



# Appendix D

Bushfire Management Plan

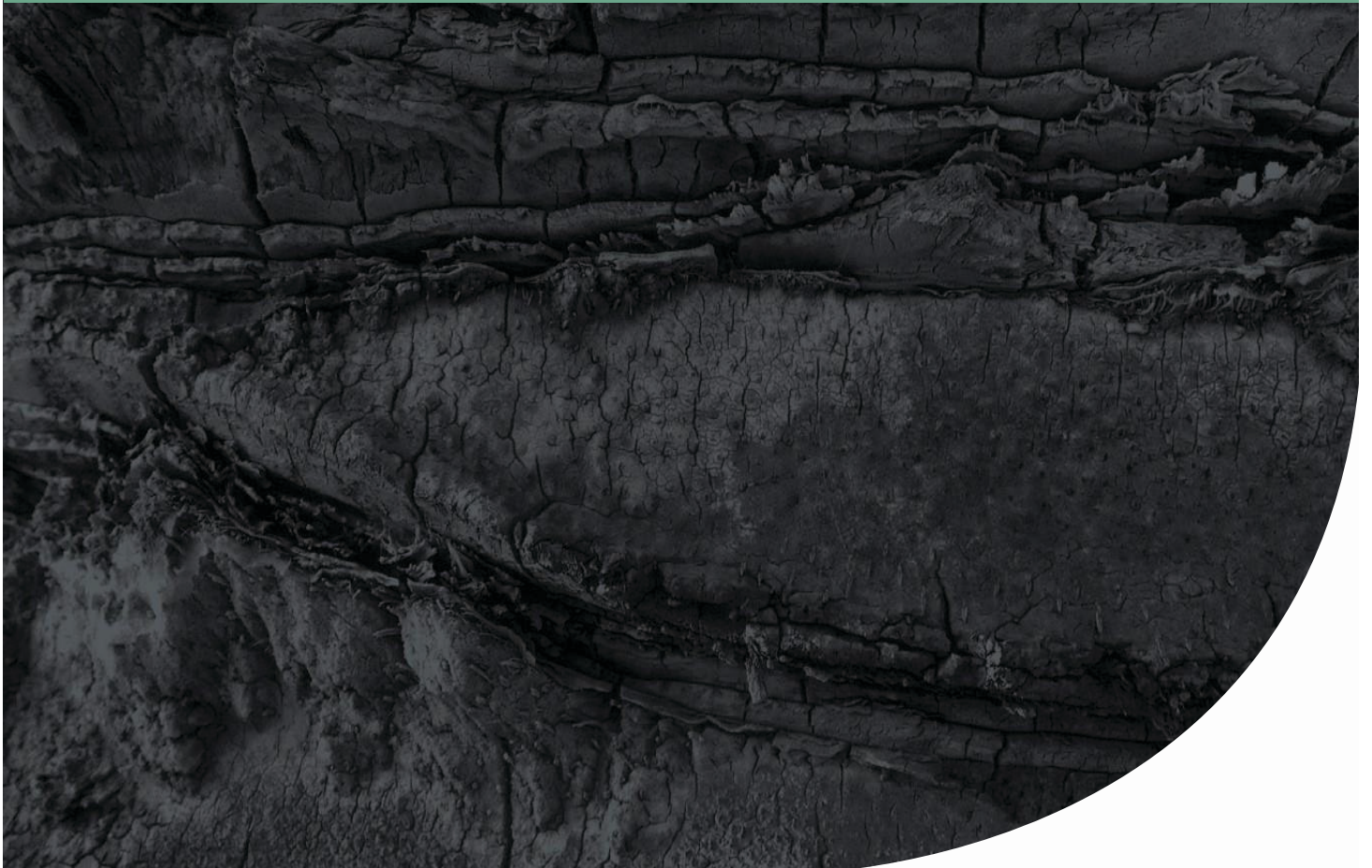
Author: Emerge Associates

# Bushfire Management Plan

## Alkimos Central Precinct Plan

Project No: EP19-077(07)

**Prepared for Development WA  
November 2021**



# Bushfire Management Plan

## Alkimos Central Precinct Plan



## Document Control

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This document has been prepared primarily to consider the layout of development and/or the appropriate building construction standards applicable to development, where relevant. The measures outlined are considered to be prudent minimum standards only based on the standards prescribed by the relevant authorities. The level of bushfire risk mitigation achieved will depend upon the actions of the landowner or occupiers of the land and is not the responsibility of the author. The relevant local government and fire authority (i.e. Department of Fire and Emergency Services or local bushfire brigade) should be approached for guidance on preparing for and responding to a bushfire.

Notwithstanding the precautions recommended in this document, it should always be remembered that bushfires burn under a wide range of conditions which can be unpredictable. An element of risk, no matter how small, will always remain. The objective of the Australian Standard AS 3959-2018 is to "prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire while the front passes" (Standards Australia 2018). Building to the standards outlined in AS 3959 does not guarantee a building will survive a bushfire or that lives will not be lost.

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## Executive Summary

Development WA (the proponent) intend to progress development of a city centre within Lots 1 and 2 of Deposited Plan 419385, and part Lot 2000 of Deposited Plan 409771, Marmion Avenue, Wanneroo (herein referred to as “the site”), in accordance with the proposed Activity Centre Plan, attached as **Appendix A**.

The Land Use Plan indicates that the future development of the site will include residential, commercial, retail, mixed-use and public purpose lots, an urban road network, public open space (POS), aged care lot, and a primary school. The current subdivision is separated by a rail corridor that is currently under construction.

The site comprises a total area of approximately 203 hectares (ha) and is located approximately 39 km north-west of the Perth Central Business District (CBD), as shown in **Figure 1**. The site is bound by regional open space to the north and east, Mitchell Freeway to the east, private landholdings to the south and Marmion Avenue to the west. The site is separated in the middle by a rail corridor that is currently being developed by the Public Transport Authority (PTA).

The site is currently identified as a “Bushfire Prone Area” under the state-wide *Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM 2017). The identification of Bushfire Prone Areas within any portion of the site requires further assessment of the bushfire hazard implications on the proposed development to be undertaken in accordance with *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7) (WAPC 2015) and the *Guidelines for Planning in Bushfire Prone Areas Version 1.3* (the Guidelines) (WAPC and DFES 2017) and *Australian Standard 3959-2018 Construction of buildings in bushfire-prone areas* (AS 3959) (Standards Australia 2018).

The purpose of SPP 3.7 is to preserve life and reduce the impact of bushfire on property and infrastructure through effective risk-based land-use planning. This BMP examines the likely long-term bushfire risk (following development) and the risk mitigation measures that will ensure the land is suitable for its intended purpose.

The majority of the site is vegetated with scrub and shrubland vegetation which will be removed as part of future development. Some clearing has occurred within the site. External to the site, scrub vegetation has been identified to the north, east, and south.

For the purpose of this assessment, a post-development vegetation classification scenario has been assumed in order to determine the likely medium-to-long-term bushfire risk posed to development within the site. As part of this, it has been assumed that all classified vegetation within the site will be managed to a ‘low threat’ standard or other exclusion criteria as part of future residential development, with the exception of vegetation within the public open space along the parabolic dune which will be revegetated to scrub, and the retained threatened ecological community. This includes public open space (POS) areas, which will be landscaped and maintained to achieve a low threat classification, initially by the proponent and then by the City of Wanneroo following handover.

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The post-development scenario also assumes that the Regional Open Space (ROS) to the north will be revegetated to a 'Scrub' classification, to represent a worst-case bushfire hazard scenario. This ROS land is managed by WAPC, which is vegetated with extensive scrub and some areas of shrubland vegetation.

The outcomes of this BMP demonstrate that as development progresses, it will be possible for an acceptable solution to be adopted for each of the applicable bushfire protection criteria outlined in the Guidelines. This includes:

- **Location:** future development will be located in an area that will, on completion, able to achieve separation for BAL-29 development or below.
- **Siting and Design:** all future dwellings can be sited within the proposed development so that BAL-29 or less can be achieved based on the proposed Master Plan.
- **Vehicular Access:** Safe vehicular access to the site will ultimately be provided through multiple public roads connecting to the east, south and west of the site, which then connects to the broader public road network. A fire access route may be required along the northern boundary of the residential cell adjoining the regional open space to facilitate a perimeter road for access to the bushfire hazard to the north.
- **Water:** the development will be provided with a permanent and reticulated water supply to support onsite firefighting requirements.

The management/mitigation measures to be implemented through the proposed subdivision of the site have been outlined as part of this BMP. Following certification, the BAL ratings determined within this BMP (or as part of future stage-based BAL assessments) can be used to support future building approval processes.

The management/mitigation measures to be implemented as part of the future development of the site have been outlined in this BMP and demonstrate that the bushfire protection criteria can be satisfied following SPP 3.7 and the Guidelines. Following approval of the Precinct Plan (PP), further detailed planning will need to be undertaken, including the preparation of subdivision applications. This BMP is intended to not only support the preparation of the PP, but to also guide future development, and identify the future planning considerations required from a bushfire perspective.

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## Appendices

### Appendix A

Alkimos Central Precinct Plan and Alkimos Central Indicative Land Use and Density Plan (Urbis 2021)

### Appendix B

Landscape Master Plan (UDLA 2021)

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## List of Abbreviations

*Table A1: Abbreviations – General terms*

General terms	
AHD	Australian Height Datum
AS	Australian Standard
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BHL	Bushfire Hazard Level
BMP	Bushfire Management Plan
BPAD	Bushfire Planning and Design
CCW	Conservation category wetland
EEP	Emergency Evacuation Plan
ESA	Environmentally Sensitive Area
ESL	Emergency Services Levy
FDI	Fire Danger Index
FZ	Flame Zone
TEC	Threatened ecological community

*Table A2: Abbreviations – Organisations*

Organisations	
DBCA	Department of Biodiversity Conservation and Attractions
DWER	Department of Water and Environmental Regulation
DFES	Department of Fire and Emergency Services
DPLH	Department of Planning, Lands and Heritage
OBRM	Office of Bushfire Risk Management
WAPC	Western Australian Planning Commission



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*Table A3: Abbreviations – Legislation and policies*

Legislation	
Guidelines	<i>Guidelines for Planning in Bushfire Prone Areas version 1.3 (WAPC and DFES 2017)</i>
SPP 3.7	<i>State Planning Policy 3.7 Planning in Bushfire Prone Areas (WAPC 2015)</i>

*Table A4: Abbreviations – Planning and building terms*

Planning and building terms	
AS 3959	Australian Standard 3959-2018 Construction of buildings in bushfire-prone areas (Standards Australia 2018)
LPS	Local Planning Scheme
PP	Precinct Plan
POS	Public Open Space
ROS	Regional Open Space

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## 1 Proposal Details

Development WA (the proponent) intend to progress development of a City Centre within Lots 1 and 2 of Deposited Plan 419385, and part Lot 2000 of Deposited Plan 409771, Marmion Avenue, Wanneroo (herein referred to as “the site”), in accordance the proposed Precinct Plan (PP) and Activity Centre Plan, attached as **Appendix A**. The site comprises a total area of approximately 203 hectares (ha) and is located approximately 39 km north-west of the Perth Central Business District (CBD), as shown in **Figure 1**. The site is bounded by regional open space (ROS) to the north and east, private landholdings to the south and Marmion Avenue to the west. The site is separated in the middle by a rail corridor that is currently being developed by the Public Transport Authority (PTA).

The site and surrounding land is currently identified as a “Bushfire Prone Area” under the state-wide *Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM 2019), as shown in **Plate 1** below. The identification of Bushfire Prone Areas within any portion of the site requires further assessment of the bushfire hazard implications on proposed development to be undertaken following *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7) (WAPC 2015) and the *Guidelines for Planning in Bushfire Prone Areas Version 1.3* (the Guidelines) (WAPC and DFES 2017).

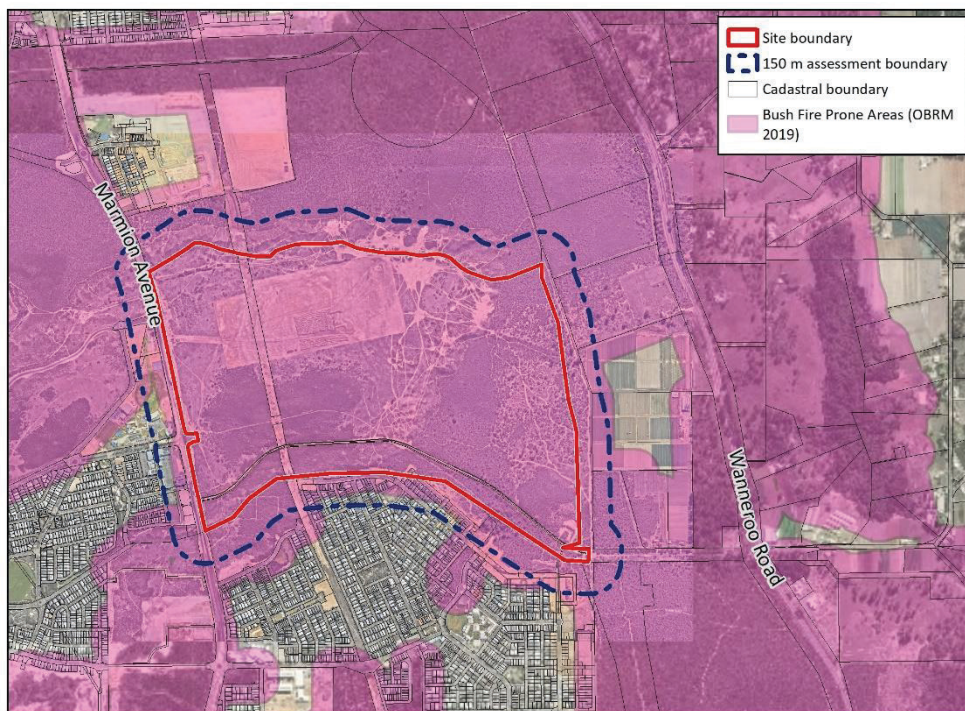


Plate 1: Areas within and surrounding the site identified as “Bushfire Prone Areas” (OBRM 2019).

# Bushfire Management Plan

## Alkimos Central Precinct Plan



### 1.1 Aim of this document

The objective of this BMP is to support the future residential development of the site following the PP Activity Centre Plan attached in **Appendix A** and to ensure bushfire management issues (such as location, siting, vehicle access and water supply) are addressed as part of the planning and development process. This BMP addresses the requirements of SPP 3.7, the Guidelines and *Australian Standard 3959-2018 Construction of buildings in bushfire-prone areas* (AS 3959) (Standards Australia 2018).

This BMP includes:

- An assessment of classified vegetation and associated bushfire hazard levels in the vicinity of the site (within 150 m) and consideration of hazards that will exist in the post-development scenario.
- Identification of how the development will achieve the performance principles of the Guidelines by ensuring:
  - Development can be located, sited and designed to ensure that any bushfire hazard does not present an unreasonable level of risk to life and property (i.e. BAL-29 is not exceeded), supported by an indicative Bushfire Attack Level (BAL) assessment. Where applicable, this includes consideration of Asset Protection Zone (APZ) requirements.
  - Vehicular access to and egress from the development is safe if a bushfire occurs.
  - Water is available to the development to assist fire suppression so that life and property can be protected from bushfire.
- An outline of the roles and responsibilities associated with implementing this BMP.

### 1.2 Statutory policy and framework

The following key legislation, policies and guidelines are relevant to the preparation of a bushfire management plan:

- *Bush Fires Act 1954*
- *Fire and Emergency Services Act 1998*
- *Planning and Development Act 2005* and associated regulations
- *Building Act 2011* and associated regulations
- *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (WAPC 2015)
- *Guidelines for Planning in Bushfire Prone Areas version 1.3* (WAPC and DFES 2017)
- *Australian Standard AS 3959:2018 Construction of buildings in bushfire-prone areas* (Standards Australia 2018)

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### 1.3 Description of the proposed development

The proposed development is a Precinct Plan (PP) to be considered by the Western Australian Planning Commission (WAPC). The proposed PP provides an outline for how the structure and layout of development should be progressed for the site. The PP will assist in the coordination and provision of utility networks, transport networks, public open space, urban water management, development standards and other infrastructure development. The proposed PP area is demonstrated in **Appendix A**.

Development within the site will include:

- Residential, commercial, retail, mixed-use, business and service industry and public purpose lots
- an interconnected public road network
- public open space, which includes a mix of passive and active recreation spaces
- a railway batter
- public open space, which includes a mix of passive and active recreation spaces, and
- a primary school and the potential for aged care facilities/retirement use.

The PP is part of 10+ year development plan for the area which will progress construction of major roads, rail and urban development within the City of Wanneroo.

The site includes a dune ridge that runs through the site and connected to the dune network in the ROS to the north. This area will be set aside as POS and revegetated to a scrub standard.

The proposed Activity Centre Plan is shown in **Appendix A**.

### 1.4 Description of the land characteristics

Historical imagery demonstrates that the site has sparse vegetation cover prior to 1965, then regenerated over the following years. The site has been used for 4WD activity and has a series of established trails. Marmion Avenue was constructed around 2008-2010, with land to the north of the site beginning clearance for development in 2017 and continuing under the Alkimos Vista development. The existing clearance of vegetation within the proposed subdivision area occurred in 2020. Land around the subdivision is continuing to be cleared for development, with the rail corridor being cleared in 2020.

The site adjoins regional open space managed by the WAPC which includes a dune system running west to east, north of the site. This dune system continues to the south through the site. This dune ridge will be maintained and revegetated as part of future development. The natural topographic contours (shown in **Figure 1**) indicate there is a depression in the western portion of the site, with the topography rising to the north, east and south. The elevation ranges from 30 m AHD in the western portion of the site to 50-60 m AHD along the dune ridge. The topography dips down again, east of the dune ridge.

More broadly, the site is located within an area where urban development is currently being progressed and connects with an existing urban road network and dissected by a rail corridor currently under construction.

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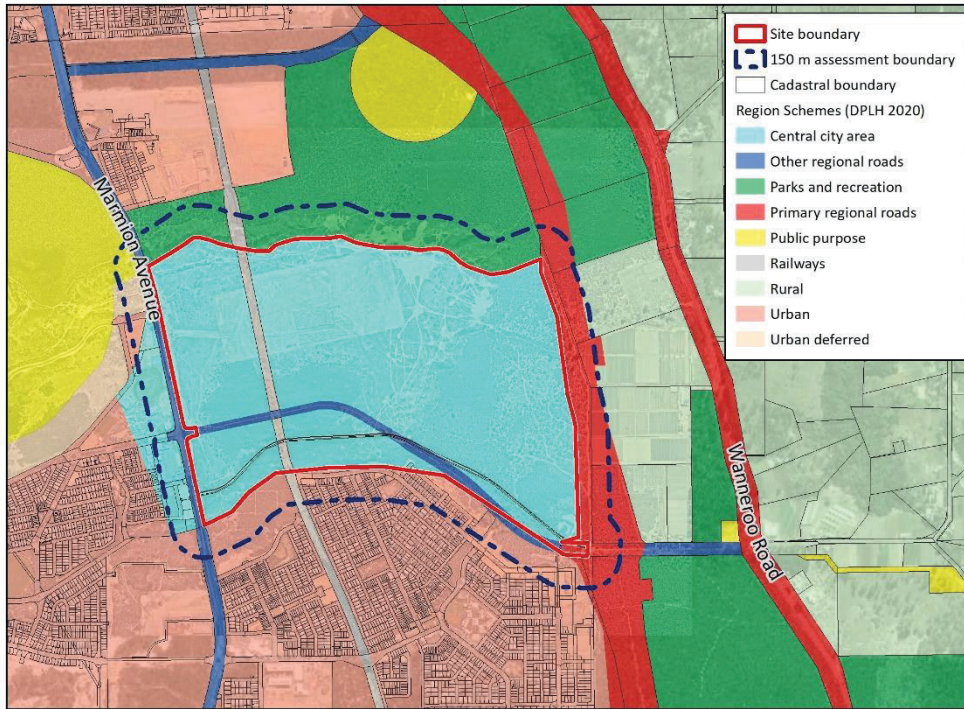


Plate 2: MRS Zones and Reserves.

# Bushfire Management Plan

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## 2 Environmental Considerations

In accordance with the *Bushfire Management Plan – BAL Contour* template prepared by the Department of Planning, Lands and Heritage (2018), this BMP has considered whether there are any environmental values that may require specific consideration through either protection, retention or revegetation. To support this, a review of publicly available databases and site-specific investigations has been undertaken, with particular reference to the Shared Location Information Platform (SLIP) databases. A summary of the search results has been provided in **Table 1**.

*Table 1: Summary of potential environmental considerations that may be associated with the site (based on a search of the SLIP databases and site-specific information)*

Key environmental feature:	Yes / no / potentially occurring within the site	If yes / potentially, describe value that may be impacted
Conservation category wetlands and buffer (Geomorphic wetlands Swan Coastal Plain) (DBCA-019)	No	Not applicable
Waterways (DWER-031)	No	Not applicable
RAMSAR wetlands (DBCA-010)	No	Not applicable.
Threatened and priority flora (DBCA-036)	No	Not applicable.
Threatened and priority fauna (DBCA-037)	Potentially	IUCN category P4 invertebrate within 6 km.
Threatened Ecological Communities (TECs) (DBCA-038)	Potentially	ID: 188, 189, 1881, 1921, 126816
Bush Forever areas (DPLH-019)	No	Not applicable.
Clearing regulations – Environmentally Sensitive Areas (ESAs) (DWER-046)	Yes	The majority of the site and surrounding land is mapped as an ESA.
DBCA controlled lands or waters (DBCA-011)	No	Not applicable
Swan Bioplan Regionally Significant Natural Areas 2010 (DWER-070)	No	Not applicable
Aboriginal heritage (DPLH-001)	Yes	No registered Aboriginal sites are known to occur on the site. However, there are features that are culturally significant to the Nyoongar people, including 'Other Heritage Place 37348 – Romeo Road Pinnacles', recorded as 'Stored Data/Not a Site'. Additional information on the Aboriginal heritage values of the site can be found in the Environmental Assessment and Management Strategy prepared to support this application (Emerge Associates 2021).
Non-indigenous heritage (DPLH-006)	No	Not applicable

Multiple flora and vegetation surveys have been undertaken over the Alkimos – Eglinton district. The most comprehensive survey was a 'level 2' survey undertaken in 2005 by ATA Environmental to support the MRS amendment.

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Emerge Associates also conducted a flora and vegetation assessment of the Alkimos City Centre and Central PP areas in October 2012 to verify the previously recorded vegetation association and vegetation condition mapping for the site (Emerge Associates 2013).

No threatened or priority flora species, priority ecological communities (PECs) or threatened ecological communities (TECs) were recorded during the flora and vegetation surveys in 2005, 2012 or 2013. Recent surveys of the PTA rail corridor (GHD 2018) revealed the presence of the state listed TEC '*Melaleuca huegelii* - *M. systema* shrublands on limestone ridges' within the site. This TEC which is listed as 'endangered', is synonymous with the Gibson *et al.* (1994) floristic community type 26a '*Melaleuca huegelii* - *M. systema* shrublands of limestone ridges'.

### 2.1 Native vegetation – modification and clearing

The areas for subdivision have been partially cleared of native vegetation. Further vegetation removal will be required as part of future development. There has been regrowth in previously disturbed areas that will be removed as construction continues.

### 2.2 Revegetation and landscape plans

Landscaping plans for the precinct plan have been prepared. The concept for landscaping of public open space is currently to provide low threat vegetation within the majority of POS. Along the parabolic dune ridge, the POS will be revegetated to scrub per the surrounding native vegetation. Two POS areas will incorporate the retained TEC, discussed in **Section 2** above. The TEC will be surrounded by a 5 m wide buffer of retained native vegetation. This vegetation has a combined area greater than 1 ha and is classified as scrub. Therefore the TEC will be a permanent bushfire hazard.

Management of areas of low threat vegetation in the future should include (but not limited to), and will occur as future development occurs:

- Regular mowing/slashing of grass to less than 100 mm in height (where present).
- Irrigation of grass and garden beds (where required).
- Regular removal of weeds and built up dead material (such as fallen branches, leaf litter etc.).
- Low pruning of trees (branches below 2 m in height removed where appropriate/applicable).
- Application of ground/surface covers such as mulch or non-flammable materials as required/applicable.

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## 3 Bushfire Assessment Results

Bushfire risk for the site has been appropriately considered in the specific context of the Guidelines and AS 3959. Appendix Two of the Guidelines provides a description for undertaking a broad level of hazard assessment using the vegetation classifications from AS 3959. The purpose is to identify at the strategic level the Bushfire Hazard Level (BHL) and the likely impact and intensity of a bushfire attack.

The objective of AS 3959 is to reduce the risk of ignition and loss of a building to bushfire. It provides a consistent method for determining a radiant heat level (radiant heat flux) as a primary consideration of bushfire attack on a building or object. It measures the Bushfire Attack Level as the radiant heat level ( $\text{kWm}^2$ ) over a distance of 100 m.

It also prescribes simple construction responses that can resist the determined radiant heat level at a given distance from the fire and are based on six Bushfire Attack Level (BAL) ratings: BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ. Bushfire risk for the site has been appropriately considered in the specific context of the Guidelines and AS 3959.

Not all vegetation is a classified bushfire risk. Vegetation and ground surfaces that are exempt from classification as a potential hazard are identified as a low threat under Section 2.2.3.2 of AS 3959. Low threat vegetation includes the following:

- a) Any vegetation type that is more than 100 m from the site.
- b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified.
- c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site or each other or of other areas of vegetation being classified vegetation.
- d) Strips of vegetation less than 20 m wide (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified.
- e) Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.
- f) Vegetation regarded as a low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.

### 3.1 Bushfire Hazard Level assessment

To support the proposed precinct plan, bushfire hazard levels (BHL) within and nearby to the site have been determined in accordance with Appendix Two of the Guidelines and based on the vegetation classification detailed in **Table 2**.

In addition, and to support future development, a method 1 BAL assessment has been completed for the site to understand the BAL ratings likely to be applicable and the associated separation requirements (where applicable), based on the vegetation classification and effective slope detailed in **Table 2**. This is detailed further below.



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### 3.1.1 Assessment inputs

Vegetation within the site and surrounding 150 m was classified in accordance with Table 2.3 of AS 3959. The classification of vegetation is based on an assessment of vegetation structure, which considers the various fuel layers of different vegetation types. For example, fuel layers in a typical forest environment can be broken down into five segments as illustrated in **Plate 3** below. These defined fuel layers are considered when determining the classification of vegetation and associated bushfire hazard levels.



*Plate 3: The five fuel layers in a forest environment that could be associated with fire behaviour (Gould et al. 2007)*

An assessment of existing vegetation within the site and surrounding 150 m was undertaken by the author on 11 May 2020 in accordance with AS 3959 and the Guidelines. It is noted that the Romeo Road corridor has been cleared since the fieldwork was undertaken, however this will not affect the post-development vegetation assessment.

It is noted that not all land within 150 m of the site were accessible due to permission issues, and therefore some areas of vegetation were only visible from publicly accessible roads and/or from lots where permission was granted to access.

**Table 2** below outlines:

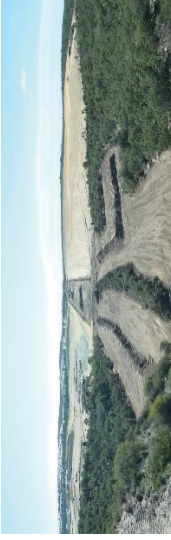

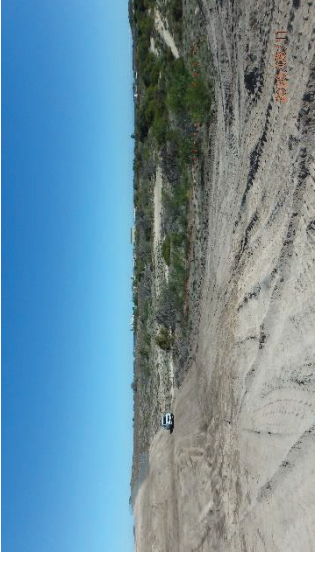

- The pre-development AS 3959 vegetation classifications (and associated photo locations) are shown in **Figure 2**.
- The pre-development bushfire hazard level ratings are shown in **Figure 3**.
- The post-development AS 3959 vegetation classifications are shown in **Figure 4**.
- The post-development BAL Contour Plan is shown in **Figure 6**.

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Table 2: Vegetation classification, effective slope and future management

Pre development		Post development	
Plot no.	AS 3959 vegetation classification (see Figure 3)	Site photo/s (location points shown in Figure 2)	Plot no. and effective slope (see Figure 4 and Figure 5)
2	<p><b>AS 3959 classification (Figure 2):</b> Scrub (Class D)</p> <p>The majority of the vegetation within 150 m of the subdivision is characterised by banksia trees with an average height of 4 m, with all trees under 6 m. The understory includes native species including grass trees, native grasses and shrubs. This vegetation has a clear surface, near-surface and elevated fuel and is classified as Class D – Scrub.</p> <p>The vegetation located in the north-west portion of the site is regenerating scrub. Whilst this vegetation has fewer plants above 2 m, it is sufficient to exceed shrubland classification.</p>	 <p><i>Photo location 1: View from the northern boundary of the site towards PTA corridor and WAPC ROS.</i></p>  <p><i>Photo location 3: View from the northern boundary of the site looking east along dune ridge.</i></p>	<p>2, 6, 7</p> <p>Scrub to the north of the subdivision within the WAPC regional open space is expected to remain and continue to revegetate.</p> <p>The scrub vegetation within the site will be cleared and replaced with urban development including low threat vegetation and unvegetated areas. The vegetation along the parabolic dune will be revegetated to scrub standard.</p> <p>The TEC vegetation will be retained and have a 5 m buffer of native vegetation surrounding it.</p> <p><b>AS 3959 classification (Figure 4):</b> Scrub (Class D)</p> <p><b>Effective slope (Figure 5):</b> Upslope Downslope 0-5° (south) Downslope 5-10° (north)</p>
		 <p><i>Photo location 2: View from the northern boundary of the site looking south-west towards the site.</i></p>  <p><i>Photo location 4: View from the top of north-south dune ridge looking south-east.</i></p>	

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Table 2: Vegetation classification, effective slope and future management (continued)

Pre development		Post development	
Plot no.	AS 3959 vegetation classification (see Figure 3)	Site photo/s (location points shown in Figure 2)	Plot no. AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)
	(Continued from above)	 <p>Photo location 5: View from the top of north-south dune ridge looking east.</p>	(Continued from above)
		 <p>Photo location 6: View from the south-central portion of the site looking north</p>	
		 <p>Photo location 7: View from the south-central portion of the site looking south</p>	
		 <p>Photo location 8: View from the south-west portion of the site looking south</p>	

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Table 2: Vegetation classification, effective slope and future management (continued)




Pre development		Post development	
Plot no.	AS 3959 vegetation classification (see Figure 3)	Site photo/s (location points shown in Figure 2)	Plot no. AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)
	(Continued from above)  The vegetation along the bottom of the dune is quite uniform in composition and is generally 2-3 m in height. Therefore, this has been classified as scrub.	 <p>Photo location 9: View from the intersection of Romeo Road and the freeway road reserve looking south</p>	(Continued from above)
		 <p>Photo location 10: View from outside the eastern boundary looking west</p>	
		 <p>Photo location 11: View from north-east boundary looking west</p>	
		 <p>Photo location 12: View towards the southern portion of the dune looking south</p>	

# Bushfire Management Plan

Alkimos Central Precinct Plan



Table 2: Vegetation classification, effective slope and future management (continued)


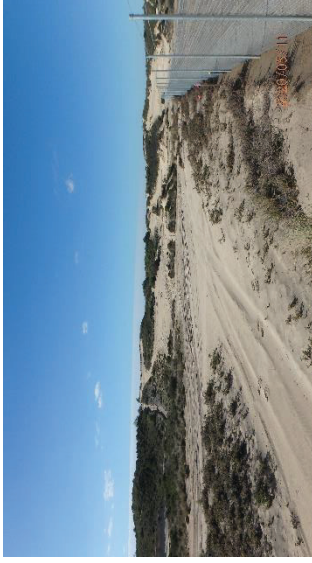

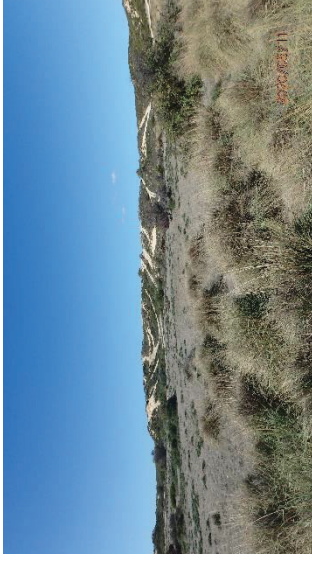
Pre development		Post development	
Plot no.	AS 3959 vegetation classification (see Figure 3)	Site photo/s (location points shown in Figure 2)	Plot no. and effective slope (see Figure 4 and Figure 5)
	(Continued from above)	 <p>Photo location 13: View across the PTA corridor in the south towards dune system vegetation</p>  <p>Photo location 15: View to south of scrub vegetation in the south-west portion of the site</p>	(Continued from above)
		 <p>Photo location 14: View to north of scrub vegetation in the south-west portion of the site</p>  <p>Photo location 15: View to the north of scrub vegetation west of the site on Marmion Avenue</p>	(Continued from above)

# Bushfire Management Plan

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Table 2: Vegetation classification, effective slope and future management (continued)

Pre development		Post development	
Plot no.	AS 3959 vegetation classification (see Figure 3)	Site photo/s (location points shown in Figure 2)	Plot no. AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)
1	<p><b>AS 3959 classification (Figure 2):</b> Shrubland (Class C)</p> <p>The Scrub vegetation is bordered to the south by a dune system vegetated with low shrubs under 2 m in height. This vegetation is classified as Shrubland.</p> <p>The vegetation has a variable condition, with large areas of degraded vegetation.</p>	 <p>Photo location 17: View to the east from PTA corridor north of site along dune ridge</p>  <p>Photo location 19: View to the east just north of the cleared area in the site</p>	<p>The shrubland vegetation located within the WAPC regional open space will remain and is expected to revegetate resulting in scrub vegetation.</p> <p>The shrubland within the site will be cleared with the exception of the [parabolic dune POS which will be revegetated to scrub standard.</p> <p><b>AS 3959 classification (Figure 4):</b> Scrub (Class D)</p> <p><b>Effective slope (Figure 5):</b> Upslope Downslope 0-5° (south) Downslope 5-10° (north)</p>
		 <p>Photo location 18: View to the east from north of site along dune ridge</p>  <p>Photo location 20: View to the east, just east of the existing cleared portion on the site</p>	

## Bushfire Management Plan

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Table 2: Vegetation classification, effective slope and future management (continued)

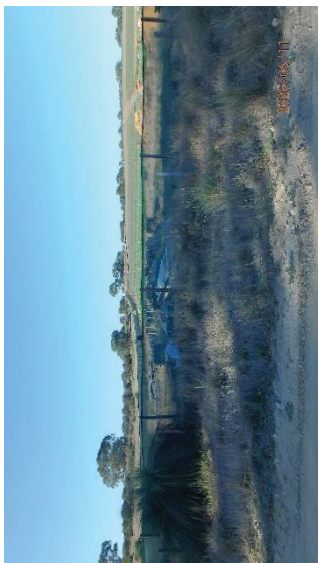
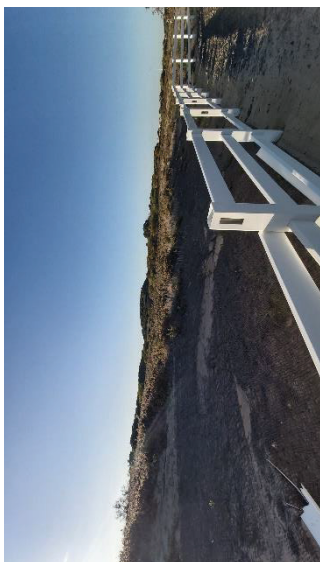
Pre development		Post development		
Plot no.	AS 3959 vegetation classification (see Figure 3)	Site photo/s (location points shown in Figure 2)	Plot no. AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)	
	<p><b>AS 3959 classification (Figure 2):</b> Shrubland (Class C)</p> <p>The Scrub vegetation is bordered to the south by a dune system vegetated with low shrubs under 2 m in height. This vegetation is classified as Shrubland.</p> <p>Vegetation south-west of the site on the opposite side of Marmion Avenue is characterised by small native shrubs less than 2 m in height.</p>	 <p><i>Photo location 21: View to the north-east from the central portion of the site, towards dune ridge</i></p>  <p><i>Photo location 23: View from just north of the roundabout of shrubland to the north</i></p>	<p>1</p>  <p><i>Photo location 22: View to the south-west from the central portion of the site</i></p>  <p><i>Photo location 24: View from just north of the roundabout of shrubland to the east</i></p>	<p>The vegetation located in Plot 1 is expected to remain in its current condition.</p> <p><b>AS 3959 classification (Figure 4):</b> Shrubland (Class C)</p> <p><b>Effective slope (Figure 5):</b> Downslope 0-5°</p>

## Bushfire Management Plan

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Table 2: Vegetation classification, effective slope and future management (continued)

Pre development		Post development	
Plot no.	AS 3959 vegetation classification (see Figure 3)	Site photo/s (location points shown in Figure 2)	Plot no. and effective slope (see Figure 4 and Figure 5)
3	<p><b>AS 3959 classification (Figure 2):</b> Grassland (Class G)</p> <p>There is a small portion of land within the nearby agricultural property that is not maintained. This is pasture vegetation greater than 100 mm in height and therefore classified as Grassland.</p> <p>The vegetation on the western side of Marmion Avenue appears to have been cleared and is regrowth. This vegetation consists of grasses and small weeds and is classified as Grassland.</p>	 <p>Photo location 35: Grassland vegetation east of site within agricultural property</p>	<p>AS 3959 vegetation classification (see Figure 4 and Figure 5)</p> <p>The external vegetation will not be modified in these areas. Therefore, the vegetation remains Grassland.</p> <p><b>AS 3959 classification (Figure 4):</b> Grassland</p> <p><b>Effective slope (Figure 5):</b> Upslope and Downslope 0-5°</p>
		 <p>Photo location 36: Grassland vegetation on the opposite side of Marmion avenue</p>	

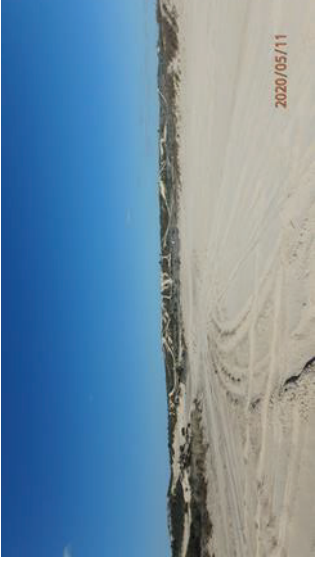
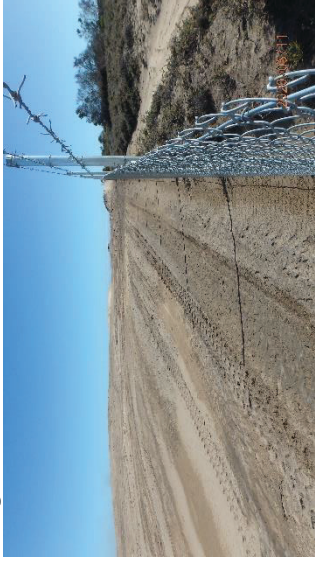




# Bushfire Management Plan

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Table 2: Vegetation classification, effective slope and future management (continued)

Pre development		Post development		
Plot no.	AS 3959 vegetation classification (see Figure 3)	Site photo/s (location points shown in Figure 2)	Plot no. AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)	
4	<p><b>AS 3959 classification (Figure 2):</b> Exclusion 2.2.3.2(e)</p> <p>The site has been used for recreational activities that have degraded the vegetation on the site and resulted in numerous cleared areas.</p> <p>Large areas have been cleared within the site for future development along the PTA corridor and in the northern portion of the site.</p> <p>These areas are excluded from vegetation classification.</p>	 <p>2020/05/11</p> <p>Photo location 25: View from the northern-central portion of the site to the east with dune ridge in background</p>  <p>Photo location 27: View from the northern side of the cleared central portion of the site to the west</p>	 <p>2020/05/11</p> <p>Photo location 26: View from the northern side of the cleared central portion of the site to the south</p>  <p>2020/05/11</p> <p>Photo location 28: Cleared area in the south-east portion of the site</p>	<p>It is assumed that areas currently identified as non-vegetated will remain so as part of current and proposed land uses. Future development of the site will result in cleared areas being developed as public roads and residential/ public use buildings or areas.</p> <p><b>AS 3959 classification (Figure 4):</b> Exclusion 2.2.3.2(e)</p> <p><b>Effective slope (Figure 5):</b> Not applicable</p>

# Bushfire Management Plan

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Table 2: Vegetation classification, effective slope and future management (continued)

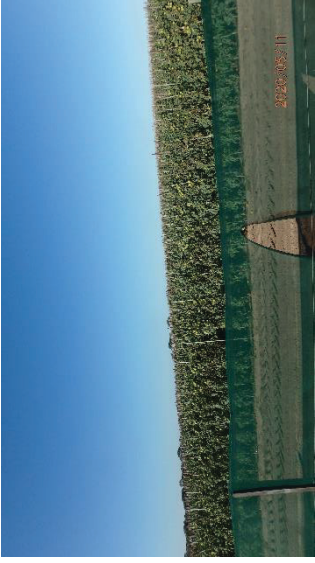

Pre development		Post development		
Plot no.	AS 3959 vegetation classification (see Figure 3)	Site photo/s (location points shown in Figure 2)	AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)	
	(Continued from above)	 <p>Photo location 29: View from the western roundabout towards south-west</p>  <p>Photo location 31: View south of the western roundabout towards the south-west</p>	 <p>Photo location 30: View from the western roundabout towards north-west</p>  <p>Photo location 32: View from Brindabella Way roundabout to the south-east, cleared area in the background</p>	<p>(Continued from above)</p> <p>It is expected that these areas will not be revegetated but will likely be developed for residential and commercial use in the future.</p>

## Bushfire Management Plan

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Table 2: Vegetation classification, effective slope and future management (continued)

Pre development		Post development	
Plot no.	AS 3959 vegetation classification (see Figure 3)	Site photo/s (location points shown in Figure 2)	Plot no. AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)
5	<p><b>AS 3959 classification (Figure 2):</b> Exclusion 2.2.3.2(f)</p> <p>The vegetation within rural allotments east of the site has been developed for horticulture and supports an extensive tomato crop. This vegetation is considered a low threat.</p>	 <p>Photo location 33: Tomato planting east of the site</p>	<p>5</p> <p>It is expected that this land will continue to be used for horticultural purposes in the future.</p> <p><b>AS 3959 classification (Figure 4):</b> Exclusion 2.2.3.2(f)</p> <p><b>Effective slope (Figure 5):</b> Not applicable</p>
		 <p>Photo location 34: Tomato planting looking north-east</p>	

## Bushfire Management Plan

### Alkimos Central Precinct Plan



### 3.1.2 Post-development assumptions

The BAL assessment, to determine the predicated BAL ratings, has assumed the following:

- **Designated FDI:** 80
- **Flame temperature:** 1090 K
- **Vegetation classification:** shrubland (Class C), scrub (Class D) and grassland (Class G) (see **Figure 4**)
- **Effective slope beneath classified vegetation:** flat/upslope, downslope 0-5°, or downslope 0-5° (see **Figure 5**)
- **Setback distances:** as per Table 2.4.3 in AS 3959 with the relevant distances used to inform the BAL contour plan provided in **Figure 6** and summarised in **Table 3**.

In addition to the above, the following key assumptions have informed this assessment:

- All vegetation within the site, except for the vegetation within the POS along the parabolic dune and retained TEC and surrounding buffer vegetation, will be cleared as part of the development of the site and maintained in a minimal fuel condition in perpetuity (in accordance with the proposed subdivision plan, attached as **Appendix A**).
- POS along the parabolic dune will be revegetated to Scrub.
- The vegetation within the 'Primary regional roads' zone adjoining the site to the east, will remain a temporary hazard until such time as the land is modified to construct a new freeway, at which point, it is expected that this vegetation will largely be cleared.
- Similarly, some vegetation to the south will be a temporary hazard until such time as Romeo Road is fully constructed, at which point the land will be cleared for development.
- Areas of public open space will be formally landscaped (low threat AS 3959 cl.2.2.3.2(f)) and maintained in perpetuity. This will include the provision of turf areas and managed garden beds, picnic/BBQ facilities, pedestrian/cycle network and all age play spaces. The specific design elements will be determined, in consultation with the City as part of implementing the subdivision. Management of this area as a minimum will include:
  - Where remnant trees are retained, these will be low pruned to 2 m from the ground.
  - Regular removal of weeds, dead material, fallen branches and built up leaf litter. This would be based on typical maintenance requirements.
  - Where grass/turf is present, this will be regularly cut so that the grass is maintained at or below 100 mm in height.

These areas will be maintained by the developer initially for at least two years (or as agreed with the City of Wanneroo) and following handover acceptance by the City will be maintained by the City of Wanneroo in a low threat state. Landscape treatments and management are discussed further in **Section 5.1.2**.

- Land designated for transport and parking facilities does not need to achieve BAL-29 setback.
- Vegetation within the parabolic dune POS will be managed as a low threat where it adjoins residential land to ensure a minimum lot standard of BAL-29.
- All vegetation within the WAPC ROS to the north will be retained and rehabilitated.

# Bushfire Management Plan

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### 3.1.3 Assessment outputs

The BAL assessment for the site has been undertaken based on the assumed post-development classified vegetation (see **Figure 4** and **Table 2**) and effective slope (**Figure 5**).

**Table 3** provides a summary of the setback distances from the identified classified vegetation necessary to achieve the indicated BAL ratings, with the BAL Contour Plan (**Figure 6**) being a visual representation of these distances. The setback distances are based on the distances outlined in Table 2.4.3 of AS 3959.

*Table 3: Setback distances for BAL ratings based on post-development vegetation classifications (Figure 3) and effective slope, as determined by the method 1 BAL assessment and Table 2.4.3 of AS 3959.*

Post development plot number (see Figure 4)	Vegetation classification (see Figure 4)	Effective slope (see Figure 5)	Distance to vegetation	BAL Rating (see Figure 6)
1	Shrubland (Class C)	Upslope	<7 m	BAL-FZ
			7-9 m	BAL-40
			9-<13 m	BAL-29
			13-<19 m	BAL-19
			19-<100 m	BAL-12.5
			> 100 m	BAL-LOW
2	Scrub (Class D)	Downslope 5-10°	< 12 m	BAL-FZ
			12 - < 17 m	BAL-40
			17 - < 24 m	BAL-29
			24 - < 35 m	BAL-19
			35 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW
2, 7	Scrub (Class D)	Downslope 0-5°	< 11 m	BAL-FZ
			11 - < 15 m	BAL-40
			15 - < 22 m	BAL-29
			22 - < 31 m	BAL-19
			31 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW
2, 6	Scrub (Class D)	Flat/upslope	< 10 m	BAL-FZ
			10 - < 13 m	BAL-40
			13 - < 19 m	BAL-29
			19 - < 27 m	BAL-19
			27 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW

# Bushfire Management Plan

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Table 3: Setback distances for BAL ratings based on post-development vegetation classifications (Figure 3) and effective slope, as determined by the method 1 BAL assessment and Table 2.4.3 of AS 3959. (continued)

Post development plot number (see Figure 4)	Vegetation classification (see Figure 4)	Effective slope (see Figure 5)	Distance to vegetation	BAL Rating (see Figure 6)
3 (east)	Grassland (Class G)	Downslope 0-5°	< 7 m	BAL-FZ
			7 - < 9 m	BAL-40
			9 - < 14 m	BAL-29
			14 - < 20 m	BAL-19
			20 - < 50 m	BAL-12.5
			> 50 m	BAL-LOW
3 (west)	Grassland (Group G)	Flat/upslope	< 6 m	BAL-FZ
			6 - < 8 m	BAL-40
			8 - < 12 m	BAL-29
			12 - < 17 m	BAL-19
			17 - < 50 m	BAL-12.5
			> 50 m	BAL-LOW

## 4 Identification of bushfire hazard issues

From a bushfire hazard management perspective, the key issues requiring management include:

- Provision of appropriate separation distances from permanent bushfire hazards within and surrounding the site, including areas of scrub vegetation associated with parabolic dune revegetation, the TEC POS, the WAPC ROS, and adjacent scrub vegetation, to ensure a BAL rating of BAL-29 or less can be achieved at future built form.
- Potential for a bushfire hazard to arise within the site by inadequate maintenance until development or by the placement of temporary materials. Fuel management will be required within portions of the proponent's landholding that are proposed for future urban development in accordance with the SP, to minimise the impacts of temporary bushfire hazards on dwellings within the site.
- Ensure future public open space is appropriately designed and managed to achieve low threat standards where indicated (see **Figure 4**), in accordance with AS 3959 and the requirements of the City of Wanneroo.
- Uncertainty regarding the timing of subdivision development, final development layout, the timing of freeway construction and timing of vegetation clearance external to the site.
- Ensure appropriate access is provided.
- Ensure that vulnerable use is adequately located.
- Ensure the provision of appropriate water supply and associated infrastructure for fire-fighting purposes.

These issues are considered further in **Section 5**.

## 5 Assessment against the Bushfire Protection Criteria

This BMP provides an outline of the mitigation strategies that will ensure that as development progresses, an acceptable solution and/or performance-based system of control is adopted for each of the bushfire protection criteria detailed within Appendix Four of the Guidelines (WAPC and DFES 2017). The bushfire protection criteria identified in the Guidelines and addressed as part of this BMP are:

- Element 1: Location of the development
- Element 2: Siting and design of the development
- Element 3: Vehicular access
- Element 4: Water supply.

As part of future development, it is likely that an 'acceptable solution' will be able to address the intent of all four bushfire protection criteria as part of future residential development within the site. A summary of how this can be achieved and an associated compliance statement for each has been provided in **Table 4**.



## Bushfire Management Plan

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Table 4: Summary of bushfire protection criteria and compliance statement

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance Statement
		Acceptable solution			
Element 1: Location	To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure.	A1.1 Development location		<p>The BAL contour plan (see <b>Figure 6</b>) indicates that future development within the site will be able to achieve a BAL rating of BAL-29 or less. Certain lots will require in-lot setbacks to achieve BAL-29 at the built form. This can be achieved based on the land use areas and demonstrated during detailed design.</p> <p>It is noted that there are areas of BAL-40 and BAL-FZ impacting residential land within the site. However, habitable buildings (developable land<sup>1</sup>) will be able to be located outside BAL-40/FZ and can achieve BAL-29 or less. In this regard, the acceptable solution can be satisfied for all proposed habitable buildings.</p> <p>The vegetation to the east presents a temporary hazard until the land is developed for future roads (i.e., the Mitchell Freeway). Regardless, the residential land in the east can achieve BAL-29 separation.</p>	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 1: Location.
Element 2: Siting and design	To ensure the siting and design of development minimises the level of bushfire impact.	A2.1 Asset Protection Zone		<p>The post-development vegetation classification (<b>Figure 4</b>) identifies permanent bushfire hazards to the north, east, south and west of the site, and within the dune POS.</p> <p>Separation from the permanent bushfire risks has been accommodated through the strategic placement of public roads and public open space (used for recreation purposes) that will be developed to typical urban standards and will achieve a low-threat standard under AS 2959. Maintenance of these areas will be routine and ongoing, initially by the proponent and then by the City of Wanneroo. This is discussed in <b>Section 5.1.2</b>.</p> <p>Future lots will be able to achieve a BAL 29 or less in accordance with Element 2.1. There are parcels of developable land that will require in-lot setbacks to achieve BAL-29 or below. This may be amended during future planning stages.</p>	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 2: Siting and design.

<sup>1</sup> Position Statement: Planning in bushfire prone areas - Demonstrating Elements 1: Location and Element 2: Siting and design (DPLH 2019) has outlined that 'developable land' is "land that can accommodate a habitable dwelling and would not generally include areas of BAL-40 and/or BAL-FZ, areas within the local government setback and areas subject to environmental constraints".

## Bushfire Management Plan

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Table 4: Summary of bushfire protection criteria and compliance statement (continued)

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance Statement
		Acceptable solution			
Element 3: Vehicular access	To ensure vehicular access serving a subdivision/development is available and safe during a bushfire event.	A3.1 Two access routes		<p>The proposed Activity Centre Plan and concept layout, provided in <b>Appendix A</b> and shown in <b>Figure 4</b>, respectively, provides for an interconnected road network which connects to the existing public road network, namely Marmion Avenue to the west of the site, Romeo Road to the east, and Piazza Link to the south. Additional roads will be constructed as part of the subdivision.</p> <p>Safe vehicular access to the site will ultimately be provided through multiple public roads connecting to the north and west of the site, which then connects to the broader public road network. In the interim whilst these roads remain unconstructed, primary access to the site will be provided through a single public road to the north of the eastern precinct, connecting to the Western Precinct.</p>	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 3: Vehicular access.
		A3.2 Public road		All new internal roads can and will comply with the minimum standards outlined in Appendix Four of the Guidelines (WAPC and DFES 2017), which includes a minimum 6 m-wide trafficable surface.	
		A3.3 Cul-de-sac (including dead-end-road)		There is one dead-end shown in the concept layout, located to the south of the POS (1.3227 ha) east of the dune ridge, however this road is not relied upon for lot access and is not considered necessary for access in a bushfire emergency. If development is staged, temporary cul-de-sacs may be provided until the broader public road network is fully developed. Where required, they will be provided with suitable turn-around areas for emergency service vehicles.	
		A3.4 Battle-axe		Not applicable. No battle-axe properties are proposed.	
		A3.5 Private driveway longer than 50 m		Not applicable. No private driveways longer than 50 m are proposed based on the density of residential development.	
		A3.6 Emergency access way		Not applicable. No emergency access ways are proposed.	
		A3.7 Fire service access routes (perimeter roads)		Future development within the site will be provided with appropriate vehicular access, as outlined above. It may be necessary to provide a perimeter road within the north-western residential cell adjoining the ROS. This can be finalised during the subdivision stage.	

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Table 4: Summary of bushfire protection criteria and compliance statement (continued)

Bushfire protection criteria	Intent	Method of compliance		Proposed bushfire management strategies	Compliance Statement
		Acceptable solution			
Element 3: Vehicular access (continued)		A3.8 Firebreak width		Until residential development is progressed in accordance with the proposed subdivision plan the proponent will maintain the existing firebreaks within the property boundary which are a minimum 3 m-wide, as per the requirements of the City of Wanneroo Fire Notice.	(continued)
Element 4: Water	To ensure water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.	A4.1 Reticulated areas		<p>Development is located within an Emergency Services Levy (ESL) Category 3 area, which is likely to change to a Category 1 area once as part of subdivision approval. The existing subdivision within the site has changed from Category 3 to Category 1 as a result of development.</p> <p>The site will connect with a reticulated water supply and will include fire hydrants installed by the developer to meet the specifications of Water Corporation (Design Standard DS 63) and DFES. Fire hydrants on land zoned for residential purposes are required to be sited at or within 200 m of residential dwellings (Class 1a).</p> <p>The Water Corporation will be responsible for all hydrant maintenance and repairs.</p>	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 4: Water

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### 5.1 Additional management strategies

#### 5.1.1 Future approval considerations

The BAL assessment within this document is considered to be a conservative assessment of potential bushfire risk posed to future habitable buildings within the site based on the proposed management of vegetation and assumptions outlined in **Section 3**.

The measures to be implemented through this precinct plan and associated future subdivision process have been outlined as part of this BMP and can be used to support future planning and development approval processes. A revised BMP is likely to be required to support any future subdivision applications, particularly if the development layout detail is different to that outlined within this document and will need to respond to the subdivision design.

#### 5.1.2 Landscape management

##### 5.1.2.1 Within the site

It is expected and assumed that the proposed subdivision and development of the site will result in the removal of all classified vegetation within the site. However, vegetation within the POS along the parabolic dune, which will be retained and assumed to be revegetated. The revegetation specification will be determined through the detailed design process, however, a 'Scrub' classification with no ongoing fuel management has been assumed to represent a worst-case scenario. On this basis, future revegetation works will not increase the risk of bushfire compared to that assessed in this BMP.

The proposed landscape treatments and management measures to be implemented within various portions of the site (including POS areas and the proposed primary school site) are yet to be determined in detail.

Clearing/management of this vegetation will be undertaken by the proponent, either in accordance with an approved Clearing Permit issued under the *Environmental Protection Act 1986* or under an exemption from a Clearing Permit through future subdivision approvals issued for this area under the *Planning and Development Act 2005*.

Any hazard management should be implemented prior to and during the bushfire season (November to May) each year, and may include one or a combination of the below:

- Removal of all vegetation; or
- Where remnant trees are retained, these will be low pruned to 2 m from the ground and any understorey species removed.
- Regular removal of weeds, dead material, fallen branches and built up leaf litter.
- Where the grass is present, this will be regularly cut so that the grass is maintained at or below 100 mm in height.

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### POS Areas

All POS areas within the site (with the exception of the parabolic dune POS and the TEC POS, as shown in **Appendix A**), will be landscaped as a low threat (AS 3959 cl.2.2.3.2(f)) and actively managed to support recreational uses. Landscape plans will be prepared by the proponent for all POS areas and will be subject to approval by the City of Wanneroo as a condition of subdivision approval. Specifically, model subdivision condition R4 is anticipated to be applied to any future subdivision approval, which states:

*Arrangements being made for the proposed public open space to be developed by the landowner/ applicant to a minimum standard and maintained for two summers through the implementation of an approved landscape plan providing for the development and maintenance of the proposed public open space in accordance with the requirements of Liveable Neighbourhoods and to the specifications of the local government. (Local Government)*

The proponent is committed to the detailed landscape designs achieving a low threat vegetation standard in POS areas, in accordance with AS 3959. It is anticipated that this will include landscape design features such as turf and managed garden beds, retained of individual mature trees, picnic/BBQ facilities, a pedestrian/cycle network and all-ages play spaces.

The maintenance of these POS areas will be the responsibility of the proponent during the initial establishment period (typically two years), following which the long-term maintenance responsibilities will transfer to the City of Wanneroo following handover. These maintenance works will ensure the low threat standard of POS areas is maintained.

The proponent is committed to achieving a low threat vegetation standard within these areas of POS. Notwithstanding this, the City of Wanneroo will maintain control of the landscaping process through the future subdivision approval issued under the *Planning and Development Act 2005*, given they will be the clearing authority for the associated subdivision approval condition, which provides a statutory mechanism for the City to ensure a low threat vegetation standard is achieved within future POS areas.

In addition, prior to handover to the City, Section 33 of the *Bushfire Act 1954* provides a statutory mechanism for the Minister or local government to enforce on a private landholder or state agency a requirement to maintain land such as not to be conducive to the outbreak of a bushfire or the spread or extension of a bushfire. As such, this provides another statutory mechanism that could be enacted by the City (if required) against the proponent to ensure that POS areas are/continue to be maintained to a low threat vegetation classification under AS 3959.

### TEC POS

The two areas of TEC identified within the site will be retained within two future POS areas located east and west of the railway line. To provide additional protection for this community, a 5 m wide buffer of native vegetation will also be retained. The combined area of this vegetation is greater than one hectare and is classified as scrub. The surrounding land will be managed as low threat vegetation and non-vegetated areas. The BAL impacts of this vegetation retention are demonstrated in **Figure 6**.

# Bushfire Management Plan

## Alkimos Central Precinct Plan



### Parabolic Dune POS

The POS along the parabolic dune will be revegetated to a scrub classification.

### Primary school lot

The area designated for the primary school has been cleared. Management of the primary school site will be the responsibility of the proponent whilst they maintain ownership of the land. Once the land is ceded to the Department of Education, they will be responsible for its ongoing management. As outlined above, the City has additional statutory mechanisms to enforce landowners to maintain their land to suitable low fuel conditions under Section 33 of the *Bushfires Act 1954*, if required.

### 5.1.2.2 Surrounding the site

Private landholdings surrounding the site are assumed to be managed by the applicable landowners in accordance with the relevant Firebreak Notices, in perpetuity.

### WAPC ROS

The WAPC managed ROS will remain in its current condition, presenting a retained bushfire hazard which has been addressed in the subdivision design.

### 5.1.3 City of Wanneroo Fire Notice

The City of Wanneroo releases a Firebreak Notice on an annual basis to provide a framework for bushfire management within the City. The City is able to enforce this notice in accordance with Section 33 of the *Bush Fires Act 1954*.

Until the subdivision is progressed within the site, the proponent will be required to comply with the Firebreak Notice, including the maintenance of minimum 3 m-wide perimeter firebreaks (or as agreed with the City).

All landowners of future lots will be required to comply with the Firebreak Notice as published, which for residential lots is likely to include ensuring that the property is cleared of all flammable material, except for living standing trees, and ensuring that grass height is no longer than 4 cm. This will be detailed within the annual Firebreak Notice.

### 5.1.4 Vulnerable or high-risk land uses

A primary school is proposed within the central portion of the site, and an aged care facility is proposed within the north-west corner, both uses are identified as a vulnerable land use based on the definitions of SPP 3.7 and the Guidelines.

Policy measure 6.6 of SPP 3.7 requires any proposal relating to a vulnerable land use subject to a BAL rating of BAL-12.5 or greater, to address the applicable policy provisions, and at the development application stage, this may include the preparation of a bushfire management plan and an emergency evacuation plan.

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### Alkimos Central Precinct Plan



The primary school will be able to construct all buildings within the area subject to a BAL rating of BAL-LOW. Accordingly, policy measure 6.6 will not apply to the primary school. If other vulnerable use, such as aged care or retirement living, is proposed in areas subject to BAL-12.5 or above, the use will need to address policy measure 6.6.

#### 5.1.5 Public education and preparedness

Community bushfire safety is a shared responsibility between individuals, the community, government and fire agencies. DFES has an extensive Community Bushfire Education Program including a range of publications, a website and Bushfire Ready Groups. The DFES publication '*Prepare. Act. Survive.*' (DFES 2014) provides excellent advice on preparing for and surviving the bushfire season. Other downloadable brochures are available from <http://www.dfes.wa.gov.au/safetyinformation/fire/bushfire/pages/publications.aspx>

The City of Wanneroo provides bushfire safety advice to residents available from their website [https://www.wanneroo.wa.gov.au/downloads/download/384/fire\\_information](https://www.wanneroo.wa.gov.au/downloads/download/384/fire_information). Professional, qualified consultants also offer bushfire safety advice and relevant services to residents and businesses in high-risk areas in addition that that provided in this BMP.

Future residents of the site are able to access additional bushfire information via the above sources, or through contacting the City of Wanneroo or DFES directly. In the case of a bushfire in the area, advice would be provided to residents by DFES, Department of Biodiversity, Conservation and Attractions and/or the City of Wanneroo on any specific recommendations to responding to the bushfire, including evacuation if required. It is recommended that future residents should make themselves aware of their responsibilities with regard to preparing for and responding to a potential bushfire that may impact them, their family/dependents and their property (regardless of the applicable BAL rating).

## Bushfire Management Plan

### Alkimos Central Precinct Plan



## 6 Responsibilities for Implementation and Management of Bushfire Measures

**Table 5** outlines the future responsibilities of the landowner/developer and the City of Wanneroo associated with implementing this BMP with reference to ongoing bushfire risk mitigation measures for existing land uses (through compliance with the *City of Wanneroo Firebreak Notice*) or future mitigation measures to be accommodated as part of the future planning process. These responsibilities will need to be considered as part of the subsequent development and implementation process.

*Table 5: Responsibilities for the implementation of the BMP*

Management action	Timing
<b>Developer/landowner</b>	
Provide a copy of this BMP to the relevant decision makers to support approval of the proposed Precinct Plan.	To support the planning approval process.
Prepare a new/revised BMP in accordance with SPP 3.7, the Guidelines and AS 3959 to support future subdivision applications, based on the proposed layout and in consideration of bushfire hazards that will be present following development.	To support each future subdivision application.
Prepare a new/revised BMP in accordance with SPP 3.7, the Guidelines and AS 3959 to support future subdivision applications, if the assumptions regarding the treatment to POS, the gas pipeline easements and/or the waterway setback area change as part of future detailed design stages.	To support each future subdivision application.
Where applicable and based on the outcomes of the BAL Contour Plan, make spatial provision within any future precinct plan(s) layout to accommodate APZs. This may include ensuring lots are of an adequate depth or width to accommodate the relevant setback distance for future buildings to achieve BAL-29 or less (as per <b>Table 3</b> in this BMP), or through the provision of public roads and/or managed public open space.	To support future strategic planning.
Make spatial provision for all public roads to be installed to the standards outlined in Appendix Four of the Guidelines (including providing a minimum 6m trafficable surface with 4.5 m vertical clearance) and ensure two access ways (either public road or temporary emergency access ways) are provided at all times for each subdivision stage.	To support each future subdivision application
Comply with the <i>City of Wanneroo Firebreak Notice/s</i> as published.	Ongoing, as required
<b>City of Wanneroo</b>	
Maintain all areas of developed POS under their management to a low threat standard in accordance with Section 2.2.3.2 of AS 3959, where required/applicable.	Ongoing, as required.
Maintaining public road reserves under their management to appropriate standards, where required/applicable.	Ongoing, as required.
<b>Water Corporation</b>	
The Water Corporation is responsible for the ongoing maintenance and repair of hydrants.	Ongoing, as required.



## Bushfire Management Plan

### Alkimos Central Precinct Plan



## 7 Applicant Declaration

### 7.1 Accreditation

This BMP has been prepared by Emerge Associates who have been providing bushfire risk management advice for more than six years, undertaking detailed bushfire assessments (and associated approvals) to support the land use development industry.

Dana Elphinstone is a FPAA Level 2 BPAD accredited practitioner (BPAD No. 52565) and is also accredited as a Bushfire Hazard Practitioner in Tasmania (BFP-146), with over six years' experience.

### 7.2 Declaration

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

Signature:

A handwritten signature in black ink that reads "Dana E".

**Name:** Dana Elphinstone

**Company:** Emerge Associates

**Date:** 10 November 2021

**BPAD Accreditation:** BPAD no. 52565

# Bushfire Management Plan

## Alkimos Central Precinct Plan



## 8 References

### 8.1 General references

Department of Fire and Emergency Services (DFES) 2014, *Prepare. Act. Survive.*, Perth. August 2014.

Emerge Associates 2013, *Vegetation Association and Condition - Alkimos City Centre and Central Alkimos*.

Emerge Associates 2021, *Alkimos Central Precinct Plan Environmental Assessment and Management Strategy*, EP19-077(07)--007 DAE, Version D.

Gould, J., McCaw, W., Cheney, N., Ellis, P. and Matthews, S. 2007, *Field Guide: Fuel Assessment and Fire Behaviour Prediction in Dry Eucalypt Forest*, CSIRO and Department of Environment and Conservation, Perth, Western Australia.

Standards Australia 2018, *AS 3959:2018 Construction of buildings in bushfire-prone areas*, Sydney.

Western Australian Planning Commission (WAPC) 2015, *State Planning Policy 3.7 Planning in Bushfire Prone Areas*, Perth.

Western Australian Planning Commission and Department of Fire and Emergency Services (WAPC and DFES) 2017, *Guidelines for Planning in Bushfire Prone Areas Version 1.3*, Western Australia. December 2017.

### 8.2 Online references

Landgate 2020, *Locate V5*, viewed May 2021, <https://maps.slip.wa.gov.au/landgate/locate/>

Landgate 2020, *Map Viewer*, viewed May 2021, <https://www0.landgate.wa.gov.au/maps-and-imagery/interactive-maps/map-viewer>

Office of Bushfire Risk Management (OBRM) 2019, *Map of Bush Fire Prone Areas*, viewed May 2021, <https://maps.slip.wa.gov.au/landgate/bushfireprone/>

# Bushfire Management Plan

## Alkimos Central Precinct Plan



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# Figures



*Figure 1: Site Location and Topographic Contours*

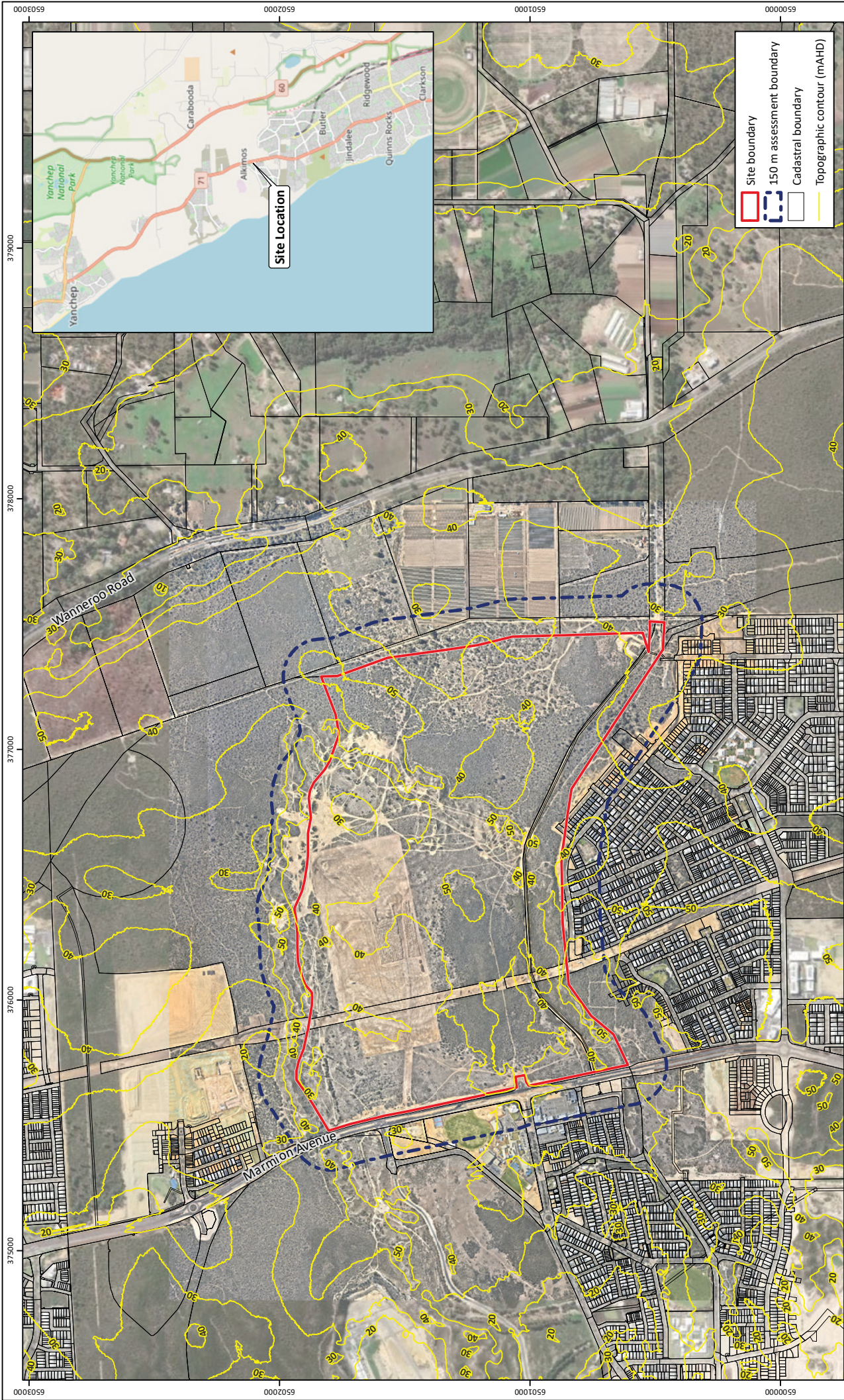
*Figure 2: Existing Conditions - AS 3959 Vegetation Classifications*

*Figure 3: Pre-Development Site Conditions - Bushfire Hazard Level*

*Figure 4: Post Development Site Conditions – AS 3959 Vegetation Classifications*

*Figure 5: Post Development Site Conditions – Effective Slope*

*Figure 6: Post Development Site Conditions – Bushfire Attack Level Contours*

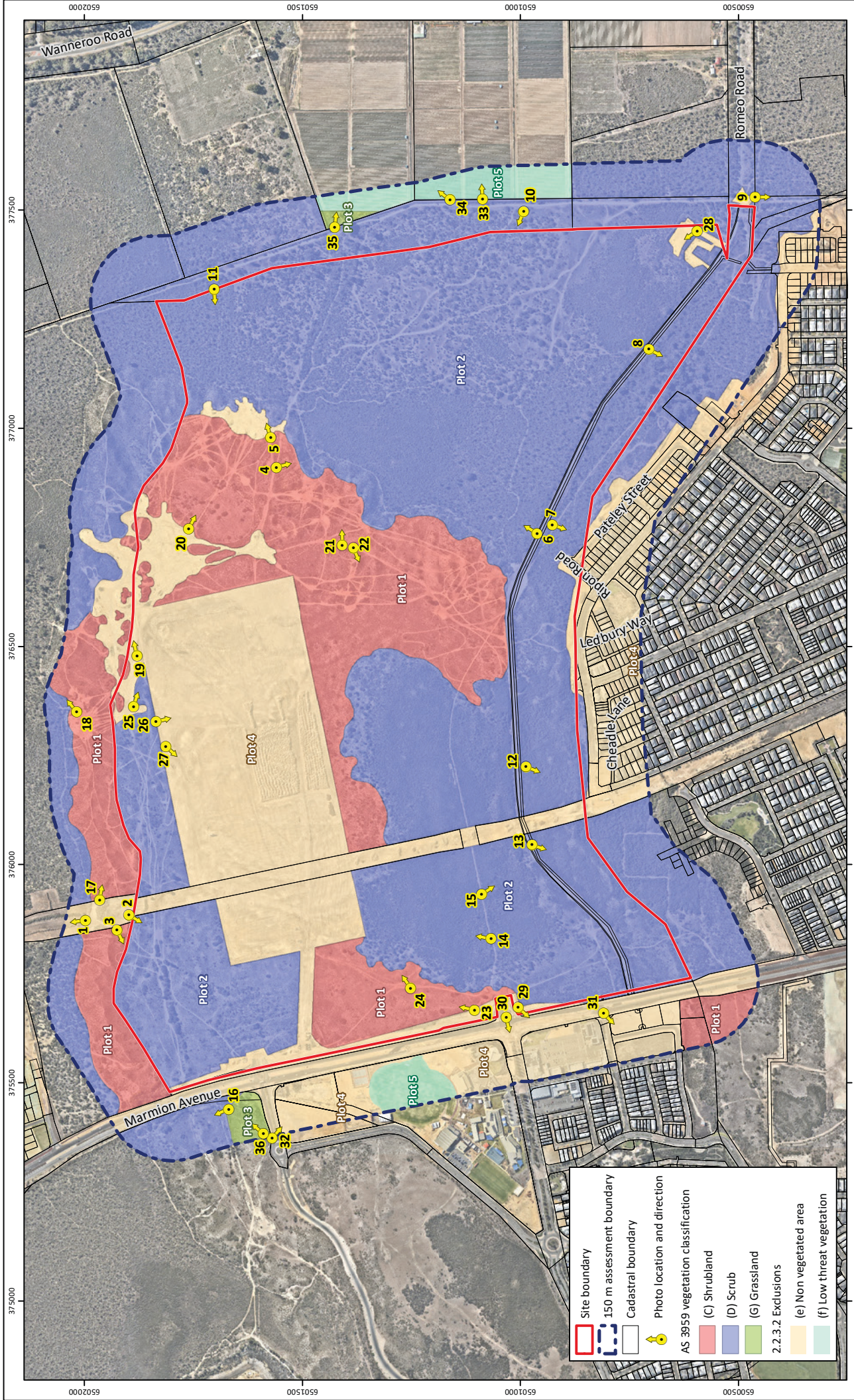


**Figure 1: Site Location and Topography**

**Project:** Bushfire Management Plan  
Alkimos Central Precinct Plan

**Client:** Development WA

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used



	Site boundary
	150 m assessment boundary
	Cadastral boundary
	Photo location and direction
	AS 3959 vegetation classification
	(C) Shrubland
	(D) Scrub
	(G) Grassland
	2.2.3.2 Exclusions
	(e) Non vegetated area
	(f) Low threat vegetation

**Figure 2: Pre-Development Conditions: AS3959 Vegetation Classification**

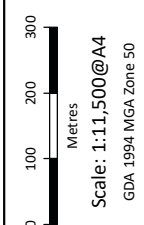
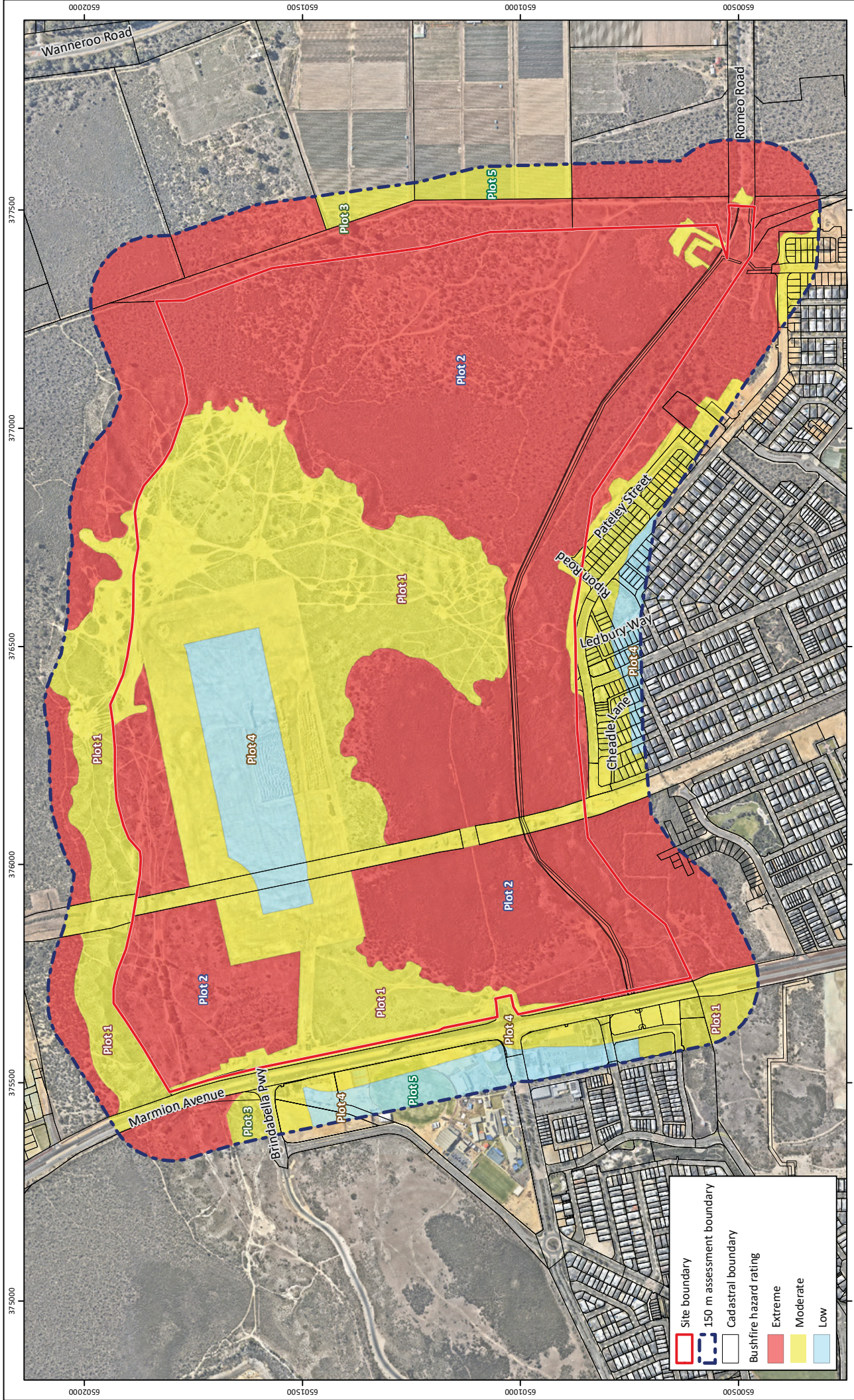
Plan Number: EP19-07(07)-F18a  
 Drawn: GAR  
 Date: 13/10/2021  
 Checked: DAE  
 Approved: RLE  
 Date: 13/10/2021



0 100 200 300  
 Metres  
 Scale: 1:11,500@A4  
 GDA 1994 MGA Zone 50

**Project:** Bushfire Management Plan  
 Alkimos Central Precinct Plan  
**Client:** Development WA

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

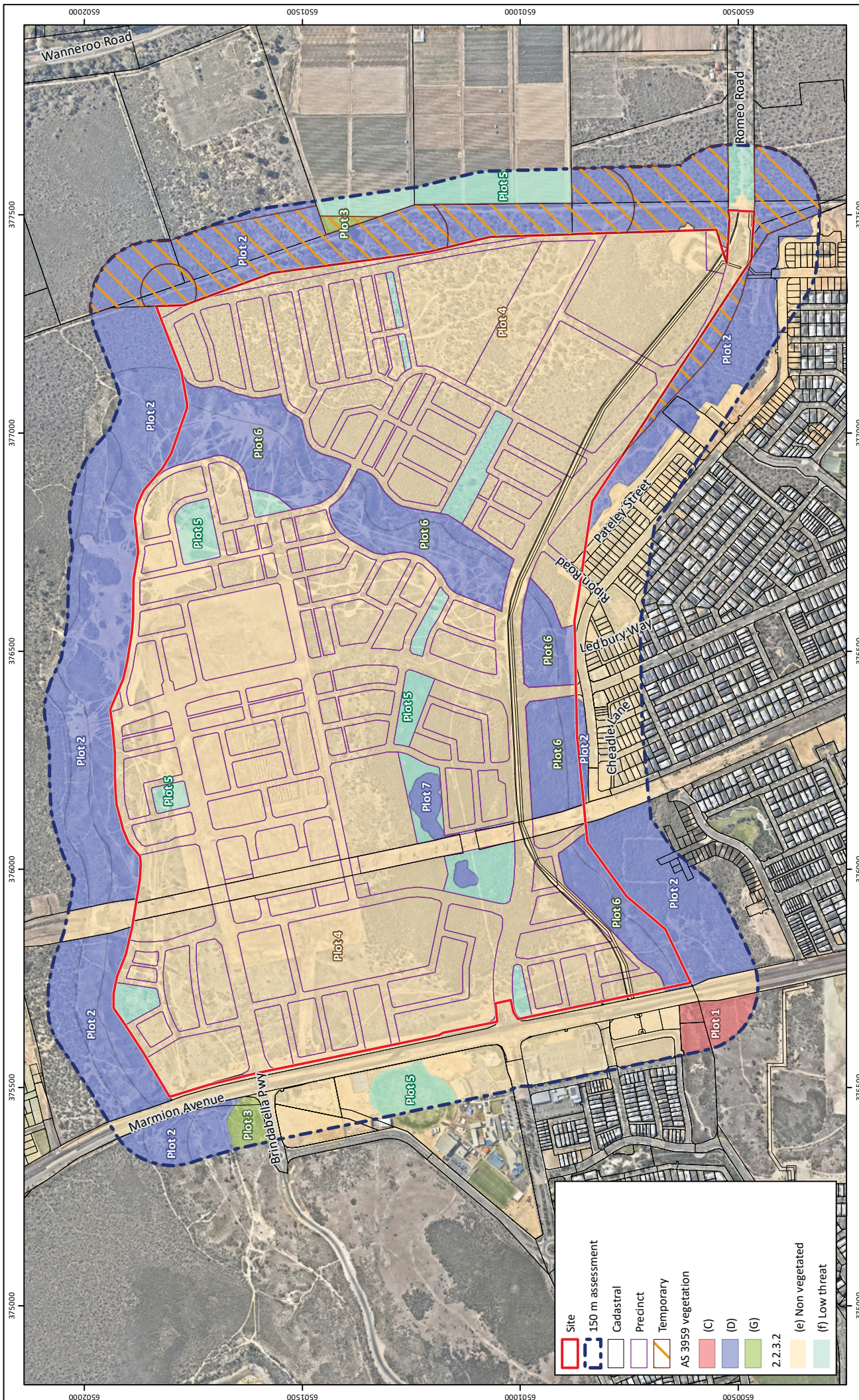


Plan Number: EP19-07(07)-F19a  
 Drawn: GAR  
 Date: 13/10/2021  
 Checked: DAE  
 Approved: RLE  
 Date: 13/10/2021

**Figure 3: Pre-Development Conditions: Bushfire Hazard Level**

**Project:** Bushfire Management Plan  
 Alkimos Central Precinct Plan  
**Client:** Development WA

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used



	Site
	150 m assessment
	Cadastral
	Precinct
	Temporary
	AS 3959 vegetation
	(C)
	(D)
	(G)
	2.2.3.2
	(e) Non vegetated
	(f) Low threat

**Figure 4: Post-Development Conditions: AS3959 Vegetation Classification**

Plan Number: EP19-077(07)-F20b  
 Drawn: GAR  
 Date: 13/10/2021  
 Checked: DAE  
 Approved: RLE  
 Date: 13/10/2021

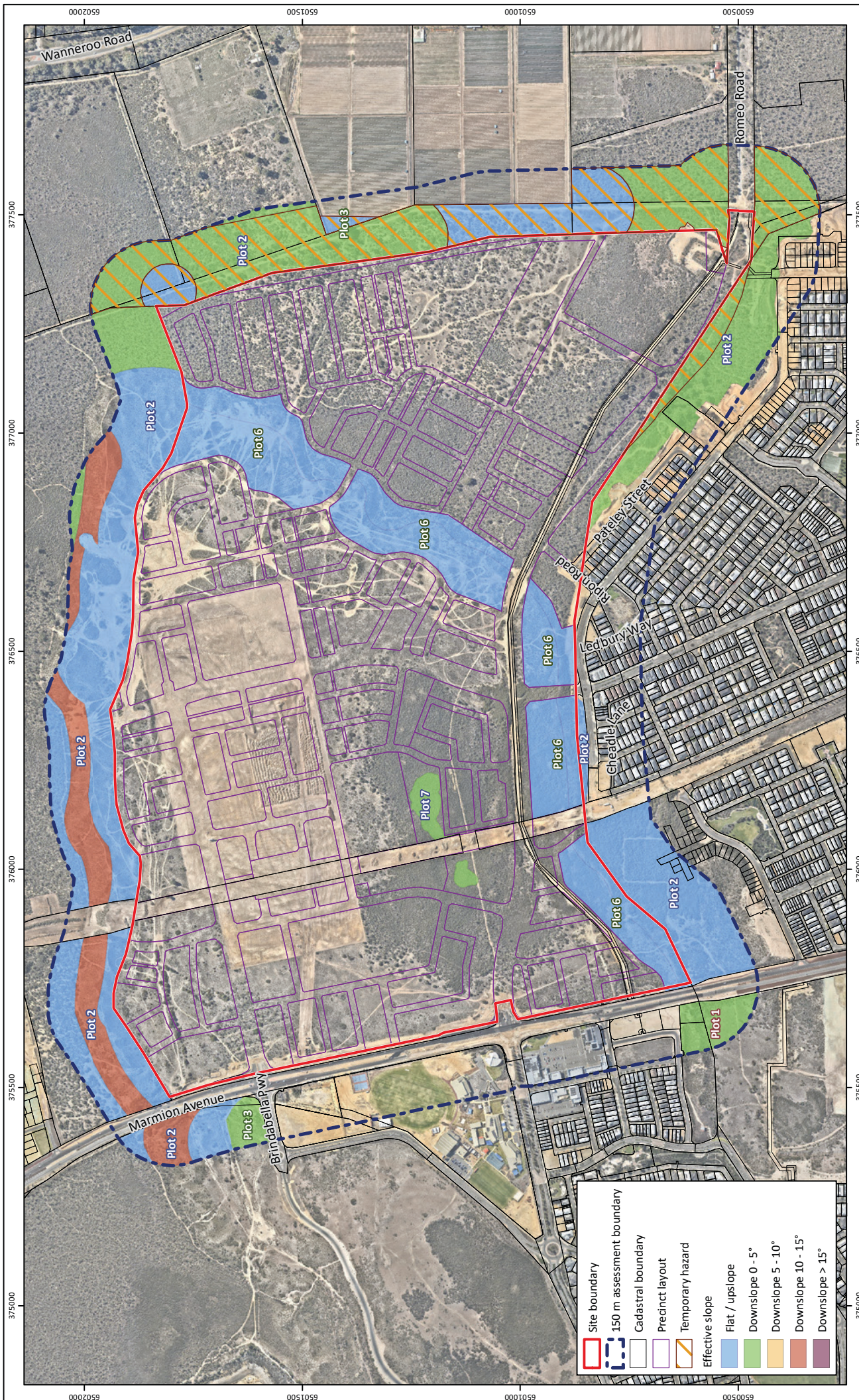
0 100 200 300  
 Metres  
 Scale: 1:11,500@A4  
 GDA 1994 MGA Zone 50



**Project:** Bush fire Management Plan  
 Alkimos Central Precinct Plan  
**Client:** Development WA

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used





	Site boundary
	150 m assessment boundary
	Cadastral boundary
	Precinct layout
	Temporary hazard
<b>Effective slope</b>	
	Flat / upslope
	Downslope 0 - 5°
	Downslope 5 - 10°
	Downslope 10 - 15°
	Downslope > 15°

Scale: 1:11,500@A4  
GDA 1994 MGA Zone 50



Plan Number: EP19-07(07)-FZ1b  
Drawn: GAR  
Date: 13/10/2021  
Checked: DAE  
Approved: RLE  
Date: 13/10/2021

**Figure 5: Post-Development Conditions: Effective Slope**

**Project:** Bush fire Management Plan  
Alkimos Central Precinct Plan  
**Client:** Development WA

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

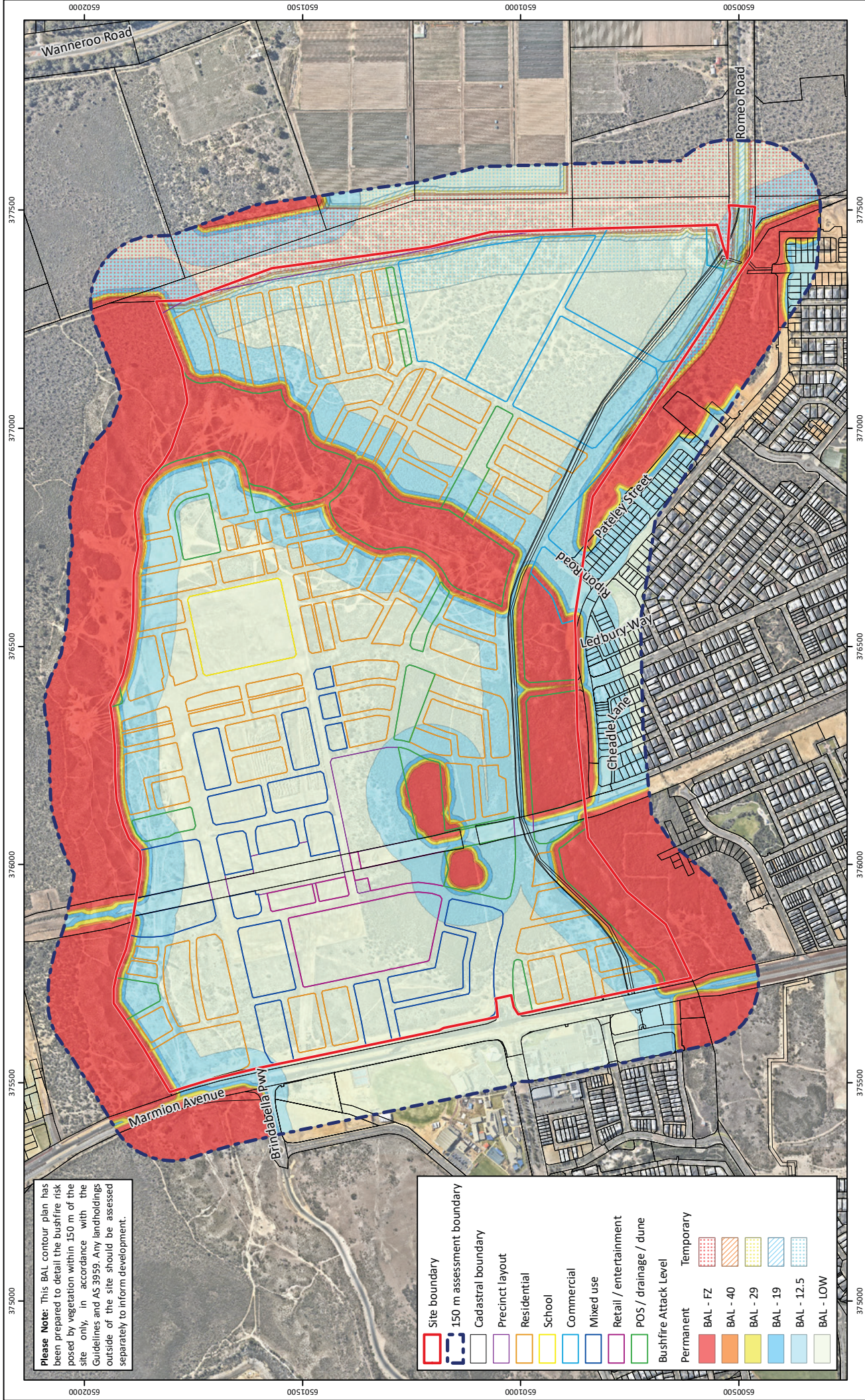


Plan Number: EP19-07(07)-F22b  
Drawn: GAR  
Date: 13/10/2021  
Checked: DAE  
Approved: RLE  
Date: 13/10/2021

**Figure 6: Bushfire Attack Level Contour Plan**

**Project:** Bushfire Management Plan  
Alkimos Central Precinct Plan  
**Client:** Development WA

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used



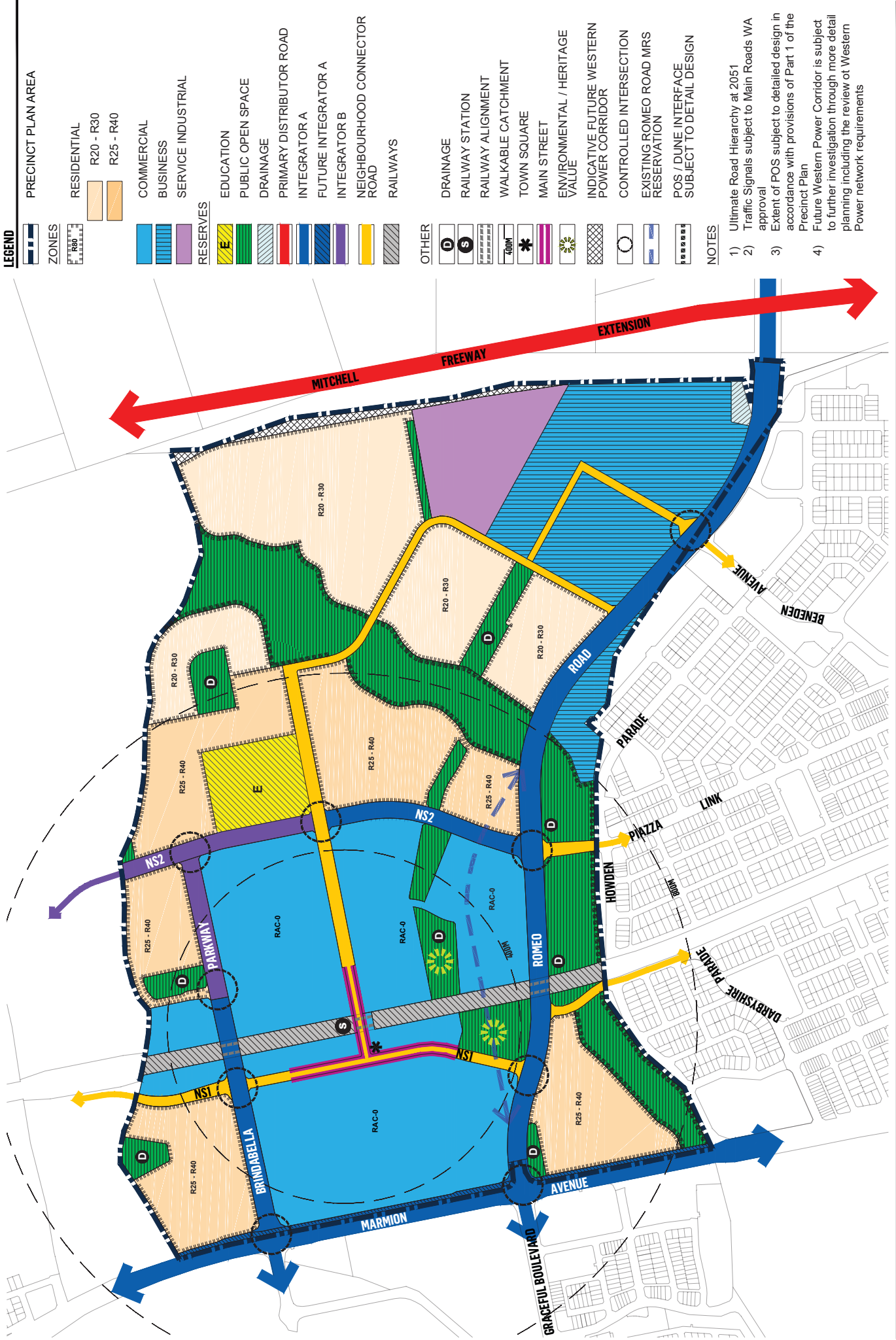
**Please Note:** This BAL contour plan has been prepared to detail the bushfire risk posed by vegetation within 150 m of the site only, in accordance with the Guidelines and AS 3959. Any landholdings outside of the site should be assessed separately to inform development.

	Site boundary
	150 m assessment boundary
	Cadastral boundary
	Precinct layout
	Residential
	School
	Commercial
	Mixed use
	Retail / entertainment
	POS / drainage / dune
	Bushfire Attack Level
<b>Permanent</b>	
	BAL - FZ
	BAL - 40
	BAL - 29
	BAL - 19
	BAL - 12.5
	BAL - LOW
<b>Temporary</b>	

# Appendix A

Alkimos Central Precinct Plan and  
Alkimos Central Indicative Land Use and Density Plan (Urbis 2021)





**LEGEND**

**PRECINCT PLAN AREA**

**ZONES**

- RESIDENTIAL
  - R20 - R30
  - R25 - R40

- COMMERCIAL
- BUSINESS
- SERVICE INDUSTRIAL

**RESERVES**

- EDUCATION
- PUBLIC OPEN SPACE
- DRAINAGE
- PRIMARY DISTRIBUTOR ROAD
- INTEGRATOR A
- FUTURE INTEGRATOR A
- INTEGRATOR B
- NEIGHBOURHOOD CONNECTOR ROAD
- RAILWAYS






















**OTHER**

- DRAINAGE
- RAILWAY STATION
- RAILWAY ALIGNMENT
- WALKABLE CATCHMENT
- TOWN SQUARE
- MAIN STREET
- ENVIRONMENTAL / HERITAGE VALUE
- INDICATIVE FUTURE WESTERN POWER CORRIDOR
- CONTROLLED INTERSECTION
- EXISTING ROMEO ROAD MRS RESERVATION
- POS / DUNE INTERFACE SUBJECT TO DETAIL DESIGN

**NOTES**

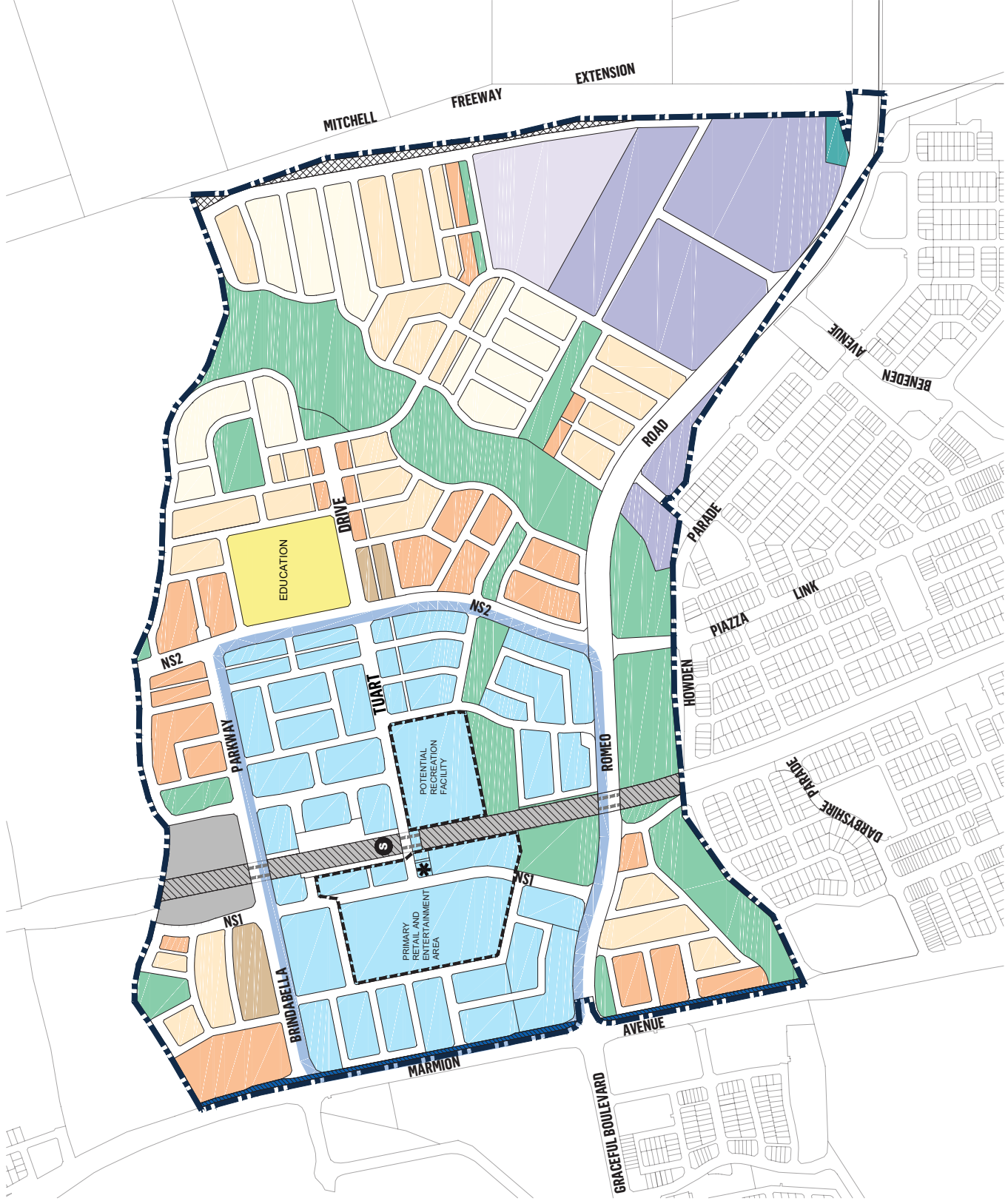
- 1) Ultimate Road Hierarchy at 2051
- 2) Traffic Signals subject to Main Roads WA approval
- 3) Extent of POS subject to detailed design in accordance with provisions of Part 1 of the Precinct Plan
- 4) Future Western Power Corridor is subject to further investigation through more detail planning including the review of Western Power network requirements

**LEGEND**

	PRECINCT PLAN AREA
	CITY CENTRE CORE
<b>INDICATIVE LAND USE &amp; DENSITIES</b>	
	RESIDENTIAL - R20
	RESIDENTIAL - R25
	RESIDENTIAL - R30
	RESIDENTIAL - R40
	COMMERCIAL (RAC-0)
	BUSINESS
	SERVICE INDUSTRIAL
	PUBLIC PURPOSE
	PUBLIC OPEN SPACE
	DRAINAGE
	PTA CARPARK
	OTHER
	RAILWAYS
	FUTURE WESTERN POWER CORRIDOR
	TOWN SQUARE
	FUTURE MARMION AVENUE ROAD WIDENING
	INDICATIVE ROAD LAYOUT
	RAILWAY ALIGNMENT
	ALKIMOS TRAIN STATION

**NOTE**

- 1) R-Code densities are indicative. Refer to Plan 1 in Part 1
- 2) For land within RAC-0 built form controls are guided by the provisions of Part 1
- 3) Land uses within the Commercial Zone shall be in accordance with the land use permissibility in DPS2 (including a mix of retail, commercial, entertainment, food and beverage, recreational, civic, cultural and some residential land uses)



# Appendix B

Landscape Master Plan (UDLA 2021)





**LEGEND**

- 1 The Pinnacles
- 2 Dune Ridge Walk
- 3 Eriy Civic Spine
- 4 NS Green Link
- 5 Parkway
- 6 Transect
- 7 Civic Heart
- 8 Town Square
- 9 Pedestrian Bridge
- L Leisure Complex
- S School
- P POS
- T Train Station
- Identified Public Art Opportunity
- TEC
- Site Extents

**ALKIMOS CENTRAL  
MASTERPLAN**



**PROJECT**  
Alkimos Central

**CLIENT**  
DevelopmentWA

**SCALE**  
1:4000 @ A1

**DRAWING #** | IMP-01  
**ISSUE DATE** | OCT 2021  
**REVISION** | K