facility and for the broader site.

Stage 2 of the development incorporates mixed use development adjacent to North lake Road, Midgegooroo Avenue and the wetland, which will be maintained by the City of Cockburn. It is currently proposed that the wetland landscape works are undertaken in this stage, which will require removal of some vegetation and weed species from the perimeter of the wetland to allow the installation of drainage treatment swales, which will be vegetated appropriately to ensure a low fuel zone.

Stage 3 is the final stage of development for the landholding, this area will be earthworked and cleared of vegetation. Lot 5 will remain as a balance title until appropriate services are delivered to the site, which is expected to be part of Stage 3 development works. It is proposed that the Western Power Easement is a maintained parkland/public reserve and used for drainage purposes.

---

10 Cardno Loc cit page 52

Figure 6 Subdivision Plan

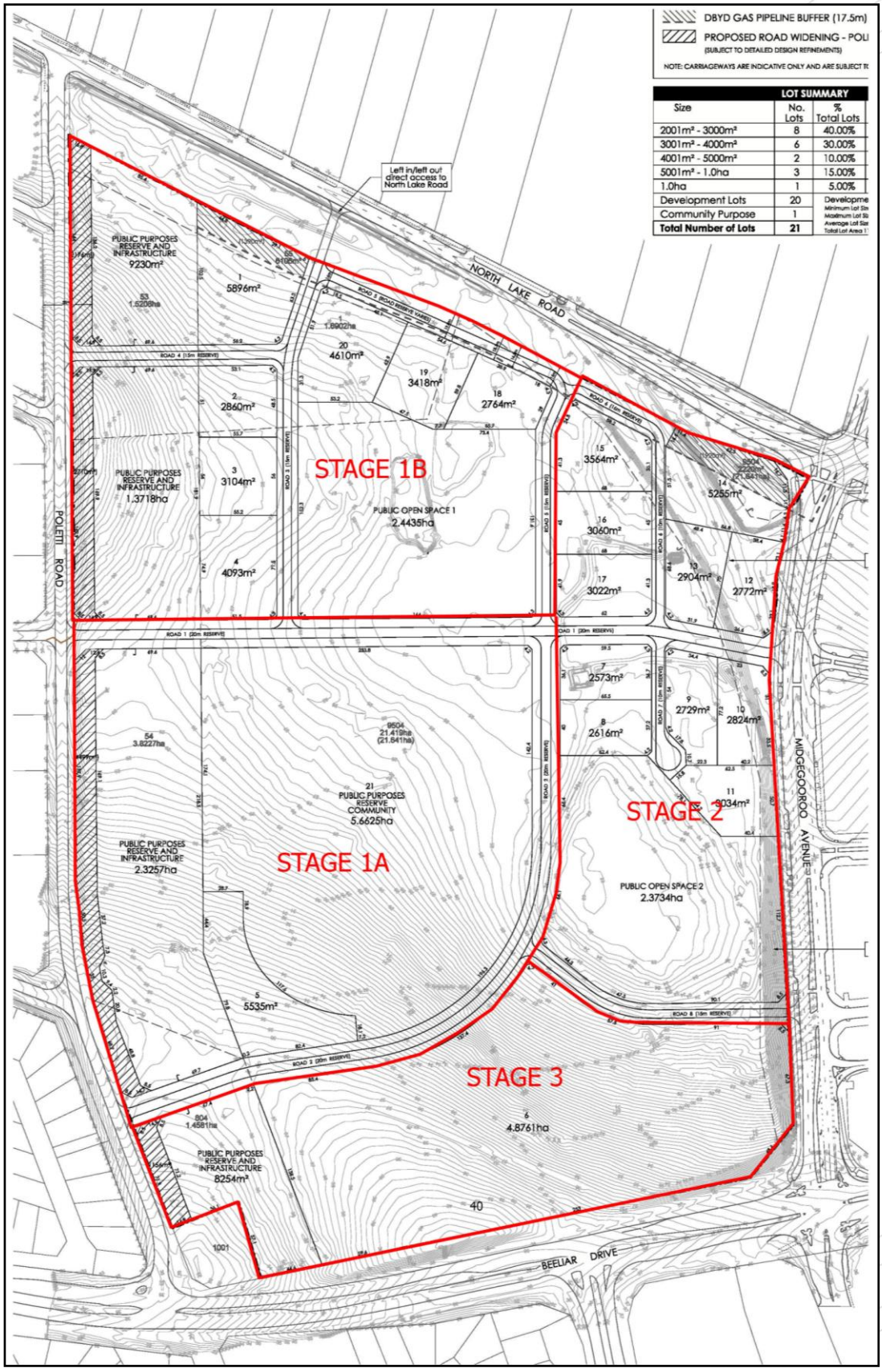


Figure 7 Landscape Concept Plan

Figure 8 Wetland Concept Plan

5.0 Bushfire Assessment

5.1 Bush Fire Season and History

The annual fire season extends from approximately mid October to mid May. This is the normal period where weather conditions are conducive to the ignition and spread of bushfires. The fire risk increases once vegetation has cured which is generally later in the season.

Council's emergency management (11) plan contains the following description:

> Bush Fires occur intermittently on an annual basis within areas of the City of Cockburn. The fire behaviour can range from very mild to unpredictable, dependant on fuel loads, and climatic conditions. A special note should be taken of the environmental changes taking place with global warming. Drying ground fuels and warming temperatures. The most severe fires may occur from October through to April. Fires in the City of Cockburn occur mainly during restricted burning times. There may be limited or no notification to the community at the initial stages of a fire, with the duration and impact being unpredictable.

Fires occur annually in the district with the most significant being the 2011 Perth Hills fire. More localised smaller fires occur each year and the most serious of these was the 2014 Aubin Grove fire to the south of the subject land.

A local fire also occurred on the subject land at this time as shown in the previous photographs.

5.2 Bush Fire Hazard

The bush fire hazard primarily relates to the vegetation on the site, the type and extent (area) of vegetation and its characteristics. Appendix 1 of the Planning for Bushfire Protection Guidelines provides the methodology for determining the bush fire hazard. This classifies vegetation based on tree height and the percentage of canopy cover. There are 28 vegetation types which are classified into the following seven groups:

A – Forest;
B – Woodland;
C – Shrubland;
D – Scrub;
E – Mallee/Mulga;
F – Rainforest; and
G – Grassland.

The characteristics of the different hazard categories (12) are:-

Low hazard areas will generally be:

- areas devoid of standing native vegetation (less than 0.25 ha cumulative area);
- areas which due to climatic or vegetation (eg rainforest) conditions, do not experience bush fires;
- inner urban or suburban areas with maintained gardens and very limited native standing vegetation (less than 0.25 ha cumulative area); or
- pasture or cropping areas with very limited native standing vegetation that is a shrubland, woodland or forest.

11 City of Cockburn (2009) Loc cit page 123
12 FESA (2010) Planning for Bush Fire Protection Guidelines Page 18

Figure 9 Fire Hazard Plan

Moderate hazard areas will generally be:

- areas containing pasture or cropping areas with slopes in excess of 10°;
- open woodlands;
- open shrublands;
- low shrubs with slopes of less than 10° or flat land; or
- suburban areas with some native tree cover.

Extreme hazard areas will generally be forests; woodlands or tall shrubs.

Figure 9 shows the bush fire hazard rating for the subject land based upon the above classifications.

- The cleared areas are classified as having a low hazard rating. This will occur where the grasslands / paddock area are managed by cropping, grazing or slashing prior to the fire season so that the grasses do not exceed 100mm in height.
- The uncleared areas are classified as having an extreme fire hazard rating; and
- The semi cleared paddock areas are classified as a moderate fire hazard rating.

5.3 Bush Fire Risk

Bush fire risk is usually measured in terms of likelihood and consequences (13).

The likelihood of the risk occurring is classified (14) as; almost certain; likely; possible; unlikely; or rare. The likelihood of a bush fire occurring is determined by a number of factors including:-

a) Frequency of Fire Season i.e. annual;

b) Length of Annual Fire Season i.e. how many months;

c) Slope Steepness – the steeper the slope the greater the fire hazard;

d) Vegetation Type – forest or pasture;

e) Vegetation Annual Driest State – if reaching 100% cured;

f) Fire History – how often do fires occur;

g) Development Density – this refers the amount of vegetation to be retained and so as the density increases (with existing remnant vegetation) so does the hazard until a threshold is reached where the density means that the vegetation is removed.

h) External access around and to the site is very good. The provision of vehicular access into the vegetation corridor will further assist in managing the fire risk; and

i) Effectiveness of Fire Fighting Service – the more effective the fire service is the lower the risk.

The consequence arising from a bush fire might be insignificant, minor, moderate, major, or catastrophic.

5.4 Bush Fire Threat

The threat from a bush fire is the product of the hazard and risk.

There are three identified bush fire threats which could impact upon the development of the subject land. These are:-

1. Fire originating from external sources;
2. Fire originating from within the property; and
3. Structural (building) fires.

---

13 COAG (2011) *National Strategy for Disaster Resilience* Page 20
14 FESA (2005) *Western Australian Emergency Risk Management Guide* Appendix 1 Page 23

In relation to the above types of fire:

a) Type 1 threats would be a fire originating in the adjoining Bush Forever site and other undeveloped land.

b) Type 2 threats relate to the internal vegetation and how it is being managed. It can also occur as a result of industrial or motor vehicle accidents.

c) Type 3 threats relate to structural fires. The provision of fire hydrants is the normal management measure and any response to a structural fire would come from the Fire and Rescue Service.

The most likely causes of fire are either from lightning strikes or from human activity. Many fires are started deliberately i.e. arson.

The threat of a bushfire occurring increases when there is a high chance of ignition due to the amount of fuel, the extent of vegetation curing (drying out) the temperature; relative humidity and wind speed. This is referred to as the "fire danger index" which represents the difficulty of controlling a bushfire.

6.0 Fire Management Issues

The hazard assessment shown in Figure 9 is based upon the undeveloped land. The development of the site will inherently remove most of the bush fire hazard.

As the subject land is surrounded by existing development, the primary fire management issue relates to any vegetation which is proposed to be retained on the site and areas where revegetation may occur. In particular:

a) Around the perimeter if Stage 1A including the existing wetland; and

b) The Western Power easement adjacent to Poletti Road.

A BAL Low rating (15) can be applied when/to:

(a) Vegetation of any type that is more than 100m from the site.

(b) Single areas of vegetation less than 1ha in area and not within 100m of other areas of vegetation being classified.

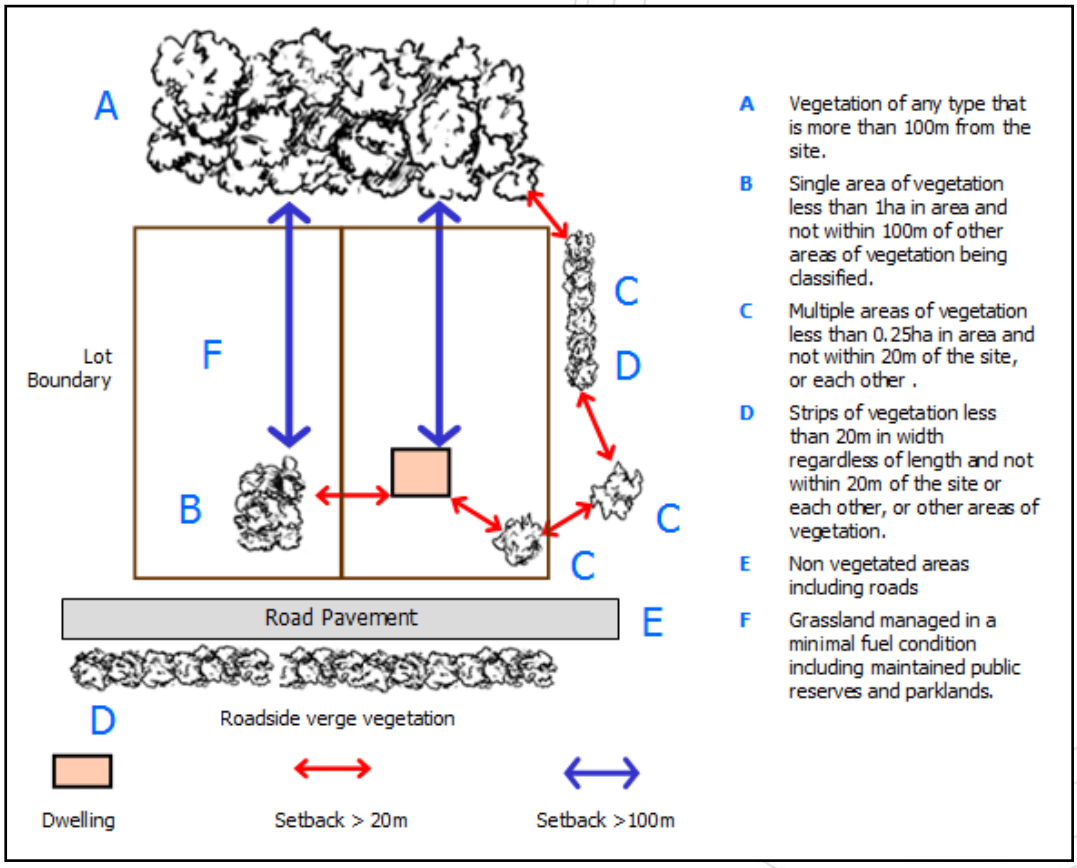
(c) Multiple areas of vegetation less than 0.25ha in area and not within 20m of the site, or each other.

(d) Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site or each other, or other areas of vegetation being classified.

(e) Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops.

(f) Low threat vegetation.

Figure 10 Low Threat Vegetation



15 AS3959 Loc cit Clause 2.2.3.2

Low threat vegetation is defined in AS3959 as grassland managed in a minimal fuel condition, maintained lawns, golf courses, **maintained public reserves and parklands**, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks. This is shown diagrammatically in Figure 10.

Photographs of maintained public reserves, parklands and bushland areas with low fuel loadings are shown on the following pages.

The interface to Stage boundaries must be managed to ensure that there are no temporary fire threats while the development is being constructed. The simplest means of managing this is to provide a low fuel buffer separating the vegetation from the development as shown in Figure 11.

In order to ensure that the buildings in Stage 1A have a BAL Low rating (with no specific construction requirements) it is necessary for the vegetation on the undeveloped stages within 100m of any proposed buildings is managed as a hazard separation zone.

LandCorp is proposing to clear all the vegetation with the exception of the wetland area. The wetland will be rehabilitated and the surrounding parkland (as shown in Figure 8) will be developed in Stage 2. In the interim it is proposed to maintain the wetland as a low hazard zone subject to the approval of Council.

If the easement remains undeveloped with the existing vegetation then it will be a bush fire hazard and it will be necessary to design the development in accordance with the Planning for Bush Fire Protection Guidelines including:

- Ensuring that buildings within 100m of the vegetation are constructed in accordance with AS3959;
- Providing individual building protection zones;
- Potentially providing boundary firebreaks and access for emergency vehicles.

If the easement is developed i.e. for car parking or maintained as "low threat" vegetation, then there is no bush fire hazard because this land would have a BAL Low rating.

It is proposed that the balance of the land under the easement will be maintained parkland/public reserve. LandCorp's preference is to reduce the BAL rating under the easement to Low, rather than push the onus of compliance with the Bush Fire Protection Guidelines and AS3959 on to the development within the site.

The landscape master plan can be designed to comply with the definition of 'managed parkland' through the spacing and selection of appropriate species. Existing vegetation can be maintained in cells having a maximum area of 2,500sqm with a 20m separation between each cell.

This design approach is shown in Figure 12.

Figure 11 Stage 1A Measures

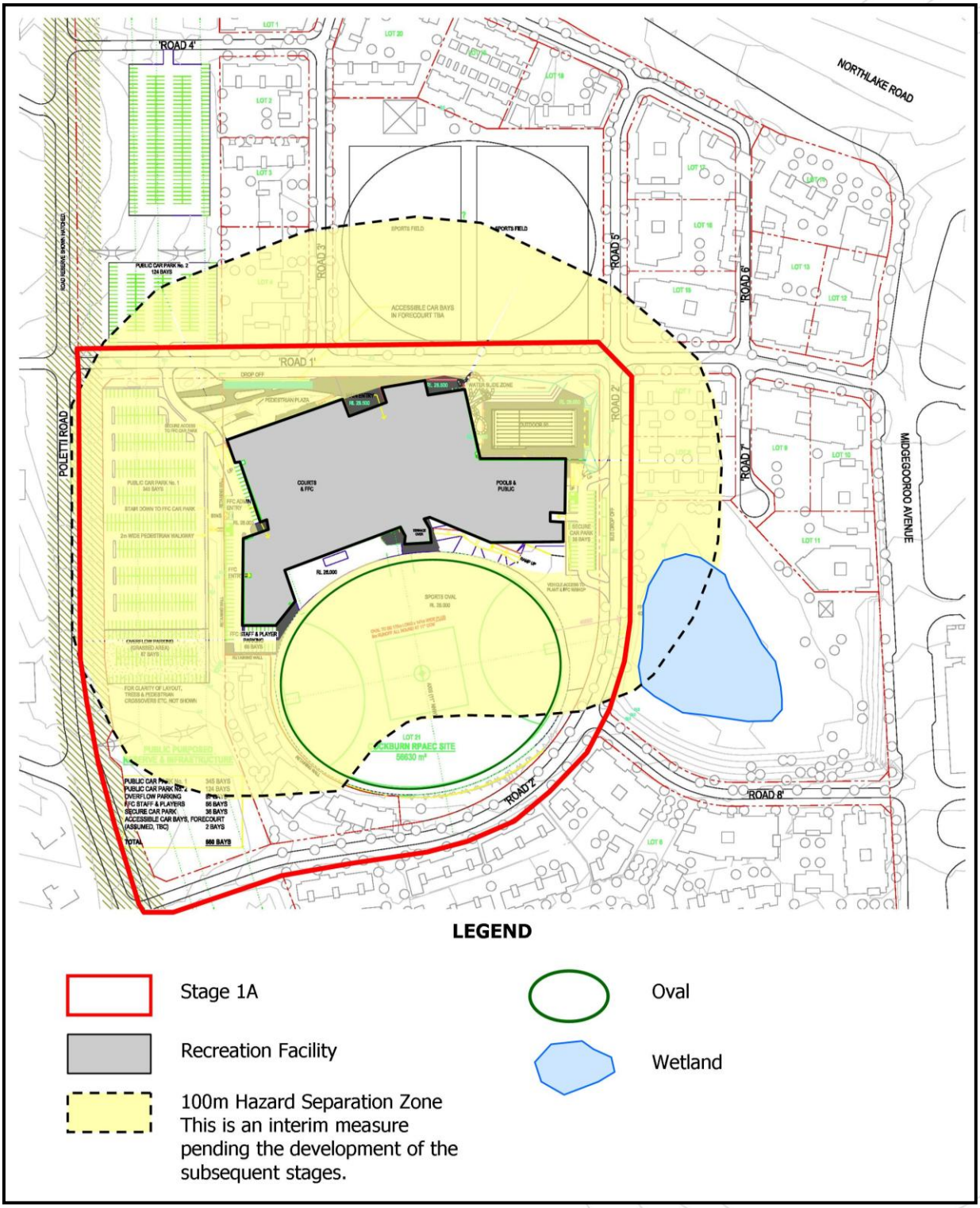


Figure 12 Low Threat Vegetation Cells

Parkland cleared reserves with low fuel loadings

Developed public open *space*

Drainage multiple us corridors

Drainage corridors and wetland revegetation

7.0 Conclusion

The purpose of this report is to assess:

1. The bush fire hazard for the undeveloped land; and
2. Whether this hazard will remain for the final proposed development and if so can suitable fire management measures be applied.

The development is introducing substantial values (property and people) which must be protected from the risk posed by bushfires. The development forms part of the Cockburn Central Townsite and will contain mixed uses and recreation facilities.

The principal fire management issue relates to the future development and management of any vegetation within the Western Power easement. The existing vegetation is currently a fire hazard not only to the intended development but also to the existing development on the western side of Poletti Road.

In accordance with Guidance Principle 4 of the Planning for Bush Fire Protection Guidelines the development will result in permanent hazard reduction by the removal of the vegetation hazard.

Provided that the Western Power easement and other landscaping/revegetation areas are developed and maintained as "low threat" vegetation, then the bush fire hazard rating for the subject land will be low.

Recommendations

1. That a 100m hazard separation zone be provided to the main building in Stage 1A as shown in Figure 11. This includes, subject to Council's approval, maintaining the western portion of the wetland as a low fuel zone.
2. That the Western Power easement be managed as parkland / low threat vegetation as shown in Figure 12.
3. **That subject to Recommendations 1 and 2 the development in Stage 1A will have a low bush fire hazard level and it is not necessary for it to comply with the Planning for Bush Fire Protection Guidelines.**
4. That in the event that the Western Power easement is not managed as low threat vegetation, then it will be necessary to prepare a fire management plan for the development and to ensure that buildings situated within 100m of the hazard vegetation are provided with appropriate fire protection and constructed to an approved BAL rating.
5. That any staging of the development must consider the management of the vegetation on the balance of the land and provide a 100m hazard separation zone.
6. That individual landowners must still comply with Council's Fire Control Order.

8.0 Bibliography

Cardno (2013) *Draft Cockburn Central West Structure Plan*

City of Cockburn (2009) *Community Emergency Risk Management.*

Department of Fire and Emergency Services (2012) *Prepare Act Survive* Perth DFES

Ellis, S, Kanowski, P & Whelan, R (2004*), National Inquiry on Bushfire Mitigation and Management,* Canberra. Council of Australian Governments.

Emergency Management Australia (2002) *Manual No 7 Planning Safer Communities – Land Use Planning for Natural Hazards* Commonwealth Attorney General's Department

FESA (2005) *Western Australian Emergency Risk Management Guide* FESA Perth

FESA (2007) *Visual Fuel Load Guide.* Perth. Fire & Emergency Services Authority of Western Australia.

FESA (2010) *Planning for Bush Fire Protection.* Perth. Western Australian Planning Commission.

FESA (undated) *Homeowner's Bush Fire Survival Manual*.

Handmer J. & Haynes K. (Eds).(2008). *Community Bushfire Safety*. Collingwood CSIRO Publishing.

Keelty M (2011) *A Shared Responsibility – The Report of the Perth Hills Bushfire February 2011 Review* Government Printer Perth

Keelty M (2012) *Appreciating the Risk – Report of the Special Inquiry into the November 2011 Margaret River Bushfire* Government Printer Perth

Leading Emergency Services (2011) *Major Incident Review, Lake Clifton, Roleystone and Red Hills Fires*

Ramsay C & Dawkins D (1993) *SAA HB36-1993 Buildings in Bushfire Prone Areas – Information and Advice.* Sydney. Standards Australia International Ltd.

Ramsay C & Rudolp L (2006) *Landscape and Building Design for Bushfire Areas.* Collingwood CSIRO Publishing.

RPS (2013) *Flora and Fauna Survey Report: Lots 1, 53 and 55 North Lake Road, Lot 54 Poletti Road and Lots 54, 804 and 9504 Beeliar Drive, Cockburn Central*

Schauble J. (2004) *The Australian Bushfire Safety Guide*. Harper Collins. Sydney

Standards Australia (2005) *DR 05060 Construction of buildings in bushfire—prone areas (Revision of AS 3959-1999)*. Sydney. Standards Australia International Ltd.

Standards Australia (2009) *AS 3959 – Construction of Buildings in Bush Fire Prone Areas.* Sydney. Standards Australia International Ltd.

Standards Australia (2009) *AS/NZS ISO 31000 Risk Management- Principles and Guidelines* Sydney. Standards Australia International Ltd.

State Emergency Management Committee (2005) *Westplan – State Bushfire Emergency Management Plan*. FESA Perth

Victorian Bushfires Royal Commission (2010) *Final Report* Government Printer Melbourne

WAPC (2006) *State Planning Policy 3.4 – Natural Hazards and Disasters*

Webster J (2012) *Essential Bushfire Safety Tips* CSIRO Publishing Collingwood