



Fire Management Plan

Alkimos City Centre and Central

Prepared for
Roberts Day
by Strategen

July 2015



STRATEGEN
environmental consultants

Fire Management Plan

Alkimos City Centre and Central

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July 2015

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Client: Roberts Day

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1. Introduction

1.1 Background

LandCorp is proposing to develop Alkimos City Centre and Alkimos Central located in the City of Wanneroo. Roberts Day has prepared and lodged Local Structure Plans (LSPs) for each site, which designate a significant proportion of land for future residential and commercial use. An overview of the proposed land use concept is outlined in Figure 1.

Both sites are currently undeveloped and vegetated and a significant proportion of this vegetation is proposed to be retained in the form of on-site Regional Open Space (ROS) and Public Open Space (POS). In addition, much of the surrounding landscape is vegetated. These areas of vegetation currently pose a bushfire risk to future assets of the development and will require a suitable management response.

Strategen has been commissioned to prepare this Fire Management Plan (FMP) to inform proposed development of Alkimos City Centre and Alkimos Central. The FMP will guide ongoing bushfire protection of each site and ensure a suitable, compliant and effective bushfire management outcome is achieved.

This FMP has been prepared in accordance with *Planning for Bush Fire Protection Guidelines Edition 2* (PFBFP Guidelines; WAPC et al. 2010) with consideration of *Draft State Planning Policy 3.7 Planning for Bushfire Risk Management* (DoP & WAPC 2014) and accompanying draft guidelines. The FMP is for submission to City of Wanneroo (CoW). An FMP compliance checklist is contained in Appendix 1.

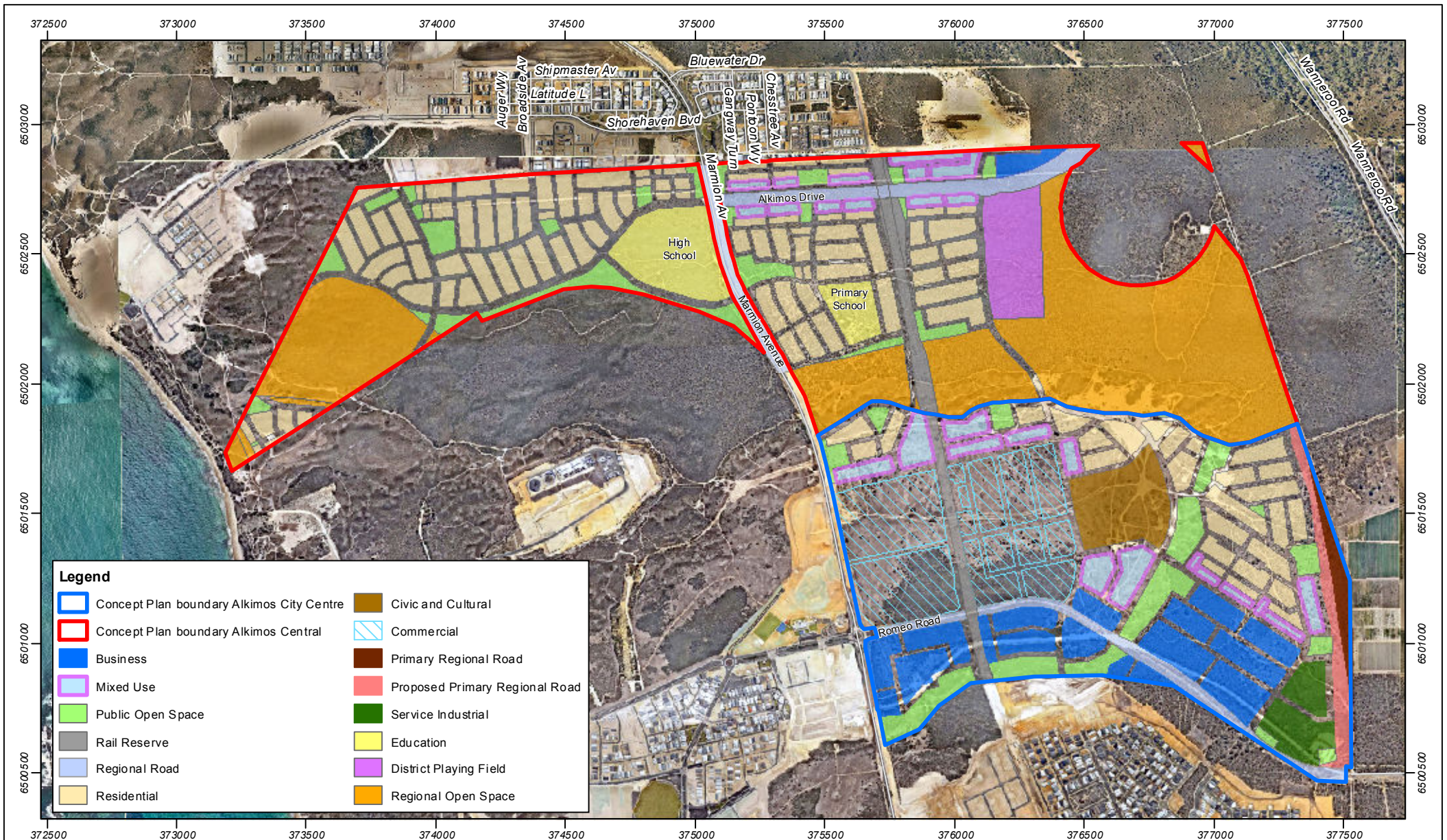
1.2 Purpose and application of the plan

The purpose of this document is to provide guidance on how to plan for and manage the bushfire risk to the Alkimos City Centre and Alkimos Central developments through implementation of a range of bushfire risk treatment and mitigation measures. The FMP outlines how future on-site assets can be protected during the summer months when the threat from bushfire is at its peak. This is particularly relevant when existing fire appliances in the area may be unable to offer a timely emergency suppression response. Therefore, the developer should aim to ensure future on-site assets are self-protecting from bushfire.

Implementation of the FMP is a shared responsibility between the developer, CoW and prospective landowners to ensure bushfire risk treatment and mitigation measures are adopted and implemented on an ongoing basis to achieve bushfire management objectives.

1.3 Stakeholder consultation

Strategen has undertaken consultation with the developer, CoW and Department of Fire and Emergency Services (DFES) to ensure aims and objectives of the FMP are in accordance with stakeholder expectations and the FMP maintains compliance with PFBFP Guidelines.



Legend

Concept Plan boundary Alkimos City Centre	Civic and Cultural
Concept Plan boundary Alkimos Central	Commercial
Business	Primary Regional Road
Mixed Use	Proposed Primary Regional Road
Public Open Space	Service Industrial
Rail Reserve	Education
Regional Road	District Playing Field
Residential	Regional Open Space

Figure 1 Concept Plans: Alkimos City Centre and Central Alkimos

Scale 1:20,000 at A4

Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 17/06/2015
 Author: JCrute
 Source: Client 2015

2. Aim and objectives

2.1 Aim

The aim of the FMP is to achieve a reduction in the occurrence of uncontrolled bushfires and minimise potential impacts on life and property of the proposed development through the following:

- quantifying the bushfire hazard and assessing the bushfire risk
- documenting bushfire prevention requirements to provide ongoing protection to future residents, visitors and built assets of the subject land
- identifying bushfire protection issues, appropriate strategies and those persons and/or organisations who have a responsibility to implement the FMP
- complying with PFBFP Guidelines and maintaining compatibility with bushfire management on neighbouring subdivisions
- providing guidance for the developer, CoW and prospective landowners to protect the subject land and on-site assets in the event that fire appliances may be unavailable to offer a timely bushfire suppression response.

2.2 Objectives

Key objectives of the FMP and the relevant section of this document in which they are addressed are outlined in Table 1.

Table 1: Key objectives of the FMP

Objective	Section
Define areas where values are located	Section 3.6
Define and rank fire hazard areas	Section 4.2.1
Propose bushfire risk treatment and mitigation measures, with due regard for life, property and the environment	Section 5
Nominate individuals and organisations responsible for fire management and associated works	Table 5
Provide acceptable solutions for all fire management works in order to meet the relevant performance criteria outlined in PFBFP Guidelines (e.g. development location, vehicular access, water supply, siting of development and design of development)	Section 5

3. Description of the area

3.1 General overview

The proposed Alkimos City Centre and Alkimos Central development sites (referred to collectively hereon as the 'project area') comprise Part Lots 9003 and 9002 Marmion Avenue, Alkimos in the City of Wanneroo (Figure 2). The project area is approximately 17 km north of Joondalup Strategic Metropolitan Centre and 40 km north of the Perth Central Business District.

Marmion Avenue traverses the centre of the project area in a north-south direction and the project area is otherwise bound by the following, as depicted in Figure 3:

- urban development at Shorehaven to the north
- urban development at Trinity to the south
- vegetated undeveloped lots and agricultural lots to the east
- Water Corporation Wastewater Treatment Plant (WWTP), vegetated WWTP buffer, urban development at Alkimos Beach and proposed urban development at Alkimos Coastal Village to the west.

The bushfire hazard and risk associated with the on-site and surrounding vegetation will be assessed as part of this FMP to determine the level of mitigation response required to protect future life and property assets of the proposed development and maintain compliance with PFBFP Guidelines.

3.1.1 Development context and fire management planning

FMPs were prepared to support each of the Alkimos City Centre and Alkimos Central LSP submissions (Don Spriggins Forestry Consultants 2012a, 2012b). However, these FMPs did not include detailed fire management measures due to the high level context of the early planning stage in which they were prepared. More detailed fire management planning is required to meet the full suite of compliance requirements outlined in PFBFP Guidelines. This includes provision of detailed Bushfire Attack Level (BAL) requirements and location of the Building Protection Zone (BPZ).

Alkimos is subject to significant urban development projects and the ongoing development is expected to continue for many years. As a result, a large proportion of the project area and adjacent land will transition from the current vegetated status to a predominant urban development footprint. The vegetation extent earmarked for future clearance and urban development is therefore considered a temporary bushfire hazard and will be removed at some future stage.

The temporary bushfire hazard that affects the site will be managed in accordance with PFBFP Guidelines. However, the developer has the opportunity to delay portions of the development affected by temporary bushfire hazard until that hazard has been removed in order to negate the requirement for a bushfire management response.

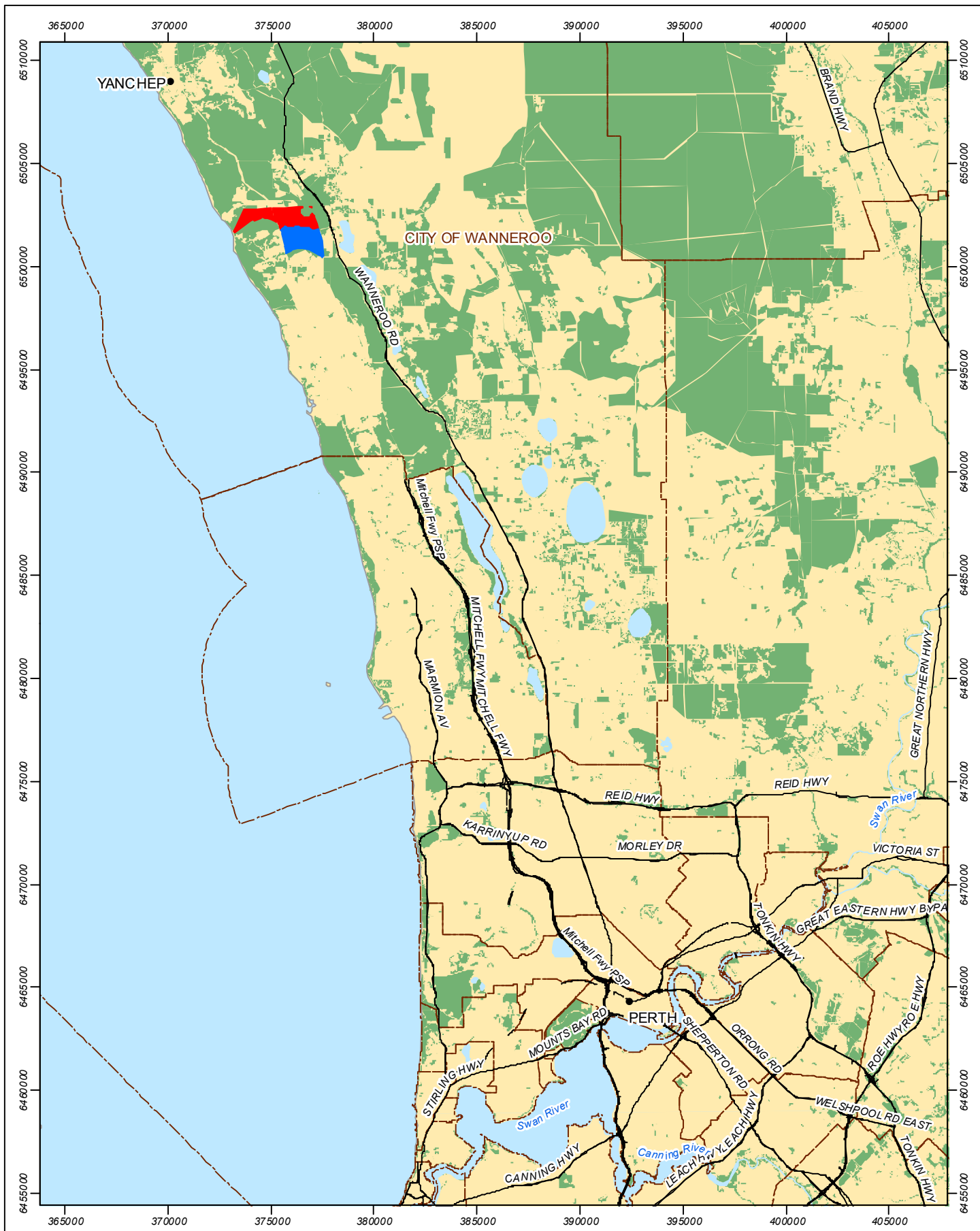


Figure 2 Regional location

Scale 1:250,000 at A4



Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 17/06/2015

Author: JCrute

Source: Topography: Geoscience Australia 2011.



Legend

- Town
- Major road
- Major river
- Lakes
- Native vegetation
- ▭ Local government boundary
- Concept Plan boundary Alkimos City Centre
- Concept Plan boundary Alkimos Central



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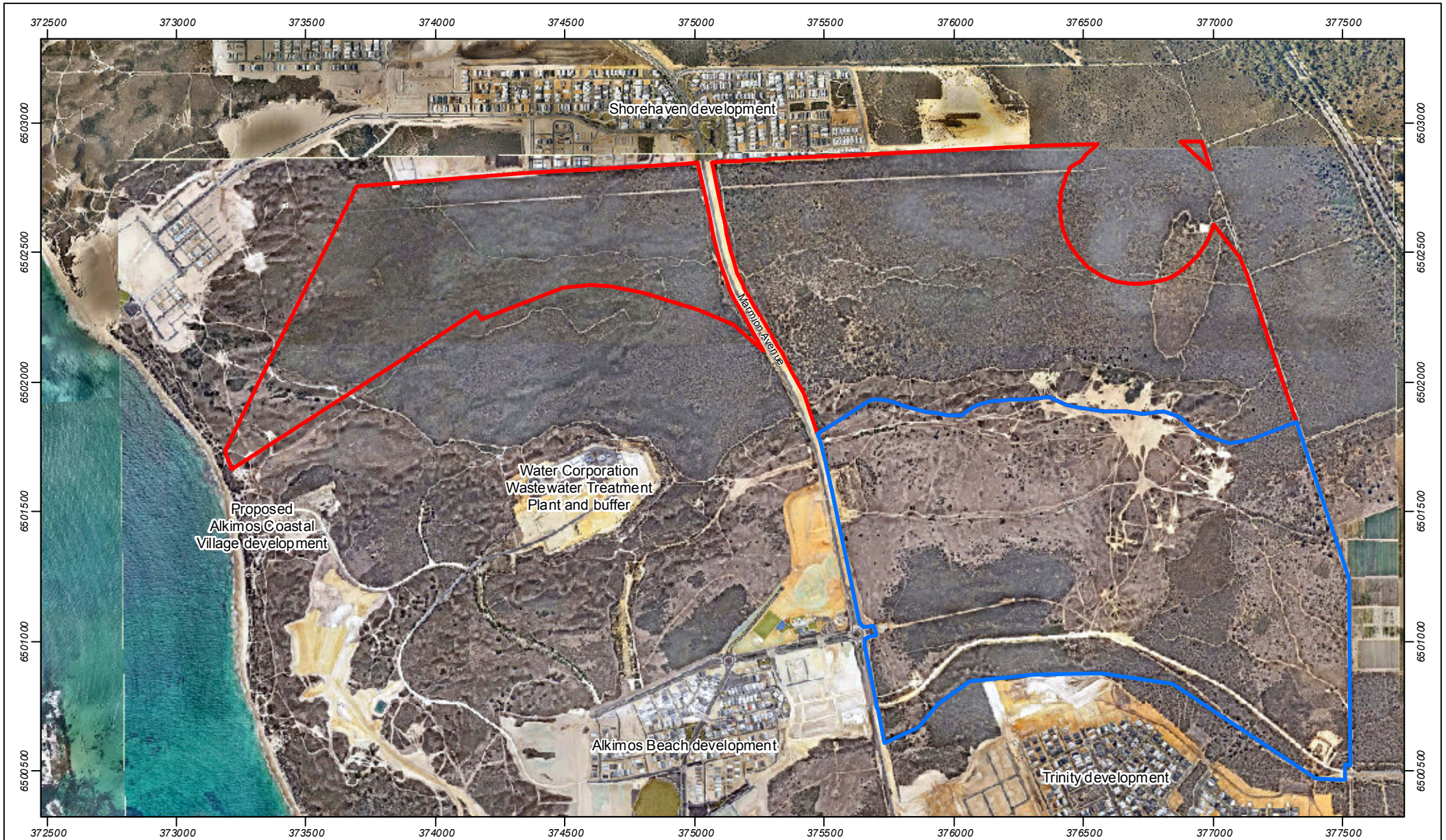


Figure 3 Site overview

Scale 1:20,000 at A4
 0 100 200 300 400 500 m

Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 17/06/2015
 Author: JCrute
 Source: Client 2014.

Legend

- Concept Plan boundary Alkimos City Centre
- Concept Plan boundary Alkimos Central



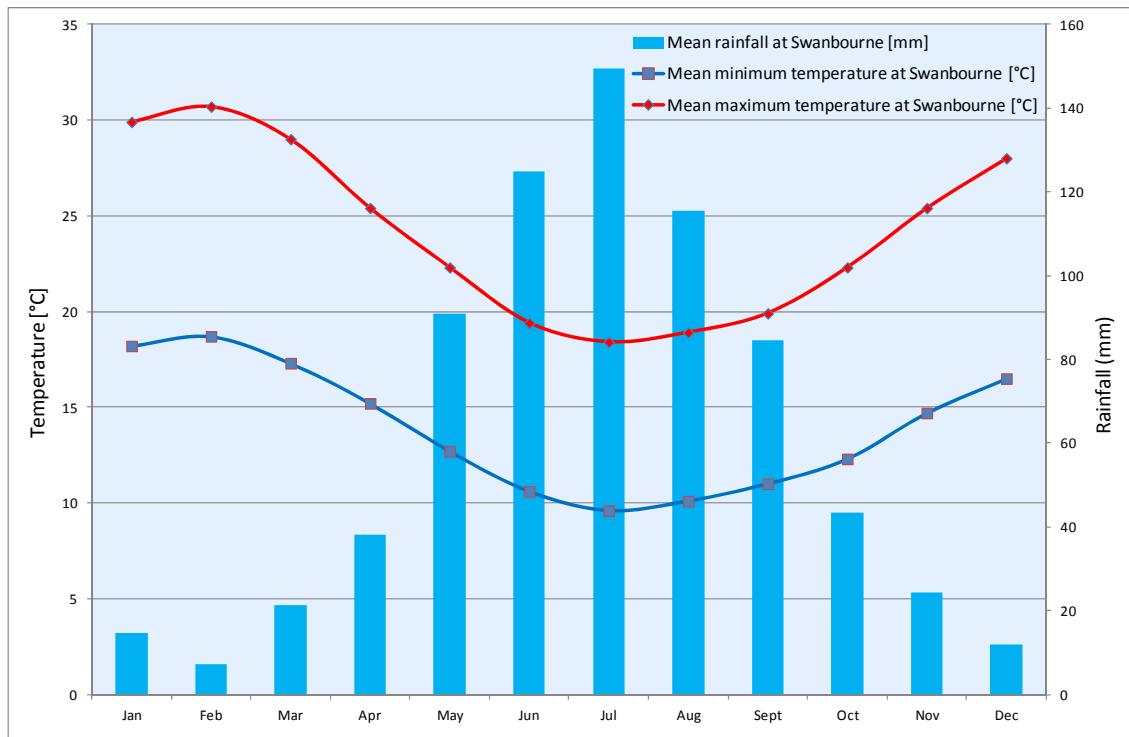
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3.2 Local climate

The Alkimos locality experiences a Mediterranean climate characterised by mild, wet winters and warm to hot, dry summers. The Bureau of Meteorology (BoM) weather station at Swanbourne (Station No. 9215, located approximately 35 km south of Jindalee) is the nearest weather station to the project area that provides the full range of climate statistics for the Perth Metropolitan coastline. Mean monthly climate statistics for Swanbourne are outlined in Figure 4.

Mean annual rainfall recorded at Swanbourne since 1993 is 717.7 mm (BoM 2015). Rainfall may occur at any time of year; however, most occurs in winter in association with cold fronts from the southwest. Highest temperatures occur between December and March, with mean monthly maximums ranging from 28°C in December to 30.7°C in February (BoM 2015). Lowest temperatures occur between June and September, with average monthly minimums ranging from 9.6°C in July to 11°C in September (BoM 2015).



Source: BoM 2015

Figure 4: Mean monthly climate statistics for Swanbourne (Station No. 9215)

3.2.1 Worst case fire weather conditions

Southwest Western Australia generally experiences a cool to mild growing season in the months of August through to November of each year, followed by four months of summer drought conditions, which is when the potential for bushfire occurrence is at its peak.

The worst fire weather conditions occur during this dry period when a low pressure trough forms off the west coast and strong winds develop from the north or northeast. These conditions are sometimes associated with 'Extreme' or 'Catastrophic' fire dangers, which are consistent with very high temperatures, low relative humidity and very strong winds. Based on the predominant summer climatic conditions of the local area, 'Extreme' and 'Catastrophic' fire dangers occur less than 5% of the time during the designated bushfire season, which equates to around six days between December and March (McCaw & Hanstrum 2003).

3.2.2 Predominant fire weather conditions

Predominant fire weather conditions are considered to occur 95% of the time during the designated bushfire season. These conditions generally align with average January climatic conditions for the locality.

Mean 9:00 am and 3:00 pm January wind profiles for Swanbourne are contained in Appendix 2. These illustrate that the predominant winds during the designated bushfire season are from the east in the morning averaging around 20 km/h; and from the southwest in the afternoon averaging around 28 km/h (BoM 2015).

Mean 9:00 am and 3:00 pm relative humidity for Swanbourne during the designated bushfire season is 53% and 55% respectively, with mean monthly maximum temperatures peaking at around 31°C (BoM 2015). These predominant fire weather conditions correlate with an average fire danger index of 'High', as determined using the Commonwealth Science and Industrial Research Organisation Fire Danger and Fire Spread Calculator (CSIRO 1999).

3.2.3 Potential bushfire scenarios

There are numerous bushfire scenarios that could eventuate due to the amount and location of vegetation retained within and adjacent to the project area. The highest risk bushfire scenarios that could affect the site are as follows:

1. Bushfire occurrence to the northeast of the site: there is a long fire run of dense woodland vegetation in this direction. Ignition under extreme or catastrophic fire danger conditions (i.e. very high temperatures, very low relative humidity and very strong easterly/north-easterly winds) is likely to direct a fire front towards the project area from the northeast. This bushfire scenario is likely to impose high levels of radiant heat and ember attack at the urban-bushland interface.
2. Bushfire occurrence within Alkimos WWTP buffer to the west of the site: there is a long fire run of woodland and shrubland vegetation in this direction. Ignition under standard afternoon weather conditions in summer (i.e. moderate to high temperatures, moderate to low relative humidity, moderate to strong westerly/south-westerly winds) is likely to direct a fire front towards the project area from the west/southwest. This bushfire scenario is not considered as high risk as point 1 above, but is still likely to impose high levels of radiant heat and ember attack at the urban-bushland interface.

3.3 Landform and topography

The project area is located on the coastal belt of the Swan Coastal Plain within the Quindalup and Spearwood dune systems. Younger sandy areas and limestones are dominated by heath and/or tuart woodlands, while Banksia and Jarrah-Banksia woodlands are found on the older dune systems (McKenzie et al. 2003). The project area has highly undulating topography due to the parabolic dunal system on which it lies (Emerge 2013a). Topographic contours of the project area and adjacent land are depicted in Figure 5 and a description of each land area is provided below.

The Alkimos City Centre site ranges in height from 29 mAHD (Australian Height Datum) to 55 mAHD. The southern arm of the parabolic dune runs from the northeast through to the southwest of the site. This dune ranges in height between 30 mAHD and 55 mAHD and has steep side slopes. The site has a predominant northwest aspect on the windward side of the parabolic dune up to the parabolic dune. The leeward side of the parabolic dune varies from a south to south-easterly aspect (Emerge 2013a)

The north-eastern portion of the Alkimos Central site is situated on a parabolic dune that runs along the southern boundary of the site. The site ranges in height from 50 mAHD in the southeast (associated with the northern arm of the parabolic dune) to 15 mAHD in the centre, rising again to 40 mAHD in the west. A low corridor runs north-south through this portion of the site, associated with Marmion Avenue. The site has a predominant north-easterly aspect (Emerge 2013b).

Due to the highly undulating nature of the dune systems, the majority of vegetation in the area is subject to slope in the range of >0–10 degrees. This information is discussed in further detail as part of the BAL assessment outlined in Section 4.2.3.

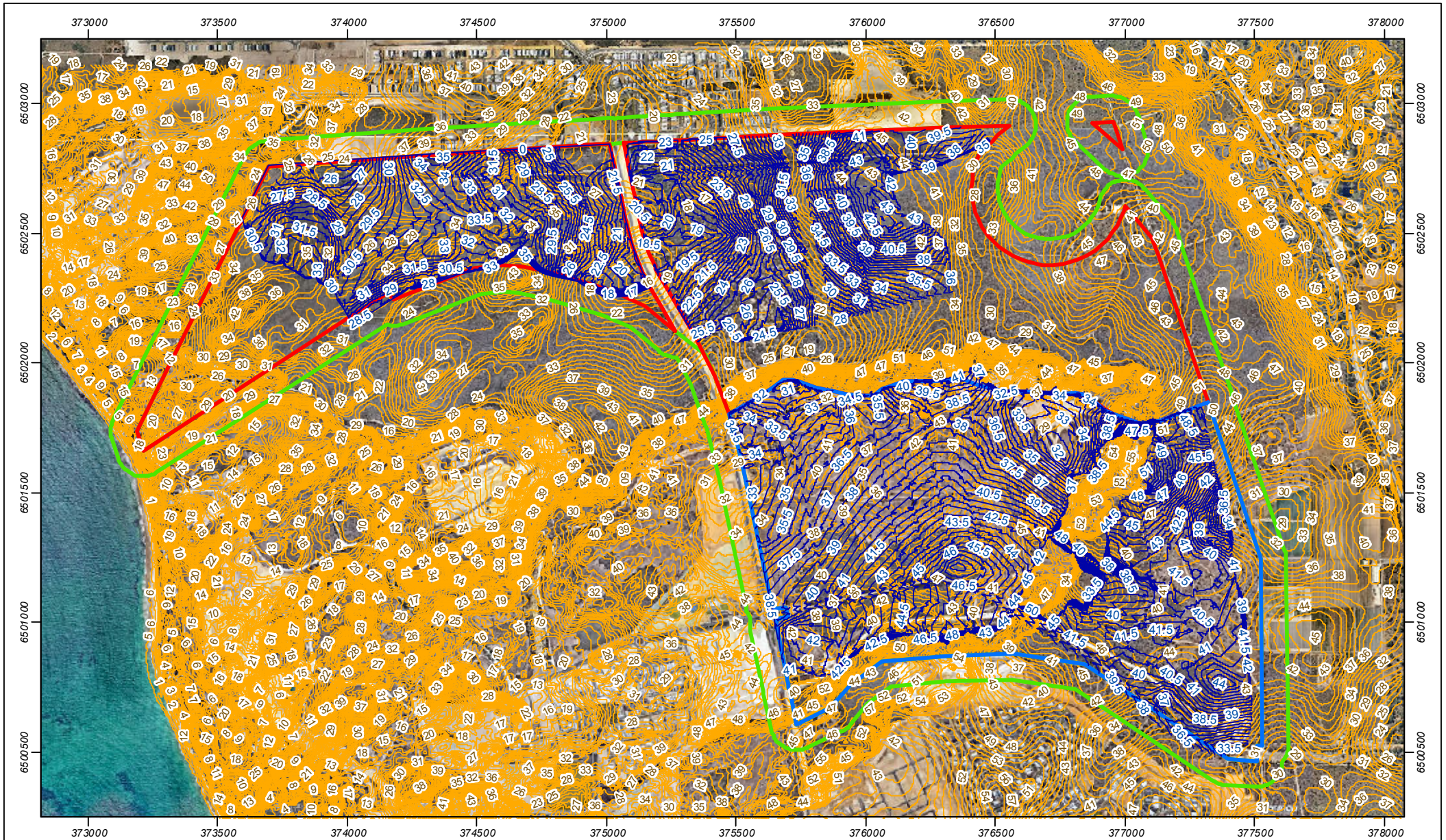


Figure 5 Site topography

Scale 1:20,000 at A4
 0 100 200 300 400 500 m
 Coordinate System: GDA 1994 MGA Zone 50

Note that positional errors may occur in some areas
 Date: 17/06/2015
 Author: JCrute
 Source: Client 2014/2015

Legend

- Updated surface contours (mAHD)
- Surface contours (mAHD)
- Concept Plan boundary Alkimos City Centre
- Concept Plan boundary Alkimos Central
- 100m wide assessment area



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3.4 Vegetation

3.4.1 Vegetation complexes

The project area is currently naturally vegetated apart from localised areas of clearing associated with tracks and off-road vehicle routes. Regional scale vegetation survey and mapping (Heddlie et al. 1980) indicates that two vegetation complexes occur throughout the project area and adjacent land, including:

1. Quindalup Complex: coastal dune complex consisting mainly of the strand and fore-dune alliance, and the mobile and stable dune alliance. Local variations include low closed forest of *Melaleuca lanceolata*–*Callitris preissii* and closed scrub of *Acacia rostellifera*.
2. Cottesloe Complex (Central and South): characterised by a closed heath on limestone areas with shrubs such as *Melaleuca huegelii*, *Acacia* species, *Grevillea thelemanniana* and *Trymalium ledifolium*. The deeper sands support a mosaic of Tuart, Jarrah and Marri. *Banksia* species are also common.

The above vegetation complexes are depicted in Figure 6.

3.4.2 On-site vegetation extent

Emerge (2013a, 2013b) mapped 30 different vegetation communities occurring within the project area. The following vegetation descriptions are provided for each land area:

- the Alkimos City Centre site contains 13 different vegetation communities consisting of two broad groups:
 - * *Melaleuca* spp heath on dune systems
 - * *Acacia* shrublands in lower lying areas and limestone
- the Alkimos Central site contains 26 different vegetation communities consisting of two broad groups:
 - * *Melaleuca* spp, *Lomandra maritima*, *Xanthorrhoea preissii*, *Acacia* spp heath on dune systems
 - * *Eucalyptus* spp, *Banksia* spp woodlands in lower lying areas and limestone.

3.4.3 Adjacent vegetation extent

A large proportion of land adjacent to the project area has been cleared for urban development, including land to the north (Shorehaven development), south (Trinity development) and west (Alkimos Beach development).

The foreshore reserve extends along the coastline to the far west of the project area, which is occupied by coastal heath. The WWTP buffer occurs to the west and is vegetated with a combination of coastal heath grading to low banksia woodland. Vegetated properties to the east and northeast of the project area grade from low banksia woodland to low eucalypt forest to Tuart forest.

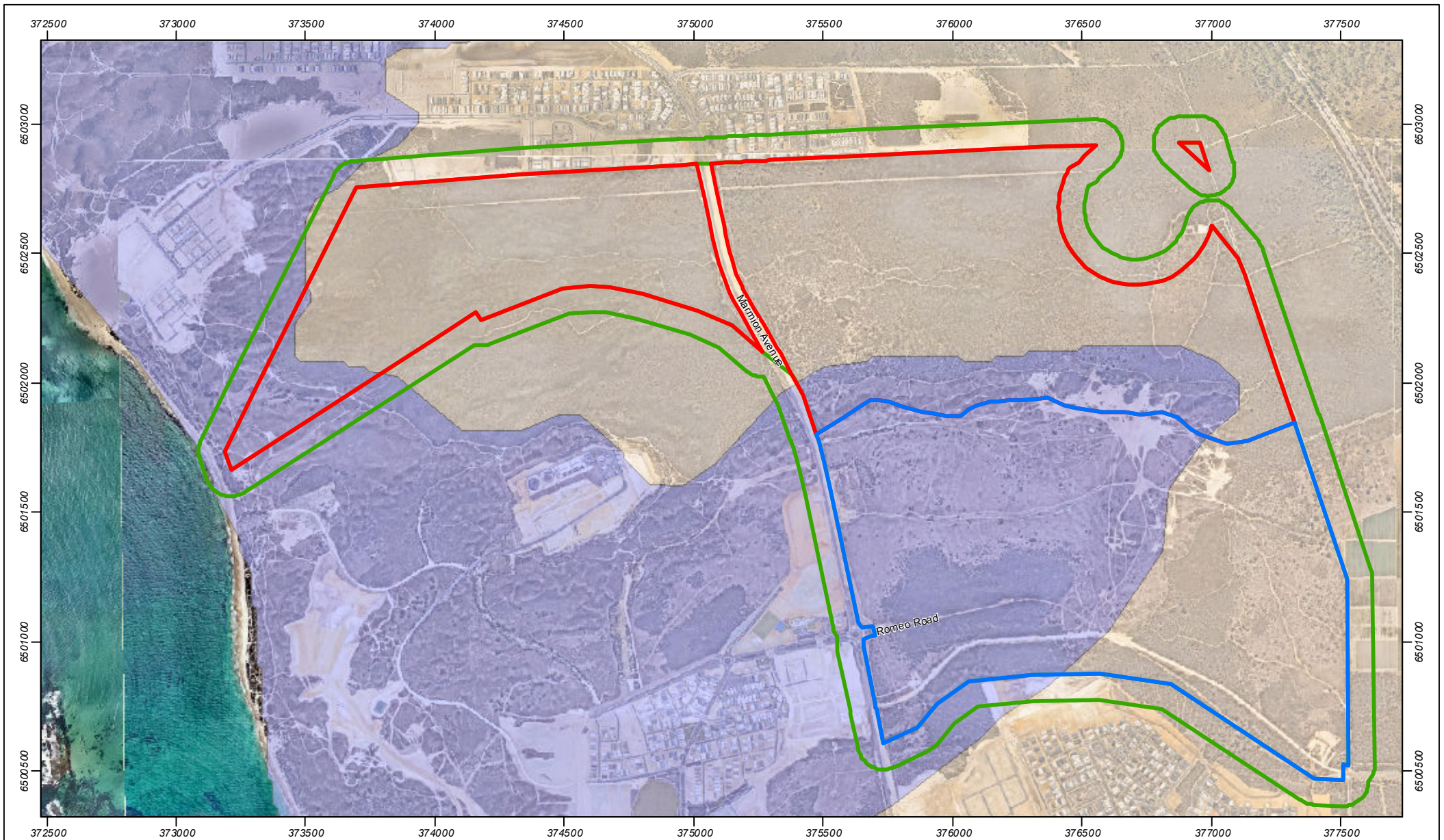


Figure 6 Vegetation complexes

Scale 1:20,000 at A4
 0 100 200 300 400 500 m
 Coordinate System: GDA 1994 MGA Zone 50

Note that positional errors may occur in some areas
 Date: 17/06/2015

Author: JCrute
 Source: Aerial image & concept plan: Client 2014/2015. Vegetation: System 6, DEC 2012.

Path: Q:\Consult\2014\RD\RD\14201\ArcMap_documents\R001\Rev0\RD\14201_01_R001_Rev0_F006.mxd

Legend

- Concept Plan boundary Alkimos City Centre
- Concept Plan boundary Alkimos Central
- 100m wide assessment area

Vegetation complex

- Cottesloe complex - central and south
- Quindalup complex



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3.5 Zoning and land use

3.5.1 Current zoning and land use

The project area is currently zoned a combination of 'Urban Development', 'Centre' and 'Parks and Recreation' under the City of Wanneroo Town Planning Scheme No. 2 (TPS No. 2), which is consistent with the proposed urban use over the site. The land is currently covered by a predominant vegetation extent and has no current active use.

3.5.2 Proposed land use

Development of the project area will ultimately result in creation of a significant amount of dwellings to service the expected population increase in the area, plus significant areas of business, mixed use, commercial, service industrial, educational, POS, roads, parking and other infrastructure.

The proposed development will create numerous POS areas throughout each site, the bulk of which will be landscaped and managed for public recreation or drainage purposes in accordance with approved landscape plans. These areas will not pose a significant bushfire risk to future assets of the development due to the vegetation clearance/landscaping proposed and ongoing management of POS areas.

Only two POS areas within the proposed Alkimos City Centre site may retain a vegetation extent, these being POS areas I and J, which occur along the southern boundary of the site at the interface with Trinity to the south and Marmion Avenue to the west. Consequently, these two POS areas have been considered from a bushfire risk perspective and appropriate management measures will be implemented in response to any retained vegetation within these areas.

3.5.3 Adjacent land use and temporary bushfire hazard

The predominant land uses adjacent to the project area are as follows:

- urban development at Shorehaven to the north
- urban development at Trinity to the south
- vegetated undeveloped lots and agricultural lots to the east
- Water Corporation Wastewater Treatment Plant (WWTP), vegetated WWTP buffer, urban development at Alkimos Beach and proposed urban development at Alkimos Coastal Village to the west.

Alkimos is subject to a number of significant urban development projects (as outlined above) and the ongoing development is expected to continue for many years. As a result, a large proportion of the project area and adjacent land will transition from the current vegetated status to a predominant urban development footprint. The vegetation extent earmarked for future clearance and urban development is therefore considered a temporary bushfire hazard and will be removed at a future stage.

The temporary bushfire hazard that affects the site will be managed in accordance with PFBFP Guidelines. However, the developer has the opportunity to delay portions of the development affected by temporary bushfire hazard until that hazard has been removed in order to negate the requirement for a bushfire management response.

3.6 Site assets

The project area is currently undeveloped, so does not contain any existing life or property assets. Proposed development of the project area will introduce a significant amount of life and property assets to the site in the form of residential, business, mixed use, commercial, service industrial, educational, POS, roads, parking and other infrastructure. This will significantly intensify the number residents, visitors and built assets across the subject land.

In addition, a large proportion of vegetation will be retained through ROS and POS areas, which is expected to contain environmental value particularly in the form of foraging habitat for Black Cockatoos in association with areas of Banksia woodland.

3.7 Water and power supply

Water and power supply services will be extended throughout the project area from the surrounding urban extent, which will result in provision of a reticulated water supply and underground power supply for proposed lots.

3.8 Site access

The project area is currently accessed via a network of informal access tracks that link with the centrally located Marmion Avenue. Proposed vehicular access throughout the project area will comprise a significant network of formal roads that will link with Marmion Avenue in the first instance, followed by future linkage with adjoining urban development to the north and south. The proposed vehicular access network will also provide a level of hazard separation between vegetated areas and developed areas.

4. Fire problem

4.1 Bushfire history, ignition risk and fire suppression response capability

The Alkimos locality is occasionally subject to deliberately lit fire resulting from arson and the torching of vehicles. One such example exists in the northeast of the project area. This area exhibits a small fire scar from a recent uncontrolled fire that appears to have been deliberately lit (refer to Plate 8). Due to the small size of the fire and alignment of a firebreak around the outskirts of the fire scar, it is concluded that this fire was promptly contained through the construction of a perimeter defence line for fire suppression purposes. The project area and adjacent vegetation is otherwise long unburnt.

The nearest localities where more significant uncontrolled bushfires have occurred are situated adjacent to Mitchell Freeway approximately 5 km north and south of site. These fires occurred in 2005 and 2007 respectively (Landgate 2015).

The current risk of ignition in the area is considered moderate due to the following factors:

- presence of ignition sources and recent occurrence of deliberately lit fire
- long unburnt status throughout the majority of the site
- moderate fuel tonnages contained within woodland areas
- reduced public access and resident/visitor occupancy
- ongoing clearing of vegetation for urban development, which removes the fuel and prevents a long north-south fire run along the coastline
- proximity to the coastline and maritime effects such as higher relative humidity compared to inland areas (i.e. resulting in slightly moderated fire danger indices for the site).

The risk of ignition is expected to increase as development progresses with ongoing intensification of residents, visitors and increased public access at the bushland interface.

Any such fire within or adjacent to the project area is expected to be attended within 30 minutes through a standard bushfire suppression response from DFES and/or the City of Wanneroo Volunteer Bushfire Brigades stationed at Wanneroo, Quinns Rocks, Wanneroo Fire Support and Two Rocks.

4.2 Bushfire hazards

A bushfire hazard assessment aims to classify the bushfire hazard at both the strategic and local level, which leads to an assessment of the BAL. Assessment of the vegetation class and bushfire hazard has been undertaken across the project area and adjacent land within 100 m of the project area boundary in accordance with procedures outlined in PFBFP Guidelines.

4.2.1 Classifying the bushfire hazard

Vegetation class

A large proportion of vegetation within the project area will be removed through a staged clearing and development process. However, on-site ROS and two small areas of on-site POS will be retained. In addition, a large proportion of vegetation occurs outside the project area within 100 m of the site boundary. Some of the adjacent vegetation extent is temporary and will be removed for urban development purposes in the future. However, the bushfire risk associated with temporary vegetation must be managed accordingly until such time that vegetation is removed.

The following vegetation classes were identified, as depicted in the Vegetation Class Map (Figure 7) and following site photographs:

- shrubland vegetation within coastal foreshore areas, on-site ROS to the west and northwest portion of the WWTP buffer (Plate 1, Plate 2 and Plate 3 respectively)
- woodland vegetation within the eastern portion of the WWTP buffer (Plate 4)
- scrub vegetation to be retained within on-site POS to the south (Plate 5)
- woodland vegetation adjoining the southeast boundary (Plate 6)
- shrubland vegetation within rural land to the east (Plate 7)
- woodland vegetation to be retained within on-site ROS to the northeast (Plate 8)
- woodland vegetation within adjacent vegetated properties to the northeast (Plate 9).



Plate 1: Shrubland vegetation within coastal foreshore areas (vegetation height within 1 m)



Plate 2: Shrubland vegetation within on-site ROS to the west (vegetation height within 1 m)



Plate 3: Shrubland vegetation within the northwest portion of the WWTP buffer (vegetation height within 1 m)



Plate 4: Woodland vegetation within the eastern portion of the WWTP buffer (vegetation height up to 4 m)



Plate 5: Scrub vegetation to be retained within on-site POS to the south (vegetation height up to 3 m)



Plate 6: Woodland vegetation adjoining the southeast boundary (vegetation height up to 4 m)



Plate 7: Shrubland vegetation within rural land to the east (vegetation height within 1 m)



Plate 8: Woodland vegetation to be retained within on-site ROS to the northeast (recently burnt) (vegetation height up to 4 m)



Plate 9: Woodland vegetation within adjacent vegetated properties to the northeast (vegetation height up to 4 m)

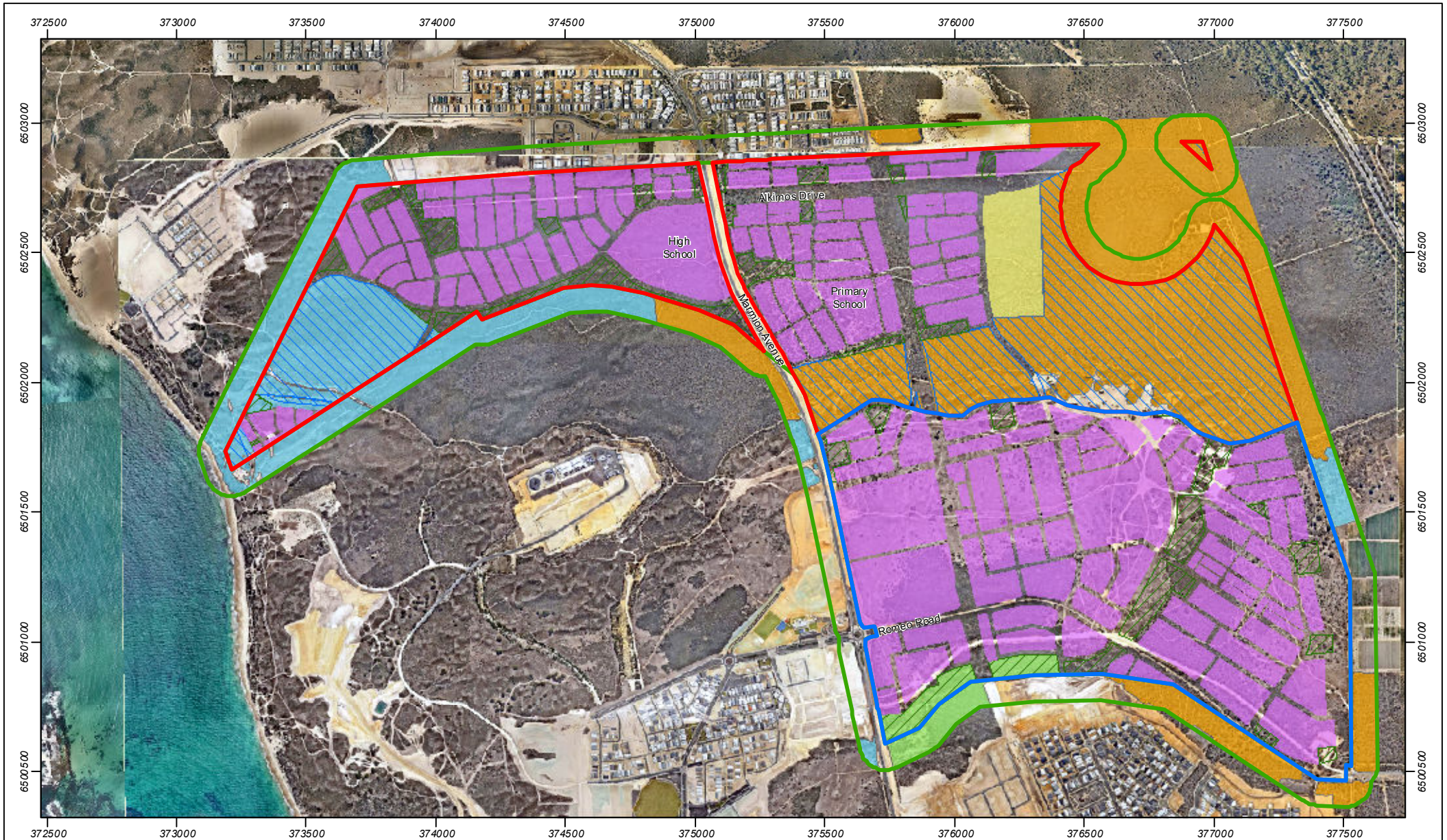


Figure 7 Vegetation class map

Scale 1:20,000 at A4
 0 100 200 300 400 500 m
 Coordinate System: GDA 1994 MGA Zone 50

Note that positional errors may occur in some areas
 Date: 19/06/2015
 Author: JCrute
 Source: Concept plan: Client 2015.

Legend

- | | | | | |
|---|-------------------|------------------------|-------------------------|-----------|
| Concept Plan boundary Alkimos City Centre | Development area | District Playing Field | Vegetation class | Shrubland |
| Concept Plan boundary Alkimos Central | Public Open Space | Regional Open Space | Scrub | Woodland |
| 100m wide assessment area | | | | |



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Bushfire hazard levels

Bushfire hazard levels of the predominant vegetation located on and within 100 m of the project area are displayed in the Bushfire Hazard Assessment Map (Figure 8). Classifying the bushfire hazard by assessing the predominant vegetation is a key to the initial determination of site suitability for development. This also leads to determination of the potential level of construction standard by the application of AS 3959–2009.

The classified shrubland extent within coastal foreshore areas, on-site ROS to the west, northwest portion of the WWTP buffer and rural land to the east is considered to be a ‘Moderate’ bushfire hazard on the basis of the vegetation height (within 1 m), fuel load (estimated within 8 t/ha) and density (moderate, particularly in coastal areas).

The classified scrub extent retained within on-site POS to the south is considered to be an ‘Extreme’ bushfire hazard on the basis of the vegetation height (up to 3 m), fuel load (estimated up to 15 t/ha) and density (high).

The classified woodland extent outlined in Figure 8 is considered to be an ‘Extreme’ bushfire hazard on the basis of the vegetation having an intact woodland structure with vegetation height up to 4 m, fuel load estimated to be within 12 t/ha and moderate density.

According to PFBFP Guidelines, land with an assessed ‘Moderate’ or ‘Extreme’ bushfire hazard level is classified as bushfire prone land, which triggers implementation of AS 3959–2009 and increased building construction standards for any proposed development that cannot achieve a 100 m wide separation distance. This zone is depicted in Figure 8 by the 100 m wide BAL application area.

4.2.2 Bushfire hazard performance criteria

The relationship between various bushfire hazard levels and development performance criteria is set out in Table 2. A proportion of proposed lots cannot achieve the full 100 m wide separation distance to bushfire prone areas depicted in Figure 8. Consequently, a comprehensive suite of bushfire risk treatment and mitigation measures, including application of AS 3959–2009, will need to be implemented to assist in mitigating the bushfire risk to these lots.

Compliance with performance criteria for a ‘Moderate’ bushfire hazard level will be achieved for the proposed development, focussing on the key areas of development location, vehicular access, water supply, siting of development and design of development. Performance criteria will be achieved through adoption of recommended acceptable solutions outlined in PFBFP Guidelines.

Table 2: Bushfire hazard levels and performance criteria

Bushfire hazard level	Bushfire protection performance criteria required
Low hazard	Development does not require special bushfire planning controls. Despite this, DFES strongly recommends that ember protection features be incorporated in design where practicable.
Moderate hazard	Performance criteria for: <ul style="list-style-type: none"> • location (Element 1) • vehicular access (Element 2) • water (Element 3) • siting of development (Element 4) • design of development (Element 5).
Extreme hazard	Development is to be avoided in areas with these hazard levels.

Compliance of the proposed development with bushfire protection performance criteria and associated acceptable solutions is detailed in Section 5 and documented in a completed compliance checklist contained in Appendix 1.

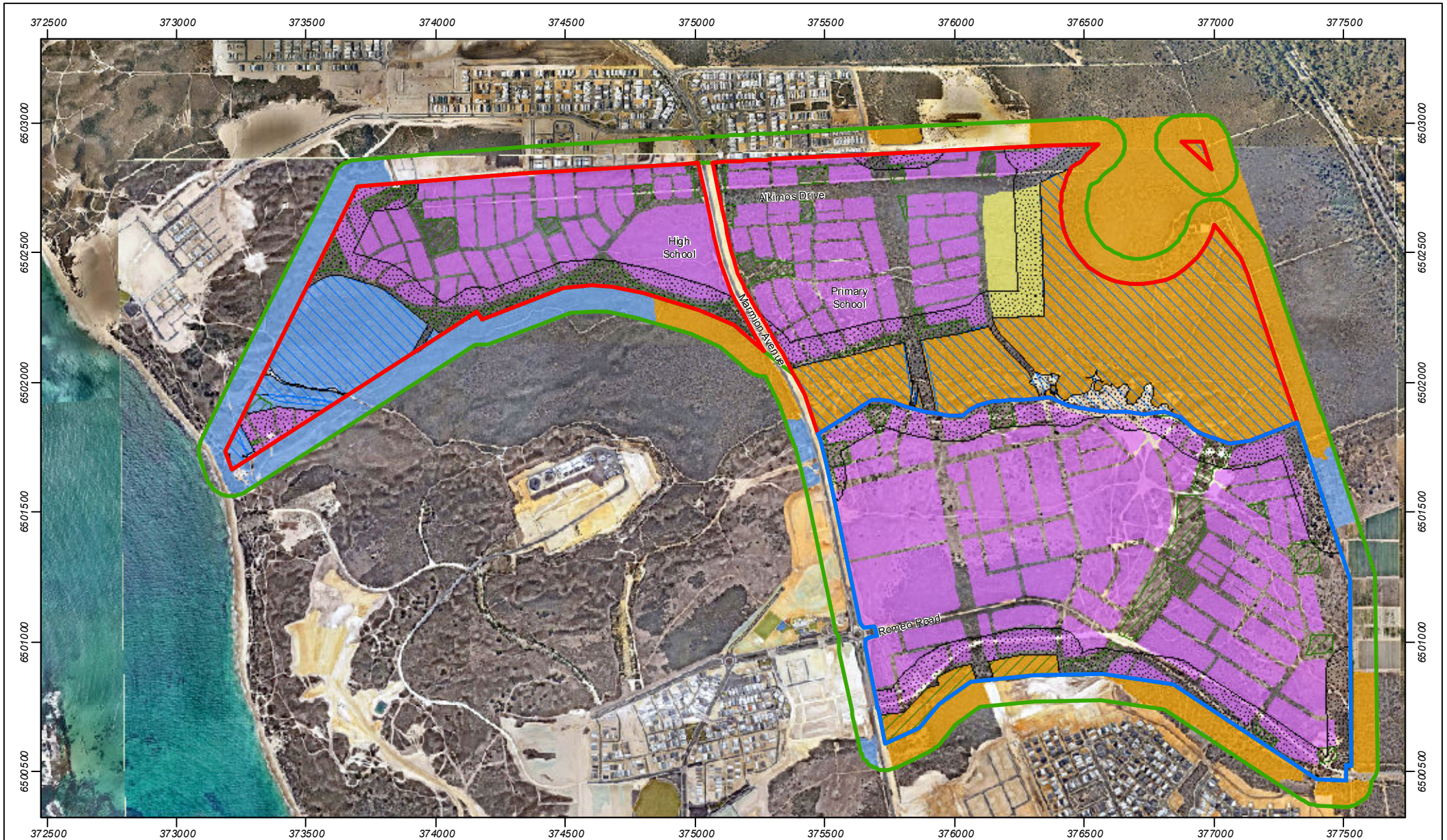


Figure 8 Bushfire hazard assessment map

Scale 1:20,000 at A4

0 100 200 300 400 500 m

Coordinate System: GDA 1994 MGA Zone 50

Note that positional errors may occur in some areas
Date: 19/06/2015

Author: JCrute
Source: Client 2015.

Path: Q:\Consult\2014\RD\PRDP14201\ArcMap_documents\R001\Rev0\RD\PRDP14201_01_R001_Rev0_F008.mxd

Legend

- | | | | |
|---|--------------------------------|------------------------|------------------------------|
| Concept Plan boundary Alkimos City Centre | 100m wide BAL application area | District Playing Field | Bushfire hazard level |
| Concept Plan boundary Alkimos Central | Development area | Regional Open Space | Extreme |
| 100m wide assessment area | Public Open Space | | Moderate |



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4.2.3 Classifying the Bushfire Attack Level (BAL)

This procedure, as outlined in PFBFP Guidelines and AS 3959–2009, uses a combination of the following parameters to specify the BAL:

- state-adopted Fire Danger Index rating: FDI 80
- classified vegetation: combination of shrubland, scrub and woodland as depicted in Figure 7
- slope under classified vegetation: slope under classified vegetation varies significantly in association with the underlying dune systems. Slope under vegetation has been assessed as occurring within the ranges of >0–5 degrees and >5–10 degrees. The elevation and landscape position of the assessed vegetation has also been compared to the proposed finished levels of the development area, which reveals that the classified vegetation occurs in a complex arrangement of up-slopes and down-slopes adjacent to the final built form. This has been taken into account as part of the BAL assessment.
- the current distance maintained between proposed development areas and the classified vegetation: a minimum separation distance of 20 m will be achieved in the form of a Building Protection Zone (BPZ) located between bushfire prone areas and proposed development areas.

The above parameters result in a combination of BAL 29, BAL 19 and BAL 12.5 being required throughout the 100 m wide BAL application area. A Method 1 BAL calculation is outlined in Table 3, with the relevant BAL ratings proposed throughout the site and corresponding separation distances shaded green.

All proposed lots located outside the 100 m wide BAL application area will not require heightened building construction standards.

It is important to note that some parameters assessed above may change as development staging progresses, such as the distance between development areas and the classified vegetation. This is particularly relevant upon removal of the temporary vegetation extent that currently affects the site. Consequently, reassessment of the BAL rating will be required at the building construction stage to ensure the BPZs and BAL ratings implemented for individual lots are an accurate reflection and response to the bushfire hazards that affect the site at the time of development.

Table 3: Determination of Bushfire Attack Level (BAL)

Vegetation class	Bushfire Attack Level (BAL)				
	BAL FZ	BAL 40	BAL 29	BAL 19	BAL 12.5
	Distance (m) of the site from the predominant vegetation class				
	Down-slope >5 to 10 degrees				
C. Shrubland	<8 (not supported in WA)	8–<11 (not supported in WA)	11–<17	17–<25	25–<100
	Down-slope >0 to 5 degrees				
B. Woodland	<13 (not supported in WA)	13–<17 (not supported in WA)	17–<25	25–<35	35–<100
C. Shrubland	<7 (not supported in WA)	7–<10 (not supported in WA)	10–<15	15–<22	22–<100
	All up-slopes and flat land (0 degrees)				
B. Woodland	<10 (not supported in WA)	10–<14 (not supported in WA)	14–<20	20–<29	29–<100
D. Scrub	<10 (not supported in WA)	10–<13 (not supported in WA)	13–<19	19–<27	27–<100

Source: WAPC et al. 2010

Relevant sections of AS 3959–2009 that outline construction standards for buildings in areas specified as BAL 29, BAL 19 and BAL 12.5 are provided in Table 4. Construction standards for BAL 29, BAL 19 and BAL 12.5 are fully explained in Appendix 3.

Table 4: Building construction standards

Bushfire Attack Level (BAL)	Classified vegetation within 100 m of the site and heat flux exposure thresholds	Description of predicted bushfire attack and levels of exposure	Relevant section of AS 3959–2009
BAL 12.5	$\leq 12.5 \text{ kW/m}^2$	Ember attack	3 and 5
BAL 19	$> 12.5 \text{ kW/m}^2$ $\leq 19 \text{ kW/m}^2$	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux	3 and 6
BAL 29	$> 19 \text{ kW/m}^2$ $\leq 29 \text{ kW/m}^2$	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux	3 and 7

4.3 Summary of key bushfire issues

The following is a summary of key bushfire issues that have been considered as part of the FMP to inform development of specified bushfire risk treatment and mitigation measures:

- a small proportion of the project area and surrounding land to the northeast has been affected by recent bushfire occurrence; however, the majority of the on-site and surrounding vegetation remains long unburnt
- the risk of ignition is currently moderate, but is expected to increase following the introduction of high levels of public visitation, resident occupancy and access at the bushland interface
- emergency response times in the event that the project area is threatened by uncontrolled bushfire are expected to be within 30 minutes from DFES and/or local Bushfire Brigades stationed throughout City of Wanneroo
- a large proportion of the project area and surrounding land will be progressively cleared to enable ongoing staged development throughout the Alkimos area, meaning that much of the vegetation that currently affects the project area is a temporary hazard
- a combination of shrubland, scrub and woodland vegetation is proposed to be retained on site within ROS and two small areas of POS
- the remainder of on-site POS will be cleared/landscaped in accordance with approved landscape plans
- the on-site and adjacent vegetation is either a shrubland, scrub or woodland class, as depicted in Figure 7
- the on-site and adjacent vegetation is either a 'Moderate' or 'Extreme' bushfire hazard, as depicted in Figure 8
- therefore, the assessed vegetation is a bushfire prone area, which triggers application of AS 3959–2009 and increased building construction standards for all proposed lots that cannot achieve a 100 m wide hazard separation distance
- slope under vegetation varies significantly in association with the underlying dune systems and was assessed as occurring within the ranges of $>0-5$ degrees and $>5-10$ degrees
- the elevation and landscape position of the assessed vegetation was compared to the proposed finished levels of the development area, which identified that the vegetation exists in a complex arrangement up-slopes and down-slopes adjacent to the final built form
- a BAL assessment undertaken for the proposed development revealed that building construction standards applicable to BAL 12.5, BAL 19 and BAL 29 will need to apply throughout the 100 m wide BAL application area in response to the current bushfire hazard extent
- a 20 m wide BPZ will be achieved at the interface between bushfire prone areas and proposed development areas
- reassessment of BAL ratings will be required at the building construction stage to ensure the BPZs and BAL ratings implemented for individual lots are an accurate reflection and response to the bushfire hazards that affect the site at the time of development.

5. Bushfire risk treatment and mitigation

The following subsections outline how the bushfire risk to future life and property will be mitigated to achieve a suitable and effective bushfire management outcome for the project area. This will be achieved by complying with performance criteria and acceptable solutions in accordance with PFBFP Guidelines. Where applicable, these measures are illustrated on an aerial image of the project area in Figure 9 to assist with implementation of the FMP. A more detailed depiction of the fire management measures for each of the Alkimos City Centre and Central sites is contained in Appendix 4.

5.1 Development location

Strategic location, layout and management of future development at the planning stage can reduce future fire threat and risk to critical life and property assets.

The proposed development will result in creation of a significant cleared and built footprint across the project area. In addition, 100 m wide cleared or fuel reduced buffers maintained annually at less than 2 t/ha will be implemented where applicable adjacent to each active development stage to mitigate the bushfire risk associated with staging.

Aside from POS areas I and J situated in the southwest of Alkimos City Centre, all on-site POS will be cleared and landscaped in accordance with approved landscape plans. Fuel loads within these POS areas will be maintained annually at less than 2 t/ha and as a result, these areas are not expected to pose a bushfire risk to the proposed development.

Strategic location of development and placement of low fuel hazard separation areas such as low fuel POS and roads has enabled the development to achieve a BAL 29 rating or lower following application of AS 3959–2009, while also providing defensible space and vehicular access between bushfire prone areas and proposed development areas.

5.1.1 Compliance statement

The above measures will ensure proposed buildings are not located in areas of 'Extreme' bushfire hazard or require BAL 40 or BAL FZ construction standards under AS 3959–2009. This meets performance criteria for development location (Element 1) by adopting acceptable solution A1.1.

5.2 Vehicular access

Vehicular access throughout the project area will be in accordance with Figure 1. This network provides a significant level of public and emergency vehicular access throughout the site, with numerous linkages to Marmion Avenue and adjacent developed areas to the north and south. This will ensure that two different vehicular access routes are provided to all residents and the public at all times, including throughout development staging. The proposed vehicular access network also provides public and emergency access along each bushland interface.

All public roads and any cul-de-sacs will be constructed in accordance with Main Roads WA, CoW and DFES requirements.

5.2.1 Compliance statement

The abovementioned measures adopt the following acceptable solutions to assist in meeting performance criteria for vehicular access (Element 2):

- A2.1 Two Access Routes: two different vehicular access routes, both of which connect to the surrounding public road network, are available to all residents/the public at all times
- A2.2 Public Roads: public roads meet the requirements of Main Roads WA, CoW and DFES (refer to PFBFP Guidelines for additional detail).
- A2.3 Cul-de-sacs: cul-de-sacs meet the requirements of Main Roads WA, CoW and DFES (refer to PFBFP Guidelines for additional detail).

Acceptable solutions for battle axes (A2.4), private driveways (A2.5), emergency access ways (A2.6), fire service access routes (A2.7), gates (A2.8), firebreak widths (A2.9) and signs (A2.10) are not applicable to this development.

5.3 Water supply

A reticulated water supply will be extended throughout the project area to ensure an all year round supply of water is provided to meet minimum domestic and emergency water supply requirements.

A network of hydrants will also be provided along the internal road network at locations which meet relevant water supply authority and DFES requirements, in particular the Water Corporation Design Standard DS 63 'Water Reticulation Standard Design and Construction Requirements for Water Reticulation Systems up to DN250'.

5.3.1 Compliance statement

The above measures adopt the following acceptable solution to ensure the development meets performance criteria for water supply (Element 3):

- A3.1: Reticulated Areas: the development is provided with a reticulated water supply, together with fire hydrants, in accordance with specifications of the water supply authority and DFES.

Acceptable solutions for non-reticulated areas (A3.2) and dams (A3.3) do not apply to this development.

5.4 Siting of development

When considering the overall bushfire management of the project area, protection should be provided to critical life and property assets (residents, visitors and built assets) as a priority. Low fuel buffers between fire hazard areas and critical assets and application of AS 3959–2009 can be implemented to achieve this.

5.4.1 BAL and BPZ requirements

Building construction standards applicable to BAL 12.5, BAL 19 and BAL 29 will apply throughout the project area in accordance with Figure 9 (refer to Section 4.2.3 for results of the BAL assessment). Where a BAL rating is specified for a building other than a residential building, a similar level of construction standard will be achieved for the relevant building in line with the specified BAL rating regardless of the land use (this is in accordance with Draft SPP 3.7 Planning for Bushfire Risk Management).

A 20 m wide BPZ will be implemented in accordance with Figure 9 along the interface with all bushfire prone areas. The BPZs will be accommodated within a combination of road reserves and/or POS and are to be maintained annually at less than 2 t/ha via mechanical slashing and weed control. Where the BPZ extends into a development area, there is to be no construction of buildings within the BPZ until such time that the affecting vegetation is removed and the BAL rating/BPZ location is reassessed. All BAL requirements and building setbacks for individual lots will be specified through the Detailed Area Plan (DAP) process.

All proposed lots located outside the 100 m wide BAL application area will not require heightened building construction standards.

5.4.2 Management of temporary bushfire hazards

Alkimos is subject to significant urban development projects and the ongoing development is expected to continue for many years. As a result, a large proportion of the project area and adjacent land will transition from the current vegetated status to a predominant urban development footprint. The vegetation extent earmarked for future clearance and urban development is therefore considered a temporary bushfire hazard and will be removed at some future stage.

The temporary bushfire hazard that affects the site will be managed in accordance with PFBFP Guidelines. However, the developer has the opportunity to delay portions of the development affected by temporary bushfire hazard until that hazard has been removed in order to negate the requirement for a bushfire management response.

As a result of ongoing clearance of the temporary vegetation extent, some parameters of the assessed BAL ratings may change, such as the distance between development areas and the classified vegetation. Consequently, reassessment of the BAL rating will be required at the building construction stage to ensure the BPZs and BAL ratings implemented for individual lots are an accurate reflection and response to the bushfire hazards that affect the site at the time of development.

5.4.3 Compliance statement

The abovementioned measures adopt the following acceptable solutions to ensure the development meets performance criteria for siting of development (Element 4):

- A4.1 Hazard separation—moderate to extreme bushfire hazard level: every building is sited a minimum distance of 100 m from any vegetation classified under Table 1 and Figure 1 of Appendix 1 of PFBFP Guidelines as forests, woodlands, closed scrub, open scrub, mallee/mulga and rainforest (i.e. in an area with a moderate or extreme bushfire hazard level) or has its construction standard increased to align with the appropriate BAL for that location
- A4.3 Building protection zone: every residential building is surrounded by a building protection zone that meets DFES requirements (refer to PFBFP Guidelines for additional detail).

Acceptable solutions for hazard separation—low bushfire hazard (A4.2), hazard separation zone (A4.4) and reduction in BAL due to shielding (A4.5) are not applicable to this development, or have been addressed through the application of AS 3959–2009 or the suggested fire planning measures described below.

5.5 Design of development

Since the proposed development complies with the relevant performance criteria for siting of development as previously discussed (i.e. compliance with A4.1 through to A4.5 where applicable) the proposed development is considered compliant and there are no special design requirements for Element 5.

5.6 Additional bushfire risk mitigation

The following measures will be implemented in addition to those outlined previously to provide a more thorough level of bushfire protection to residents, visitors and built assets of the subject land:

1. Annual fuel inspections: undertaken at the discretion of CoW in accordance with the current City of Wanneroo Annual Firebreak Notice under provisions of the *Bush Fires Act 1954*. Failure to comply with this FMP and the specified requirements of the current annual notice may result in the issuing of fines (refer to Appendix 5 for the current annual firebreak notice).
2. Landowner education and awareness: landowners should obtain a copy of local government and DFES bushfire information booklets that are currently available. In addition, attendance by landowners at annual DFES bushfire awareness briefings would be advantageous.
3. Section 70 Notification: to be placed on those Titles of the proposed development assigned with a specified BAL rating to ensure prospective landowners are aware that an FMP exists over the site and that specified building requirements apply.

5.7 FMP review and update

The on-ground fire environment and vegetation extent will transition over time in response to staged clearing and development within the project area. Consequently, the bushfire risk will change as the current vegetated landscape is progressively cleared. This FMP will therefore need to be reviewed and updated as required following any significant changes to the bushfire hazard extent (that this FMP has not accounted for) to ensure the proposed management responses reflect the actual bushfire risk at the time of development.

5.8 Summary of bushfire risk mitigation and works program

A summary of the bushfire risk treatment and mitigation measures described in Section 5, as well as a works program, is provided in Table 5. These measures will be implemented to ensure the ongoing protection of proposed life and property assets is achieved. Additional optional measures are also provided and can be adopted by residents to further mitigate the risk to life and property from uncontrolled bushfires. Timing and responsibilities are also defined to assist with implementation of each management measure.

Table 5: Summary of bushfire risk mitigation measures and works program

Bushfire risk mitigation	Recommended works	Mandatory	Optional	Timing	Responsibility
Development location	Undertake development in accordance with the approved FMP and subdivision design to ensure the development is not subject to an 'Extreme' bushfire hazard level or requires BAL 40 or BAL FZ construction standards. Refer to FMP Section 5.1.	Yes	No	Throughout implementation of the development	Developer
	Maintain the available fuel load at less than 2 t/ha within all POS areas (with the exception of POS I and J situated within Alkimos City Centre). This can be achieved through mechanical slashing and weed control. Refer to FMP Section 5.1.	Yes	No	Annually prior to the onset of the designated bushfire season	Developer during development, CoW thereafter
	Construct 100 m wide cleared or low fuel buffers where applicable adjacent to each development stage and maintain these annually at less than 2 t/ha. Refer to FMP Section 5.1.	Yes	No	Prior to construction within each stage and ongoing maintenance thereafter	Developer
Vehicular access	Implement the proposed vehicular access network as per the approved subdivision design to ensure two different public access routes are available to all residents/the public at all times, including throughout development staging. Refer to FMP Section 5.2.	Yes	No	During earthworks and servicing for each subdivision stage	Developer
	Construct all public roads and cul-de-sacs in accordance with Main Roads WA, CoW and DFES requirements. Refer to FMP Section 5.2.	Yes	No	During earthworks and servicing for each subdivision stage	Developer
Water supply	Provide a reticulated water supply throughout the proposed development. Refer to FMP Section 5.3.	Yes	No	During earthworks and servicing for each subdivision stage	Developer
	Provide a network of hydrants along the internal road network at locations which meet relevant water supply authority and DFES requirements (i.e. in accordance with Water Corporation Design Standard DS 63 'Water Reticulation Standard Design and Construction Requirements for Water Reticulation Systems up to DN250'). Refer to FMP Section 5.3.	Yes	No	During earthworks and servicing for each subdivision stage	Developer
Siting of development	Apply BAL 12.5, BAL 19 and BAL 29 building construction standards to future lots in accordance with Figure 9. Refer to FMP Section 5.4.1.	Yes	No	During building construction	Builder, prospective landowners
	Construct the 20 m wide BPZ in accordance with Figure 9. Refer to FMP Section 5.4.1.	Yes	No	Prior to construction and ongoing maintenance thereafter	Developer
	Maintain the BPZ at less than 2 t/ha. This can be achieved through mechanical slashing and weed control. Refer to FMP Section 5.4.1.	Yes	No	Annually prior to the onset of the designated bushfire season	Developer during development, relevant managing authority thereafter
	Specify BAL/setback requirements for relevant lots through the DAP process. Refer to FMP Section 5.4.1.	Yes	No	At the DAP stage	Developer
	Reassess BAL ratings and BPZ requirements paying particular regard to temporary vegetation proposed to be cleared as part of future development adjacent to the project area. Refer to FMP Section 5.4.2.	Yes	No	At the building construction stage or following any significant change in the status of the assessed bushfire prone areas	Developer
Design of development	Comply with all relevant acceptable solutions for siting of development (Element 4) to prevent special design requirements. Refer to FMP Section 5.5.	Yes	No	During implementation of the development	Developer

Bushfire risk mitigation	Recommended works	Mandatory	Optional	Timing	Responsibility
Additional bushfire risk mitigation	Comply with the current annual firebreak notice and City of Wanneroo-determined burning periods. Refer to Appendix 5.	Yes	No	At all times	Developer, prospective landowners
	Undertake an inspection of fuel hazards across the development area to assess compliance with the FMP and annual firebreak notice. Refer to FMP Section 5.6.	No	Yes	Annually prior to the onset of the designated bushfire season	CoW staff
	Issue work orders or fines where compliance with the <i>Bush Fires Act 1954</i> , FMP or annual firebreak notice has been compromised. Refer to FMP Section 5.6.	No	Yes	Annually prior to the onset of the designated bushfire season	CoW staff
	Obtain bushfire information booklets and attend annual DFES bushfire awareness briefings. Refer to FMP Section 5.6.	No	Yes	Annually	Prospective landowners
	Place a Section 70 Notification on those Titles affected by a specified BAL rating to ensure prospective landowners are aware that an FMP exists over the site and that specified building requirements may apply. Refer to FMP Section 5.6.	Yes	No	On creation of Titles	Developer
FMP review	Review the FMP and update the proposed management responses of this FMP accordingly. Refer to FMP Section 5.7.	Yes	No	Following any significant changes in the on-ground bushfire hazard extent that this FMP has not accounted for	Developer

6. Implementation of the Fire Management Plan

6.1 Implementation of bushfire risk treatment and mitigation

The works program provided in Table 5 provides clear direction for the implementation of all works associated with this FMP, including appropriate timing and responsibilities. In addition, the full range of bushfire risk treatment and mitigation measures, as well as location of implementation as specified in this FMP, is provided in Figure 9 (overview map) and Appendix 4 (detailed depiction). The plan has been overlain on an aerial image of the project area to assist with implementation.

6.2 Assessment of bushfire risk treatment and mitigation measures

Implementation of the bushfire risk treatment and mitigation measures outlined in this FMP will ensure that should a bushfire occur within or adjacent to the proposed residential development, fire intensity on site will be minimised and life and property assets will have a higher level of protection. In addition, a fire occurring on the site is highly likely to be readily contained within 30 minutes, which is the expected emergency response time provided by local Bushfire Brigades.

The cost of undertaking the various tasks and initiatives outlined in the FMP will provide significant cost benefit to the developer and prospective landowners when compared with the possible loss of life or infrastructure within the site.

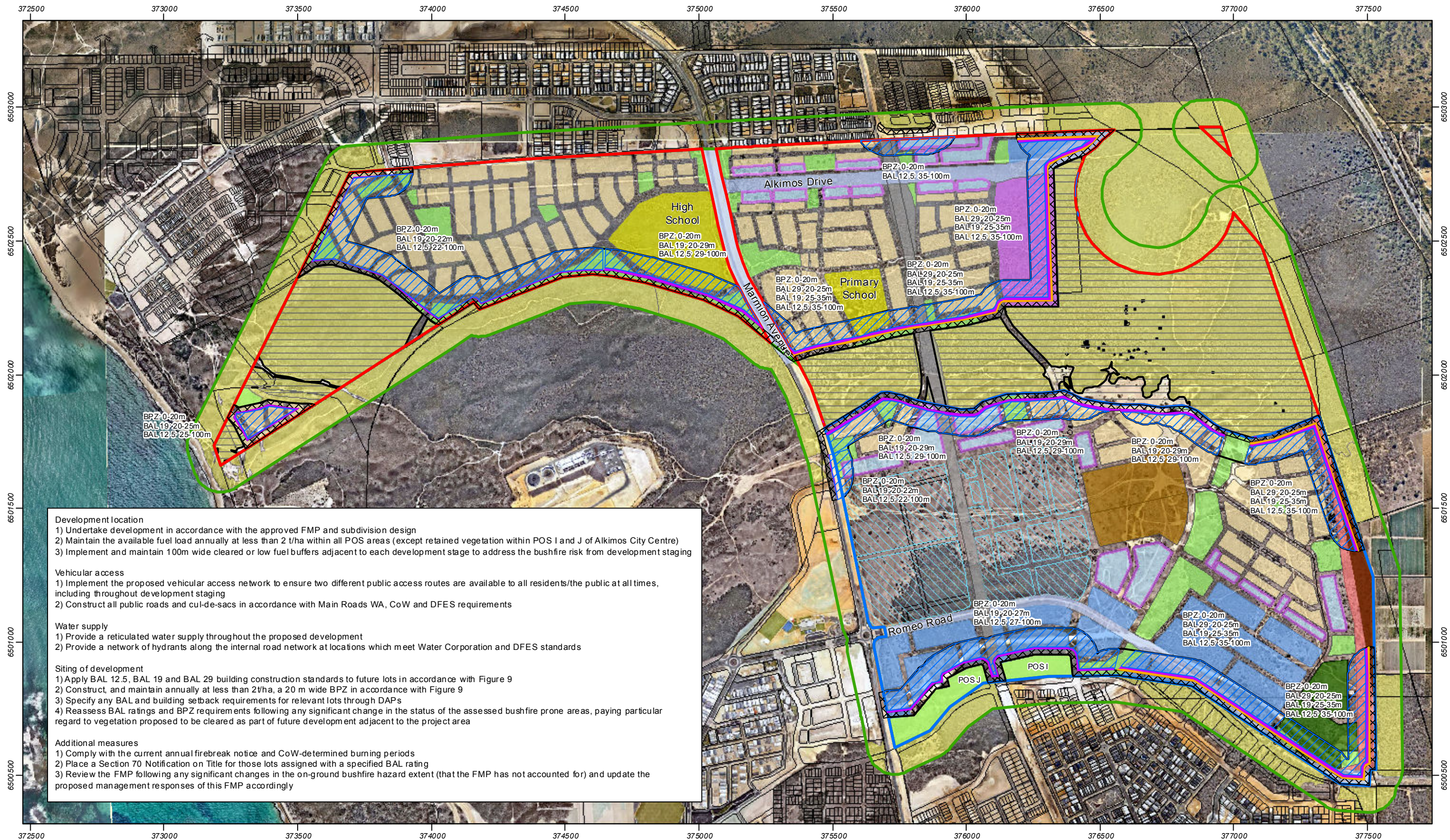
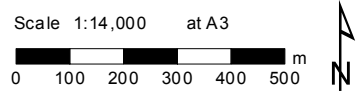


Figure 9 Fire Management Plan: Alkimos City Centre and Central



Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 8/07/2015
 Author: JCrute
 Source: Client 2015.

Legend

Concept Plan boundary Alkimos City Centre	Business	Regional Road	Primary Regional Road	District Playing Field	20m wide BPZ
Concept Plan boundary Alkimos Central	Mixed Use	Residential	Proposed Primary Regional Road	Regional Open Space	BAL 12.5
100m wide assessment area	Public Open Space	Civic and Cultural	Service Industrial	Surrounding cadastre	BAL 19
100m wide BAL application area	Rail Reserve	Commercial	Education	Bushfire prone area	BAL 29



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6.3 Legislative requirements, specifications and standards

The legislative requirements, specifications and standards applicable to implementation of this FMP are referenced in Section 7 and pertain to the following:

- *Bush Fires Act 1954*
- *Planning and Development Act 2005*
- *Environment Protection and Biodiversity Conservation Act 1999*
- *Environmental Protection Act 1986*
- *Wildlife Conservation Act 1950*
- Building Code of Australia
- Planning for Bush Fire Protection Guidelines (Edition 2)
- Draft State Planning Policy 3.7 Planning for Bushfire Risk Management
- Draft Planning for Bushfire Risk Management Guidelines
- Australian Standard AS 3959–2009 Construction of Buildings in Bushfire-prone Areas
- City of Wanneroo Annual Firebreak Notice
- AFAC Bushfire Glossary.

7. References

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Appendix 1
Fire Management Plan compliance
checklist

Compliance checklist for performance criteria and acceptable solutions

Element	Acceptable solution	Compliance	Yes/No	Explanation (if no)
1. Location	A1.1 Development location	Does the proposal comply with performance criteria P1 by applying acceptable solution A1.1?	Yes	
2. Vehicular access	A2.1 Two access routes	Does the proposal comply with performance criteria P2 by applying acceptable solution A2.1?	Yes	
	A2.2 Public roads	Does the proposal comply with performance criteria P2 by applying acceptable solution A2.2?	Yes	
	A2.3 Cul-de-sacs	Does the proposal comply with performance criteria P2 by applying acceptable solution A2.3?	Yes	
	A2.4 Battle axes	Does the proposal comply with performance criteria P2 by applying acceptable solution A2.4?	N/A	
	A2.5 Private driveways	Does the proposal comply with performance criteria P2 by applying acceptable solution A2.5?	N/A	
	A2.6 Emergency access ways	Does the proposal comply with performance criteria P2 by applying acceptable solution A2.6?	N/A	
	A2.7 Fire service access routes	Does the proposal comply with performance criteria P2 by applying acceptable solution A2.7?	N/A	
	A2.8 Gates	Does the proposal comply with performance criteria P2 by applying acceptable solution A2.8?	N/A	
	A2.9 Firebreak widths	Does the proposal comply with performance criteria P2 by applying acceptable solution A2.9?	N/A	
	A2.10 Signs	Does the proposal comply with performance criteria P2 by applying acceptable solution A2.10?	N/A	
3. Water	A3.1 Reticulated areas	Does the proposal comply with performance criteria P3 by applying acceptable solution A3.1?	Yes	
	A3.2 Non-reticulated areas (a)	Does the proposal comply with performance criteria P3 by applying acceptable solution A3.2?	N/A	
	A3.3 Non-reticulated areas (b)	Does the proposal comply with performance criteria P3 by applying acceptable solution A3.3?	N/A	
4. Siting of development	A4.1 Hazard separation – moderate to extreme bushfire hazard level	Does the proposal comply with performance criteria P4 by applying acceptable solution A4.1?	Yes	
	A4.2 Hazard separation – low bushfire hazard level	Does the proposal comply with performance criteria P4 by applying acceptable solution A4.2?	N/A	
	A4.3 Building protection zone	Does the proposal comply with performance criteria P4 by applying acceptable solution A4.3?	Yes	
	A4.4 Hazard separation zone	Does the proposal comply with performance criteria P4 by applying acceptable solution A4.4?	N/A	
	A4.5 Reduction in bushfire attack level due to shielding	Does the proposal comply with performance criteria P4 by applying acceptable solution A4.5?	N/A	
5. Design of development	A5.1 Compliant development	Does the proposal comply with performance criteria P5 by applying acceptable solution A5.1?	Yes	

Element	Acceptable solution	Compliance	Yes/No	Explanation (if no)
	A5.2 Non-compliant development	Does the proposal comply with performance criteria P5 by applying acceptable solution A5.2?	N/A	

Note: Performance criteria and acceptable solutions are in accordance with *Planning for Bush Fire Protection Guidelines (Edition 2)* (WAPC et al. 2010).

Applicant Declaration

I declare that the information provided is true and correct to the best of my knowledge.

Full name: Roger Banks

Applicant signature:



Date: 9/07/2015

Appendix 2
January wind profiles for Swanbourne
(BoM 2015)

Rose of Wind direction versus Wind speed in km/h (10 Sep 1993 to 30 Sep 2010)

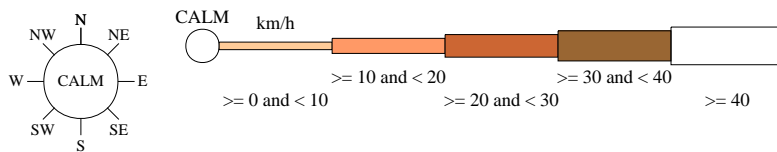
Custom times selected, refer to attached note for details

SWANBOURNE

Site No: 009215 • Opened Nov 1985 • Still Open • Latitude: -31.9558° • Longitude: 115.7619° • Elevation 40.9m

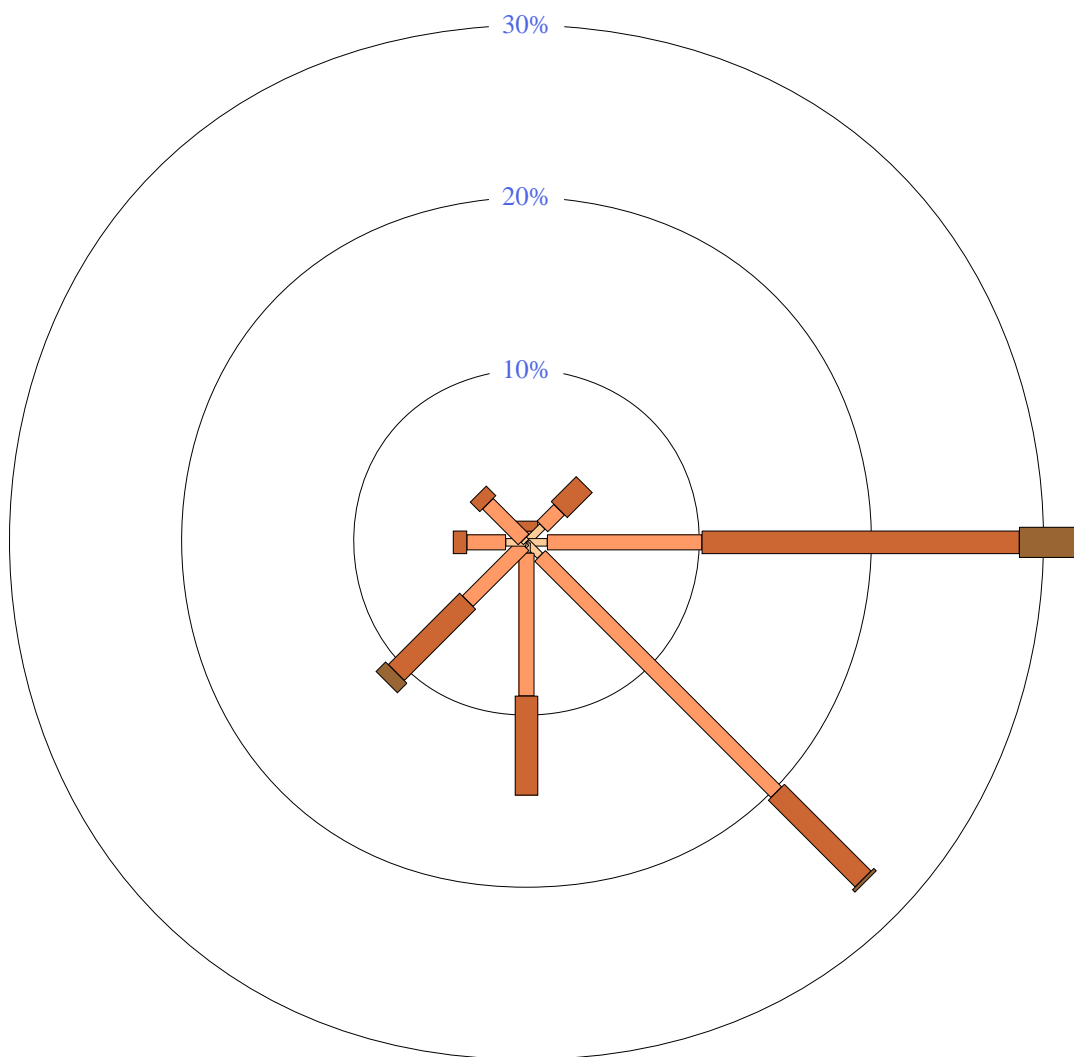
An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



9 am Jan
513 Total Observations

Calm *



Rose of Wind direction versus Wind speed in km/h (10 Sep 1993 to 30 Sep 2010)

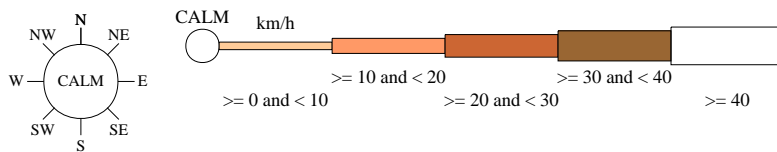
Custom times selected, refer to attached note for details

SWANBOURNE

Site No: 009215 • Opened Nov 1985 • Still Open • Latitude: -31.9558° • Longitude: 115.7619° • Elevation 40.9m

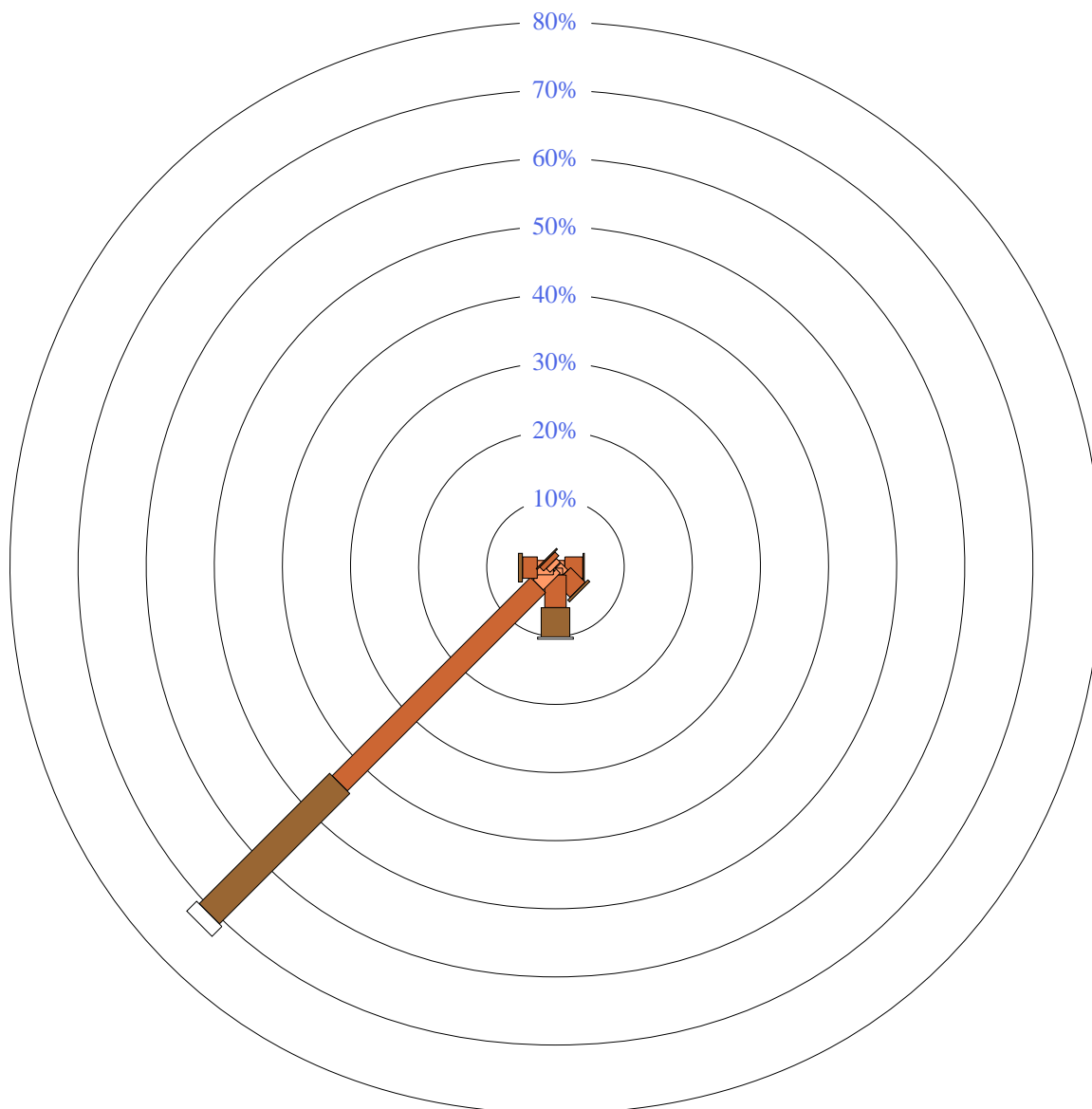
An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



3 pm Jan
514 Total Observations

Calm *



Appendix 3
Building construction standards for
BAL 12.5, BAL 19 and BAL 29 as per
AS 3959–2009

SECTION 5 CONSTRUCTION FOR BUSHFIRE ATTACK LEVEL 12.5 (BAL — 12.5)

5.1 GENERAL

A building assessed in Section 2 as being BAL—12.5 shall comply with Section 3 and Clauses 5.2 to 5.8.

NOTE: There are a number of Standards that specify requirements for construction; however, where this Standard does not provide construction requirements for a particular element, the other Standards apply.

Any element of construction or system that satisfies the test criteria of AS 1530.8.1 may be used in lieu of the applicable requirements contained in Clauses 5.2 to 5.8 (see Clause 3.8).

NOTE: BAL—12.5 is primarily concerned with protection from ember attack and radiant heat up to and including 12.5 kW/m^2 where the site is less than 100 m from the source of bushfire attack.

5.2 SUBFLOOR SUPPORTS

This Standard does not provide construction requirements for subfloor support posts, columns, stumps, piers and poles.

NOTE: The exclusion of requirements for subfloor supports applies to the principal building only and not to verandas, decks, steps, ramps and landings (see Clause 5.7).

C5.2 Ideally, storage of combustible materials beneath a floor at this BAL would not occur and on this assumption, there is no requirement to enclose the subfloor space or to protect flooring materials from bushfire attack. However, should combustible materials be stored, it is recommended the area be protected as materials stored in the subfloor space may be ignited by embers and cause an impact to the building.

5.3 FLOORS

5.3.1 Concrete slabs on ground

This Standard does not provide construction requirements for concrete slabs on the ground.

5.3.2 Elevated floors

This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring.

5.4 EXTERNAL WALLS

5.4.1 Walls

That part of an external wall surface that is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less

than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D) shall be of—

- (a) non-combustible material; or
- (b) fibre-cement external cladding, a minimum of 6 mm in thickness; or
- (c) bushfire-resisting timber (see Appendix F); or
- (d) a timber species as specified in Paragraph E1 and listed in Table E1, Appendix E; or
- (e) a combination of any of Items (a), (b), (c) or (d) above.

There are no requirements for external wall surfaces 400 mm or more from the ground or for external wall surfaces 400 mm or more above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D).

5.4.2 Joints

All joints in the external surface material of walls shall be covered, sealed, overlapped, backed or butt-jointed to prevent gaps greater than 3 mm.

Alternatively, sarking-type material may be applied over the outer face of the frame prior to fixing any external cladding.

5.4.3 Vents and weepholes

Vents and weepholes in external walls shall be screened with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium, except where the vents and weepholes are less than 3 mm (see Clause 3.6), or are located in an external wall of a subfloor space.

5.5 EXTERNAL GLAZED ELEMENTS AND ASSEMBLIES AND EXTERNAL DOORS

5.5.1 Bushfire shutters

Where fitted, bushfire shutters shall comply with Clause 3.7 and be made from—

- (a) non-combustible material; or
- (b) a timber species as specified in Paragraph E1 and listed in Table E1, Appendix E; or
- (c) bushfire-resisting timber (see Appendix F); or
- (d) a combination of any of Items (a), (b) or (c) above.

5.5.2 Windows

Window assemblies shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with Clause 5.5.1.

or

(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

or

(c) They shall comply with the following:

(i) For window assemblies less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), window frames and window joinery shall be made from one of the following:

(A) Bushfire-resisting timber (see Appendix F).

or

(B) A timber species specified in Paragraph E2 and listed in Table E2, Appendix E.

or

(C) Metal.

Or

(D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the frame and sash shall satisfy the design load, performance and structural strength of the member.

(ii) Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal.

(iii) Where glazing is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), the glazing shall be Grade A safety glass minimum 4 mm, or glass blocks with no restriction on glazing methods.

NOTE: Where double glazed units are used the above requirements apply to the external face of the window assembly only.

(iv) Where glazing is other than that specified in Item (iii) above, annealed glass may be used.

(v) The openable portions of windows shall be screened with mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

5.5.3 Doors—Side-hung external doors (including French doors, panel fold and bi-fold doors)

Side-hung external doors, including French doors, panel fold and bi-fold doors, shall comply with one of the following:

(a) They shall be protected by a bushfire shutter that complies with Clause 5.5.1.

or

(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

or

(c) They shall comply with the following:

(i) Doors shall be—

(A) non-combustible; or

(B) a solid timber door, having a minimum thickness of 35 mm for the first 400 mm above the threshold; or

(C) a door, including a hollow core door, with a non-combustible kickplate on the outside for the first 400 mm above the threshold; or

(D) a fully framed glazed door, where the framing is made from materials required for bushfire shutters (see Clause 5.5.1), or from a timber species specified in Paragraph E2 and listed in Table E2, Appendix E.

(ii) Where doors incorporate glazing, the glazing shall comply with the glazing requirements for windows.

(iii) Doors shall be tight-fitting to the doorframe and to an abutting door, if applicable.

(iv) Where any part of the door assembly is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the door (see Figure D3, Appendix D), that part of the door assembly shall be made from one of the following:

(A) Bushfire-resisting timber (see Appendix F).

or

(B) A timber species specified in Paragraph E2 and listed in Table E2, Appendix E.

or

(C) Metal.

or

(D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the door assembly shall satisfy the design load, performance and structural strength of the member.

(v) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.

5.5.4 Doors—Sliding doors

Sliding doors shall comply with one of the following:

(a) They shall be protected by a bushfire shutter that complies with Clause 5.5.1.

or

(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

or

(c) They shall comply with the following:

(i) Any glazing incorporated in sliding doors shall be Grade A safety glass complying with AS 1288.

(ii) There is no requirement to screen the openable part of the sliding door. However, if screened, the screens shall be a mesh or perforated sheet made of corrosion-resistant steel, bronze or aluminium.

NOTE: The construction of manufactured sliding doors should prevent the entry of embers when the door is closed. There is no requirement to provide screens to the openable part of these doors as it is assumed that a sliding door will be closed if occupants are not present or during a bushfire event. Screens of materials other than those specified may not resist ember attack.

(iii) Sliding doors shall be tight-fitting in the frames.

5.5.5 Doors—Vehicle access doors (garage doors)

The following apply to vehicle access doors:

(a) The lower portion of a vehicle access door that is within 400 mm of the ground when the door is closed (see Figure D4, Appendix D) shall be made from—

(i) non-combustible material; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) fibre-cement sheet, a minimum of 6 mm in thickness; or

(iv) a timber species specified in Paragraph E1 and listed in Table E1, Appendix E; or

(v) a combination of any of Items (i), (ii), (iii) or (iv) above.

(b) Panel lift, tilt doors or side-hung doors shall be fitted with suitable weather strips, draught excluders, draught seals or guide tracks, as appropriate to the door type, with a maximum gap no greater than 3 mm.

(c) Roller doors shall have guide tracks with a maximum gap no greater than 3 mm and shall be fitted with a nylon brush that is in contact with the door (see Figure D4, Appendix D).

(d) Vehicle access doors shall not include ventilation slots.

5.6 ROOFS (INCLUDING VERANDA AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES)

5.6.1 General

The following apply to all types of roofs and roofing systems:

- (a) Roof tiles, roof sheets and roof-covering accessories shall be non-combustible.
- (b) The roof/wall junction shall be sealed, to prevent openings greater than 3 mm, either by the use of fascia and eaves linings or by sealing between the top of the wall and the underside of the roof and between the rafters at the line of the wall.
- (c) Roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

5.6.2 Tiled roofs

Tiled roofs shall be fully sarked. The sarking shall—

- (a) have a flammability index of not more than 5;
- (b) be located directly below the roof battens;
- (c) cover the entire roof area including the ridge; and
- (d) be installed so that there are no gaps that would allow the entry of embers where the sarking meets fascias, gutters, valleys and the like.

5.6.3 Sheet roofs

Sheet roofs shall—

- (a) be fully sarked in accordance with Clause 5.6.2, except that foil-backed insulation blankets may be installed over the battens;

or

- (b) have any gaps greater than 3 mm, under corrugations or ribs of sheet roofing and between roof components, sealed at the fascia or wall line and at valleys, hips and ridges by—

- (i) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or
- (ii) mineral wool; or
- (iii) other non-combustible material; or
- (iv) a combination of any of Items (i), (ii) or (iii) above.

5.6.4 Veranda, carport and awning roofs

The following apply to veranda, carport and awning roofs:

- (a) A veranda, carport or awning roof forming part of the main roof space [see Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in Clauses 5.6.1, 5.6.2, 5.6.3, 5.6.5 and 5.6.6.

(b) A veranda, carport or awning roof separated from the main roof space by an external wall [see Figures D1(b) and D1(c), Appendix D] complying with Clause 5.4 shall have a non-combustible roof covering.

NOTE: There is no requirement to line the underside of a veranda, carport or awning roof that is separated from the main roof space.

5.6.5 Roof penetrations

The following apply to roof penetrations:

(a) Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors, shall be adequately sealed at the roof to prevent gaps greater than 3 mm. The material used to seal the penetration shall be non-combustible.

(b) Openings in vented roof lights, roof ventilators or vent pipes shall be fitted with ember guards made from a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(c) All overhead glazing shall be Grade A laminated safety glass complying with AS 1288.

(d) Glazed elements in roof lights and skylights may be of polymer provided a Grade A safety glass diffuser, complying with AS 1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass, minimum 4 mm, shall be used in the outer pane of the IGU.

(e) Flashing elements of tubular skylights may be of a fire-retardant material, provided the roof integrity is maintained by an under-flashing of a material having a flammability index no greater than 5.

(f) Evaporative cooling units shall be fitted with butterfly closers at or near the ceiling level or, the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(g) Vent pipes made from PVC are permitted.

5.6.6 Eaves linings, fascias and gables

The following apply to eaves linings, fascias and gables:

(a) Gables shall comply with Clause 5.4.

(b) Eaves penetrations shall be protected the same as for roof penetrations, as specified in Clause 5.6.5.

(c) Eaves ventilation openings greater than 3 mm shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.

This Standard does not provide construction requirements for fascias, bargeboards and eaves linings.

5.6.7 Gutters and downpipes

This Standard does not provide material requirements for—

- (a) gutters, with the exception of box gutters; and
- (b) downpipes.

If installed, gutter and valley leaf guards shall be non-combustible.

Box gutters shall be non-combustible and flashed at the junction with the roof with non-combustible material.

5.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS

5.7.1 General

Decking shall be either spaced or continuous (i.e., without spacing).

There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.

C5.7.1 Spaced decking is nominally spaced at 3 mm (in accordance with standard industry practice); however, due to the nature of timber decking with seasonal changes in moisture content, that spacing may range from 0–5 mm during service. The preferred dimension for gaps is 3 mm (which is in line with other ‘permissible gaps’) in other parts of this Standard. It should be noted that recent research studies have shown that gaps at 5 mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacings of 10 mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

5.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings

5.7.2.1 Materials to enclose a subfloor space

This Standard does not provide construction requirements for the materials used to enclose a subfloor space except where those materials are less than 400 mm from the ground.

Where the materials used to enclose a subfloor space are less than 400 mm from the ground, they shall comply with Clause 5.4.

5.7.2.2 Supports

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

5.7.2.3 Framing

This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).

5.7.2.4 Decking

This Standard does not provide construction requirements for decking that is more than 300 mm from a glazed element.

Decking less than 300 mm (measured horizontally at deck level) from glazed elements that are less than 400 mm (measured vertically) from the surface of the deck (see Figure D2, Appendix D) shall be made from—

- (a) non-combustible material; or
- (b) bushfire-resisting timber (see Appendix F); or
- (c) a timber species, as specified in Paragraph E1 and listed in Table E1 of Appendix E;
- (d) PVC-U; or
- (e) a combination of any of Items (a), (b), (c) or (d) above.

5.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings

5.7.3.1 Supports

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

5.7.3.2 Framing

This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).

5.7.3.3 Decking

This Standard does not provide construction requirements for decking unless it is less than 300 mm from a glazed element.

Decking less than 300 mm (measured horizontally at deck level) from glazed elements that are less than 400 mm (measured vertically) from the surface of the deck (see Figure D2, Appendix D) shall be made from—

- (a) non-combustible material; or
- (b) bushfire-resisting timber (see Appendix F); or
- (c) a timber species, as specified in Paragraph E1 and listed in Table E1, Appendix E; or
- (d) a combination of any of Items (a), (b) or (c) above.

5.7.4 Balustrades, handrails or other barriers

This Standard does not provide construction requirements for balustrades, handrails and other barriers.

5.8 WATER AND GAS SUPPLY PIPES

AS 3959 – 2009

Above-ground, exposed water and gas supply pipes shall be metal.

SECTION 6 CONSTRUCTION FOR BUSHFIRE ATTACK LEVEL 19 (BAL — 19)

6.1 GENERAL

A building assessed in Section 2 as being BAL—19 shall comply with Section 3 and Clauses 6.2 to 6.8.

NOTE: There are a number of Standards that specify requirements for construction; however, where this Standard does not provide construction requirements for a particular element, the other Standards apply.

Any element of construction or system that satisfies the test criteria of AS 1530.8.1 may be used in lieu of the applicable requirements contained in Clauses 6.2 to 6.8 (see Clause 3.8).

NOTE: BAL—19 is primarily concerned with protection from ember attack and radiant heat greater than 12.5 kW/m² up to and including 19 kW/m².

6.2 SUBFLOOR SUPPORTS

This Standard does not provide construction requirements for subfloor support posts, columns, stumps, piers and poles.

NOTE: The exclusion of requirements for subfloor supports applies to the principal building only and not to verandas, decks, steps, ramps and landings (see Clause 6.7).

C6.2 Ideally, storage of combustible materials beneath a floor at this BAL would not occur and on this assumption, there is no requirement to enclose the subfloor space or to protect flooring materials from bushfire attack. However, should combustible materials be stored, it is recommended the area be protected as materials stored in the subfloor space may be ignited by embers and cause an impact to the building.

6.3 FLOORS

6.3.1 Concrete slabs on the ground

This Standard does not provide construction requirements for concrete slabs on ground.

6.3.2 Elevated floors

This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring.

6.4 EXTERNAL WALLS

6.4.1 Walls

That part of an external wall surface that is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18

degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D) shall be made from—

- (a) non-combustible material; or
- (b) fibre-cement external cladding, a minimum of 6 mm in thickness; or
- (c) bushfire-resisting timber (see Appendix F); or
- (d) a timber species, as specified in Paragraph E1 and listed in Table E1, Appendix E; or
- (e) a combination of any of Items (a), (b), (c) or (d) above.

This Standard does not provide construction requirements for external wall surfaces 400 mm or more from the ground or for external wall surfaces 400 mm or more above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D).

6.4.2 Joints

All joints in the external surface material of walls shall be covered, sealed, overlapped, backed or butt-jointed to prevent gaps greater than 3 mm.

Alternatively, sarking-type material may be applied over the outer face of the frame prior to fixing any external cladding.

6.4.3 Vents and weepholes

Vents and weepholes in external walls shall be screened with mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium, except where they are less than 3 mm (see Clause 3.6), or are located in an external wall of a subfloor space.

6.5 EXTERNAL GLAZED ELEMENTS AND ASSEMBLIES AND EXTERNAL DOORS

6.5.1 Bushfire shutters

Where fitted, bushfire shutters shall comply with Clause 3.7 and be made from—

- (a) non-combustible material; or
- (b) a timber species, as specified in Paragraph E1 and listed in Table E1, Appendix E; or
- (c) bushfire-resisting timber (see Appendix F); or
- (d) a combination of any of Items (a), (b), or (c) above.

6.5.2 Windows

Window assemblies shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with Clause 6.5.1.

or

(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

or

(c) They shall comply with the following:

(i) For window assemblies less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings, having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), window frames and window joinery, shall be made from one of the following:

(A) Bushfire-resisting timber (see Appendix F).

or

(B) A timber species, as specified in Paragraph E2 and listed in Table E2, Appendix E.

or

(C) Metal.

or

(D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the frame and the sash shall satisfy the design load, performance and structural strength of the member.

(ii) Externally fitted hardware that supports the sash in its functions of opening and closing, shall be metal.

(iii) Where glazing is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings, having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), the glazing shall be toughened glass, minimum 5 mm, or glass blocks with no restriction on glazing methods.

NOTE: Where double-glazed units are used, the above requirements apply to the external face of the window assembly only.

(iv) Where glazing is other than that specified in Item (iii) above, annealed glass may be used. Where annealed glass is used, the fixed and openable portions of windows shall be screened externally with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(v) Where toughened glass is used, the openable portions of windows shall be screened internally or externally with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(vi) Glazed elements that are designed to take internal screens shall use toughened glass and the openable portion shall be screened in such a way to have no gaps greater than 3 mm in diameter. Screening material shall be a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

6.5.3 Doors—Side-hung external doors (including French doors, panel fold and bi-fold doors)

Side-hung external doors, including French doors, panel fold and bi-fold doors, shall comply with one of the following:

(a) They shall be protected by a bushfire shutter that complies with Clause 6.5.1.

or

(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

or

(c) They shall comply with the following:

(i) Doors shall be—

(A) non-combustible; or

(B) a solid timber door, having a minimum thickness of 35 mm for the first 400 mm above the threshold; or

(C) a door, including a hollow core door, with a non-combustible kickplate on the outside for the first 400 mm above the threshold; or

(D) a fully-framed glazed door, where the framing is made from materials specified for bushfire shutters (see Clause 6.5.1).

(ii) Where doors incorporate glazing, the glazing shall be toughened glass minimum 5 mm.

(iii) Doors shall be tight-fitting to the doorframe and to an abutting door, if applicable.

(iv) Where the doorframe is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the door (see Figure D3, Appendix D) the doorframe shall be made from one of the following:

(A) Bushfire-resisting timber (see Appendix F).

or

(B) A timber species, as specified in Paragraph E2 and listed in Table E2, Appendix E.

or

(C) Metal.

or

(D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the door assembly shall satisfy the design load, performance and structural strength of the member.

(v) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.

6.5.4 Doors—Sliding doors

Sliding doors shall comply with one of the following:

(a) They shall be completely protected by a bushfire shutter that complies with Clause 6.5.1.

or

(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

or

(c) They shall comply with the following:

(i) Any glazing incorporated in sliding doors shall be toughened glass, minimum 5 mm.

(ii) There is no requirement to screen the openable part of the sliding door. However, if screened, the screens shall be mesh or perforated sheet made of corrosion-resistant steel, bronze or aluminium.

NOTE: The construction of manufactured sliding doors should prevent the entry of embers when the door is closed. There is no requirement to provide screens to the openable part of these doors as it is assumed that a sliding door will be closed if occupants are not present or during a bushfire event. Screens of materials other than those specified may not resist ember attack.

(iii) Sliding doors shall be tight-fitting in the frames.

6.5.5 Doors—Vehicle access doors (garage doors)

The following apply to vehicle access doors:

(a) The lower portion of a vehicle access door that is within 400 mm of the ground when the door is closed (see Figure D4, Appendix D) shall be made from—

(i) non-combustible material; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) fibre-cement sheet, a minimum of 6 mm in thickness; or

- (iv) a timber species, as specified in Paragraph E1 and listed in Table E1, Appendix E; or
 - (v) a combination of any of Items (i), (ii), (iii) or (iv) above.
- (b) Panel lift, tilt doors or side-hung doors shall be fitted with suitable weather strips, draught excluders, draught seals or guide tracks, as appropriate to the door type, with a maximum gap no greater than 3 mm.
- (c) Roller doors shall have guide tracks with a maximum gap no greater than 3 mm and shall be fitted with a nylon brush that is in contact with the door (see Figure D4, Appendix D).
- (d) Vehicle access doors shall not include ventilation slots.

6.6 ROOFS (INCLUDING VERANDA AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES)

6.6.1 General

The following apply to all types of roofs and roofing systems:

- (a) Roof tiles, roof sheets and roof-covering accessories shall be non-combustible.
- (b) The roof/wall junction shall be sealed, to prevent openings greater than 3 mm, either by the use of fascia and eaves linings or by sealing between the top of the wall and the underside of the roof and between the rafters at the line of the wall.
- (c) Roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

6.6.2 Tiled roofs

Tiled roofs shall be fully sarked. The sarking shall—

- (a) have a flammability index of not more than 5, when tested to AS 1530.2;
- (b) be located directly below the roof battens;
- (c) cover the entire roof area including the ridge; and
- (d) be installed so that there are no gaps that would allow the entry of embers where the sarking meets fascias, gutters, valleys and the like.

6.6.3 Sheet roofs

Sheet roofs shall—

- (a) be fully sarked in accordance with Clause 6.6.2, except that foil-backed insulation blankets may be installed over the battens;

or

(b) have any gaps greater than 3 mm under corrugations or ribs of sheet roofing and between roof components sealed at the fascia or wall line and at valleys, hips and ridges by—

(i) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or

(ii) mineral wool; or

(iii) other non-combustible material; or

(iv) a combination of any of Items (i), (ii), or (iii) above.

6.6.4 Veranda, carport and awning roofs

The following apply to veranda, carport and awning roofs:

(a) A veranda, carport or awning roof forming part of the main roof space [see Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in Clauses 6.6.1, 6.6.2, 6.6.3, 6.6.5 and 6.6.6.

(b) A veranda, carport or awning roof separated from the main roof space by an external wall [see Figures D1(b) and D1(c), Appendix D] complying with Clause 6.4 shall have a non-combustible roof covering.

NOTE: There is no requirement to line the underside of a veranda, carport or awning roof that is separate from the main roof space.

6.6.5 Roof penetrations

The following apply to roof penetrations:

(a) Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors shall be adequately sealed at the roof to prevent gaps greater than 3 mm. The material used to seal the penetration shall be non-combustible.

(b) Openings in vented roof lights, roof ventilators or vent pipes shall be fitted with ember guards made from a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(c) All overhead glazing shall be Grade A laminated safety glass complying with AS 1288.

(d) Glazed elements in roof lights and skylights may be of polymer provided a Grade A safety glass diffuser, complying with AS 1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass of minimum 4 mm shall be used in the outer pane of the IGU.

(e) Flashing elements of tubular skylights may be of a fire-retardant material, provided the roof integrity is maintained by an under-flashing of a material having a flammability index no greater than 5.

(f) Evaporative cooling units shall be fitted with butterfly closers at or near the ceiling level, or the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

6.6.6 Eaves linings, fascias and gables

The following apply to eaves linings, fascias and gables:

(a) Gables shall comply with Clause 6.4.

(b) Eaves penetrations shall be protected the same as for roof penetrations, as specified in Clause 6.6.5.

(c) Eaves ventilation openings greater than 3 mm shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.

This Standard does not provide construction requirements for fascias, bargeboards and eaves linings.

6.6.7 Gutters and downpipes

This Standard does not provide material requirements for—

(a) gutters, with the exception of box gutters; and

(b) downpipes.

If installed, gutter and valley leaf guards shall be non-combustible.

Box gutters shall be non-combustible and flashed at the junction with the roof with non-combustible material.

6.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS

6.7.1 General

Decking shall be either spaced or continuous (i.e., without spacings).

There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.

C6.7.1 Spaced decking is nominally spaced at 3 mm (in accordance with standard industry practice); however, due to the nature of timber decking with seasonal changes in moisture content, that spacing may range from 0–5 mm during service. The preferred dimension for gaps is 3 mm (which is in line with other ‘permissible gaps’) in other parts of this Standard. It should be noted that recent research studies have shown that gaps at 5 mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacings of 10 mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

6.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings

6.7.2.1 *Materials to enclose a subfloor space*

This Standard does not provide construction requirements for the materials used to enclose a subfloor space except where those materials are less than 400 mm from the ground.

Where the materials used to enclose a subfloor space are less than 400 mm from the ground, they shall comply with Clause 6.4.

6.7.2.2 *Subfloor supports*

This Standard does not provide construction requirements for subfloor support posts, columns, stumps, stringers, piers and poles.

6.7.2.3 *Framing*

This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).

6.7.2.4 *Decking*

This Standard does not provide construction requirements for decking that is more than 300 mm from a glazed element.

Decking less than 300 mm (measured horizontally at deck level) from glazed elements that are less than 400 mm (measured vertically) from the surface of the deck (see Figure D2, Appendix D) shall be made from—

- (a) non-combustible material; or
- (b) bushfire-resisting timber (see Appendix F); or
- (c) a timber species, as specified in Paragraph E1 and listed in Table E1, Appendix E; or
- (d) a combination of any of Items (a), (b), or (c) above.

6.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings

6.7.3.1 *Supports*

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

6.7.3.2 *Framing*

This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).

6.7.3.3 *Decking*

This Standard does not provide construction requirements for decking that is more than 300 mm from a glazed element.

Decking less than 300 mm (measured horizontally at deck level) from glazed elements that are less than 400 mm (measured vertically) from the surface of the deck (see Figure D2, Appendix D) shall be made from—

- (a) non-combustible material; or
- (b) bushfire-resisting timber (see Appendix F); or
- (c) a timber species, as specified in Paragraph E1 and listed in Table E1, Appendix E; or
- (d) a combination of any of Items (a), (b), or (c) above.

6.7.4 Balustrades, handrails or other barriers

This Standard does not provide construction requirements for balustrades, handrails and other barriers.

6.8 WATER AND GAS SUPPLY PIPES

Above-ground, exposed water and gas supply pipes shall be metal.

SECTION 7 CONSTRUCTION FOR BUSHFIRE ATTACK LEVEL 29 (BAL — 29)

7.1 GENERAL

A building assessed in Section 2 as being BAL—29 shall comply with Section 3 and Clauses 7.2 to 7.8.

NOTE: There are a number of Standards that specify requirements for construction; however, where this Standard does not provide construction requirements for a particular element, the other Standards apply.

Any element of construction or system that satisfies the test criteria of AS 1530.8.1 may be used in lieu of the applicable requirements contained in Clauses 7.2 to 7.8 (see Clause 3.8).

NOTE: BAL—29 is primarily concerned with protection from ember attack and radiant heat greater than 19 kW/m² up to and including 29 kW/m².

7.2 SUBFLOOR SUPPORTS

This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with—

- (a) a wall that complies with Clause 7.4; or
- (b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or
- (c) a combination of Items (a) and (b) above.

Where the subfloor space is unenclosed, the support posts, columns, stumps, piers and poles shall be—

- (i) of non-combustible material; or
- (ii) of bushfire-resisting timber (see Appendix F); or
- (iii) a combination of Items (i) and (ii) above.

NOTE: This requirement applies to the principal building only and not to verandas, decks, steps, ramps and landings (see Clause 7.7).

C7.2 Combustible materials stored in the subfloor space may be ignited by embers and cause an impact to the building.

7.3 FLOORS

7.3.1 Concrete slabs on ground

This Standard does not provide construction requirements for concrete slabs on ground.

7.3.2 Elevated floors

7.3.2.1 Enclosed subfloor space

This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring, where the subfloor space is enclosed with—

- (a) a wall that complies with Clause 7.4; or
- (b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or
- (c) a combination of Items (a) and (b) above.

7.3.2.2 Unenclosed subfloor space

Where the subfloor space is unenclosed, flooring material, including bearers, joists and flooring less than 400 mm above finished ground level, shall be—

- (a) non-combustible (e.g., concrete, steel); or
- (b) of bushfire-resisting timber (see Appendix F); or
- (c) particleboard or plywood flooring where the underside is lined with sarking-type material or mineral wool insulation; or
- (d) a system complying with AS 1530.8.1; or
- (e) a combination of any of Items (a), (b), (c) or (d) above.

This Standard does not provide construction requirements for elements of elevated floors, including bearers, joists and flooring, if the underside of the element is 400 mm or more above finished ground level.

7.4 EXTERNAL WALLS

7.4.1 Walls

Walls shall be one of the following:

- (a) Made of non-combustible material (e.g., full masonry, brick veneer, mud brick, concrete, aerated concrete).

or

- (b) Made of timber-framed or steel-framed walls that are sarked on the outside of the frame and clad with—

- (i) fibre-cement external cladding, a minimum of 6 mm in thickness; or
- (ii) steel sheet; or

- (iii) bushfire-resisting timber (see Appendix F); or
- (iv) a combination of any of Items (i), (ii) or (iii) above.

or

- (c) A combination of Items (a) and (b) above.

7.4.2 Joints

All joints in the external surface material of walls shall be covered, sealed, overlapped, backed or butt-jointed to prevent gaps greater than 3 mm.

Alternatively, sarking-type material can be applied over the frame prior to fixing any external cladding.

7.4.3 Vents and weepholes

Vents and weepholes in external walls shall be screened with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium, except where they are less than 3 mm (see Clause 3.6).

7.5 EXTERNAL GLAZED ELEMENTS AND ASSEMBLIES AND EXTERNAL DOORS

7.5.1 Bushfire shutters

Where fitted, bushfire shutters shall comply with Clause 3.7 and be made from—

- (a) non-combustible material; or
- (b) bushfire-resisting timber (see Appendix F); or
- (c) a combination of Items (a) and (b) above.

7.5.2 Windows

Windows shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with Clause 7.5.1.

or

- (b) They shall comply with the following:

- (i) Window frames and window joinery shall be made from one of the following:

- (A) Bushfire-resisting timber (see Appendix F).

or

- (B) Metal.

or

(C) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel, and the frame and the sash shall satisfy the design load, performance and structural strength of the member.

(ii) Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal.

(iii) Glazing shall be toughened glass minimum 5 mm.

(iv) Where glazing is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D) that portion shall be screened with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(v) The openable portions of windows shall be screened with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

7.5.3 Doors—Side-hung external doors (including French doors, panel fold and bi-fold doors)

Side-hung external doors, including French doors, panel fold and bi-fold doors, shall comply with one of the following:

(a) They shall be protected by a bushfire shutter that complies with Clause 7.5.1.

or

(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium

or

(c) They shall comply with the following:

(i) Doors shall be—

(A) non-combustible; or

(B) a solid timber door, having a minimum thickness of 35 mm for the first 400 mm above the threshold; or

(C) a door, including a hollow core door, protected on the outside by a screen door or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or

(D) a fully framed glazed door, where the framing is made from non-combustible materials or from bushfire-resisting timber (see Appendix F).

(ii) Externally fitted hardware that supports the panel in its functions of opening and closing shall be metal.

(iii) Where doors incorporate glazing, the glazing shall be toughened glass, minimum 5 mm.

(iv) Where glazing is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the door (see Figure D3, Appendix D), that portion shall be screened with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(v) Doorframes shall be made from one of the following:

(A) Bushfire-resisting timber (see Appendix F).

or

(B) Metal.

or

(C) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the door assembly shall satisfy the design load, performance and structural strength of the member.

(vi) Doors shall be tight-fitting to the doorframe and to an abutting door, if applicable.

(vii) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.

7.5.4 Doors—Sliding doors

Sliding doors shall comply with one of the following:

(a) They shall be protected by a bushfire shutter that complies with Clause 7.5.1.

or

(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

or

(c) They shall comply with the following:

(i) Doorframes shall be of bushfire-resisting timber (see Appendix F) or aluminium or steel.

(ii) Externally fitted hardware that supports the panel in its functions of opening and closing shall be metal.

(iii) Where sliding doors incorporate glazing, the glazed assembly shall be toughened glass minimum 6 mm except where both the fixed and openable portions of doors are screened by a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(iv) Sliding doors shall be tight-fitting in the frames.

7.5.5 Doors—Vehicle access doors (garage doors)

The following apply to vehicle access doors:

(a) Vehicle access doors shall be made from—

(i) non-combustible material; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) fibre-cement sheet, a minimum of 6 mm in thickness; or

(iv) a combination of any of Items (i), (ii) or (iii) above.

(b) Panel lift, tilt doors or side-hung doors shall be fitted with suitable weather strips, draught excluders, draught seals or guide tracks, as appropriate to the door type, with a maximum gap no greater than 3 mm.

(c) Roller doors shall have guide tracks with a maximum gap no greater than 3 mm and shall be fitted with a nylon brush that is in contact with the door (see Figure D4, Appendix D).

(d) Vehicle access doors shall not include ventilation slots.

7.6 ROOFS (INCLUDING VERANDA AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES)

7.6.1 General

The following apply to all types of roofs and roofing systems:

(a) Roof tiles, roof sheets and roof-covering accessories shall be non-combustible.

(b) The roof/wall junction shall be sealed, to prevent openings greater than 3 mm, either by the use of fascia and eaves linings or by sealing between the top of the wall and the underside of the roof and between the rafters at the line of the wall.

(c) Roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(d) A pipe or conduit that penetrates the roof covering shall be non-combustible.

7.6.2 Tiled roofs

Tiled roofs shall be fully sarked. The sarking shall—

- (a) have a flammability index of not more than 5, when tested to AS 1530.2;
- (b) be located directly below the roof battens;
- (c) cover the entire roof area including the ridge; and
- (d) extend into gutters and valleys.

7.6.3 Sheet roofs

Sheet roofs shall—

(a) be fully sarked in accordance with Clause 7.6.2, except that foil-backed insulation blankets may be installed over the battens;

or

(b) have any gaps greater than 3 mm under corrugations or ribs of sheet roofing and between roof components sealed at the fascia or wall line and at valleys, hips and ridges by—

- (i) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or
- (ii) mineral wool; or
- (iii) other non-combustible material; or
- (iv) a combination of any of Items (i), (ii) or (iii) above.

7.6.4 Veranda, carport and awning roofs

The following apply to veranda, carport and awning roofs:

(a) A veranda, carport or awning roof forming part of the main roof space [see Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in Clauses 7.6.1, 7.6.2, 7.6.3, 7.6.5 and 7.6.6.

(b) A veranda, carport or awning roof separated from the main roof space by an external wall [see Figures D1(b) and D1(c), Appendix D] complying with Clause 7.4 shall have a non-combustible roof covering and the support structure shall be—

- (i) of non-combustible material; or
- (ii) bushfire-resisting timber (see Appendix F); or
- (iii) timber rafters lined on the underside with fibre-cement sheeting a minimum of 6 mm in thickness, or with material complying with AS 1530.8.1; or
- (iv) a combination of any of Items (i), (ii) or (iii) above.

7.6.5 Roof penetrations

The following apply to roof penetrations:

- (a) Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors, shall be adequately sealed at the roof to prevent gaps greater than 3 mm. The material used to flash the penetration shall be non-combustible.
- (b) Openings in vented roof lights, roof ventilators or vent pipes shall be fitted with ember guards made from a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.
- (c) All overhead glazing shall be Grade A laminated safety glass complying with AS 1288.
- (d) Glazed elements in roof lights and skylights may be of polymer provided a Grade A safety glass diffuser, complying with AS 1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass, minimum 4 mm, shall be used in the outer pane of the IGU.
- (e) Where roof lights are installed in roofs having a pitch of less than 18 degrees to the horizontal, the glazing shall be protected with ember guards made from a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.
- (f) Evaporative cooling units shall be fitted with butterfly closers at or near the ceiling level, or the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

7.6.6 Eaves linings, fascias and gables

The following apply to eaves linings, fascias and gables:

- (a) Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.
- (b) Gables shall comply with Clause 7.4.
- (c) Fascias and bargeboards shall—
 - (i) where timber is used, be made from bushfire-resisting timber (see Appendix F); or
 - (ii) where made from metal, be fixed at 450 mm centres; or
 - (iii) be a combination of Items (i) and (ii) above.
- (d) Eaves linings shall be—
 - (i) fibre-cement sheet, a minimum 4.5 mm in thickness; or
 - (ii) bushfire-resisting timber (see Appendix F); or
 - (iii) a combination of Items (i) and (ii) above.

(e) Eaves penetrations shall be protected the same as for roof penetrations (see Clause 7.6.5).

(f) Eaves ventilation openings greater than 3 mm shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

7.6.7 Gutters and downpipes

This Standard does not provide construction-specific material requirements for downpipes.

If installed, gutter and valley leaf guards shall be non-combustible.

With the exception of box gutters, gutters shall be metal or PVC-U.

Box gutters shall be non-combustible and flashed at the junction with the roof, with non-combustible materials.

7.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS

7.7.1 General

Decking shall be either spaced or continuous (i.e., without spacing).

There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.

C7.7.1 Spaced decking is nominally spaced at 3 mm (in accordance with standard industry practice); however, due to the nature of timber decking with seasonal changes in moisture content, that spacing may range from 0–5 mm during service. The preferred dimension for gaps is 3 mm (which is in line with other ‘permissible gaps’) in other parts of this Standard. It should be noted that recent research studies have shown that gaps at 5 mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacings of 10 mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

7.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings

7.7.2.1 *Materials to enclose a subfloor space*

The subfloor spaces of verandas, decks, steps, ramps and landings are considered to be ‘enclosed’ when—

(a) the material used to enclose the subfloor space is—

(i) non-combustible; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or

(iv) a combination of any of Items (i), (ii) or (iii) above; and

(b) all openings greater than 3 mm are screened with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

7.7.2.2 Supports

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

7.7.2.3 Framing

This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).

7.7.2.4 Decking

Decking shall be—

- (a) of non-combustible material; or
- (b) of bushfire-resisting timber (see Appendix F); or
- (c) a combination of Items (a) and (b) above.

7.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings

7.7.3.1 Supports

Support posts, columns, stumps, stringers, piers and poles shall be—

- (a) of non-combustible material; or
- (b) of bushfire-resisting timber (see Appendix F); or
- (c) a combination of Items (a) and (b) above.

7.7.3.2 Framing

Framing of verandas, decks, ramps or landings (i.e., bearers and joists) shall be—

- (a) of non-combustible material; or
- (b) of bushfire-resisting timber (see Appendix F); or
- (c) a combination of Items (a) and (b) above.

7.7.3.3 Decking

Decking shall be—

- (a) of non-combustible material; or
- (b) of bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b) above.

7.7.4 Balustrades, handrails or other barriers

Those parts of the handrails and balustrades less than 125 mm from any glazing or any combustible wall shall be—

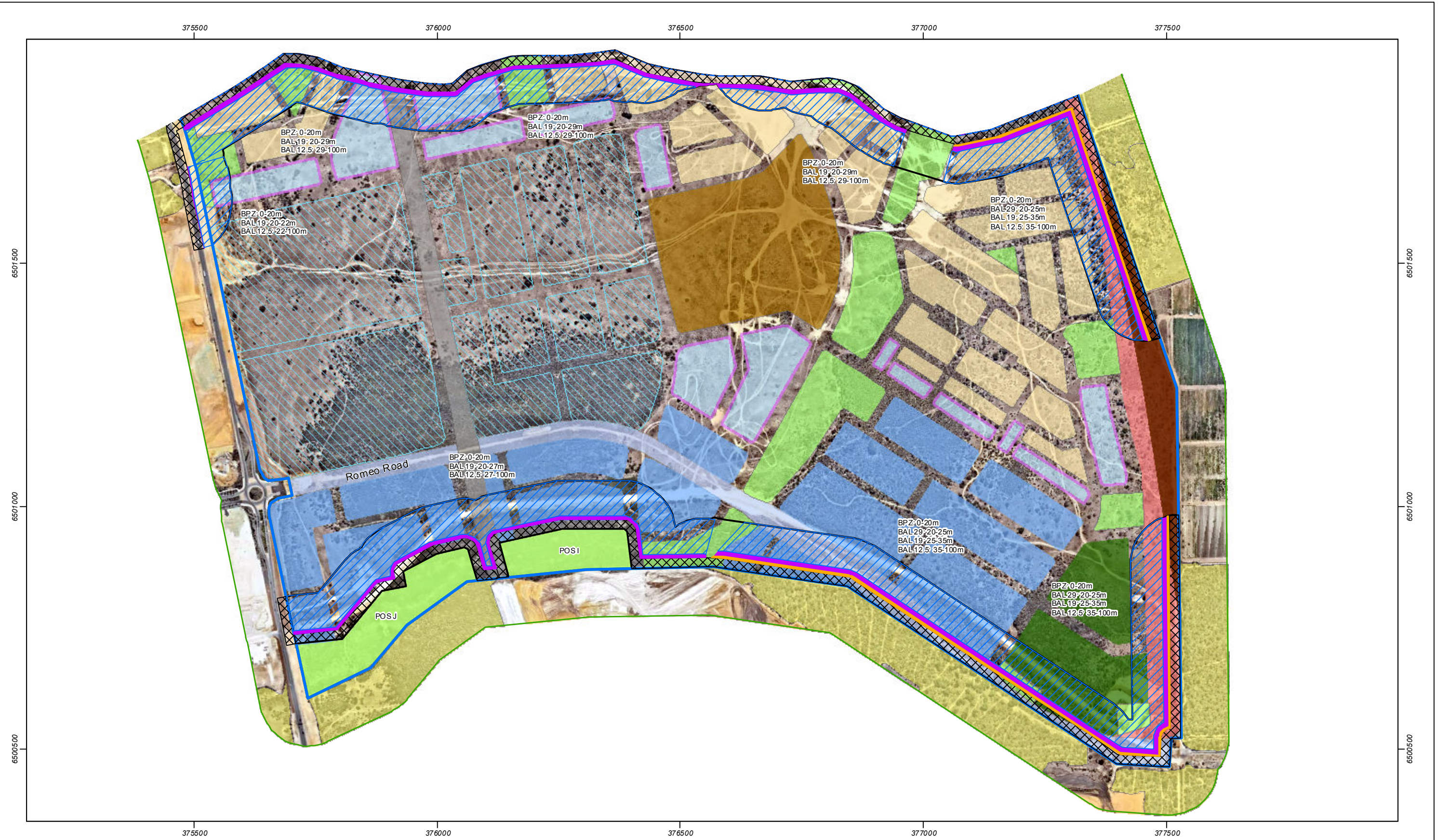
- (a) of non-combustible material; or
- (b) bushfire-resisting timber (see Appendix F); or
- (c) a combination of Items (i) and (ii) above.

Those parts of the handrails and balustrades that are 125 mm or more from the building have no requirements.

7.8 WATER AND GAS SUPPLY PIPES

Above-ground, exposed water and gas supply pipes shall be metal.

Appendix 4
Detailed depiction of fire management
measures for each site



Appendix 4 Detailed depiction of fire management measures: Alkimos City Centre

Scale 1:7,500 at A3
 0 50 100 150 200 m



Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 9/07/2015
 Author: JCrute
 Source: Client 2015.

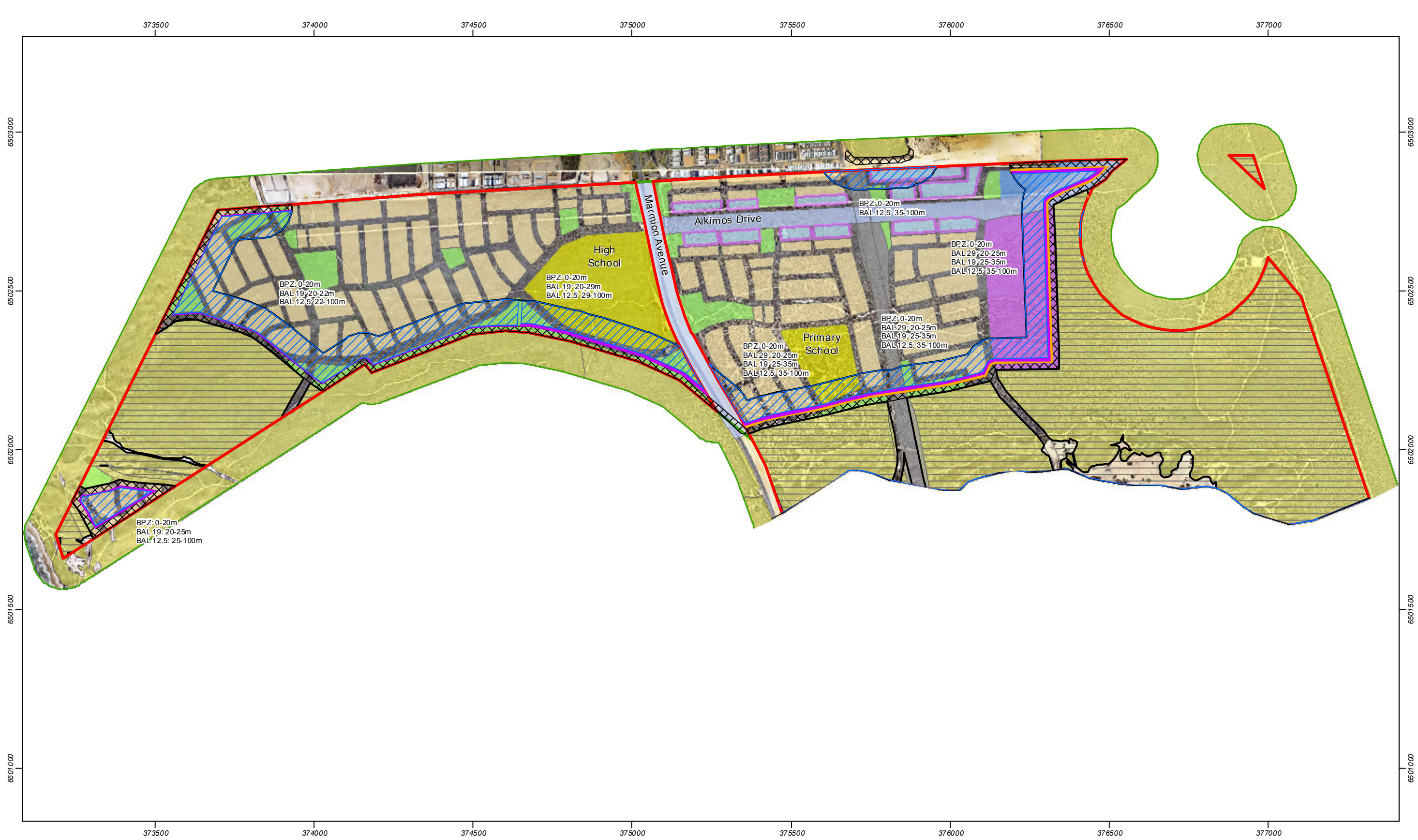
Legend

- | | | | | | |
|---|---------------------|-------------------|--------------------|--------------------|--------------------------------|
| Concept Plan boundary Alkimos City Centre | Bushfire prone area | BAL 12.5 | Business | Regional Road | Primary Regional Road |
| Concept Plan boundary Alkimos Central | 20m wide BPZ | BAL 19 | Mixed Use | Residential | Proposed Primary Regional Road |
| 100m wide assessment area | BAL 29 | Public Open Space | Civic and Cultural | Service Industrial | |
| 100m wide BAL application area | Rail Reserve | Commercial | | | |



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Appendix 4 Detailed depiction of fire management measures: Alkimos Central

Scale 1:11,500 at A3
 0 100 200 300 400 m

Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 8/07/2015
 Author: JCrute
 Source: Client 2015.

Legend

- | | | | | | |
|---|---------------------|----------|-------------------|------------------------|---------------------|
| Concept Plan boundary Alkimos City Centre | Bushfire prone area | BAL 12.5 | Business | Regional Road | Regional Open Space |
| Concept Plan boundary Alkimos Central | 20m wide BPZ | BAL 19 | Mixed Use | Residential | |
| 100m wide assessment area | | BAL 29 | Public Open Space | Education | |
| 100m wide BAL application area | | | Rail Reserve | District Playing Field | |



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Appendix 5
City of Wanneroo Annual Firebreak
Notice

Firebreaks

Firebreaks are a simple way to help protect your property from fire.

A firebreak is a strip of cleared or ploughed land to allow easy access for emergency vehicles during a fire. Firebreaks must extend around the entire perimeter of the land immediately inside the boundary.

Firebreaks are a legal requirement and property owners are required to clear firebreaks by 15 November each year and maintain them until the following April.

Property less than 2,000 sqm

A firebreak no less than 2 metres wide by 2 metres high is required around the perimeter and the growth on the firebreak cannot exceed 20mm high.

Property greater than 2,000 sqm

A firebreak no less than 3 metres wide by 3 metres high is required around the perimeter and the growth on the firebreak cannot exceed 20mm high.

Firebreak inspections

From the 16 November each year, firebreak inspections are carried out by the City's Rangers/Fire Control Officers on all vacant urban land and rural properties.

Firebreak inspections are carried out on all vacant residential, rural, semi-rural, special rural and special residential land annually and if not constructed, an on the spot fine of \$250 will be issued to the owner of the property.