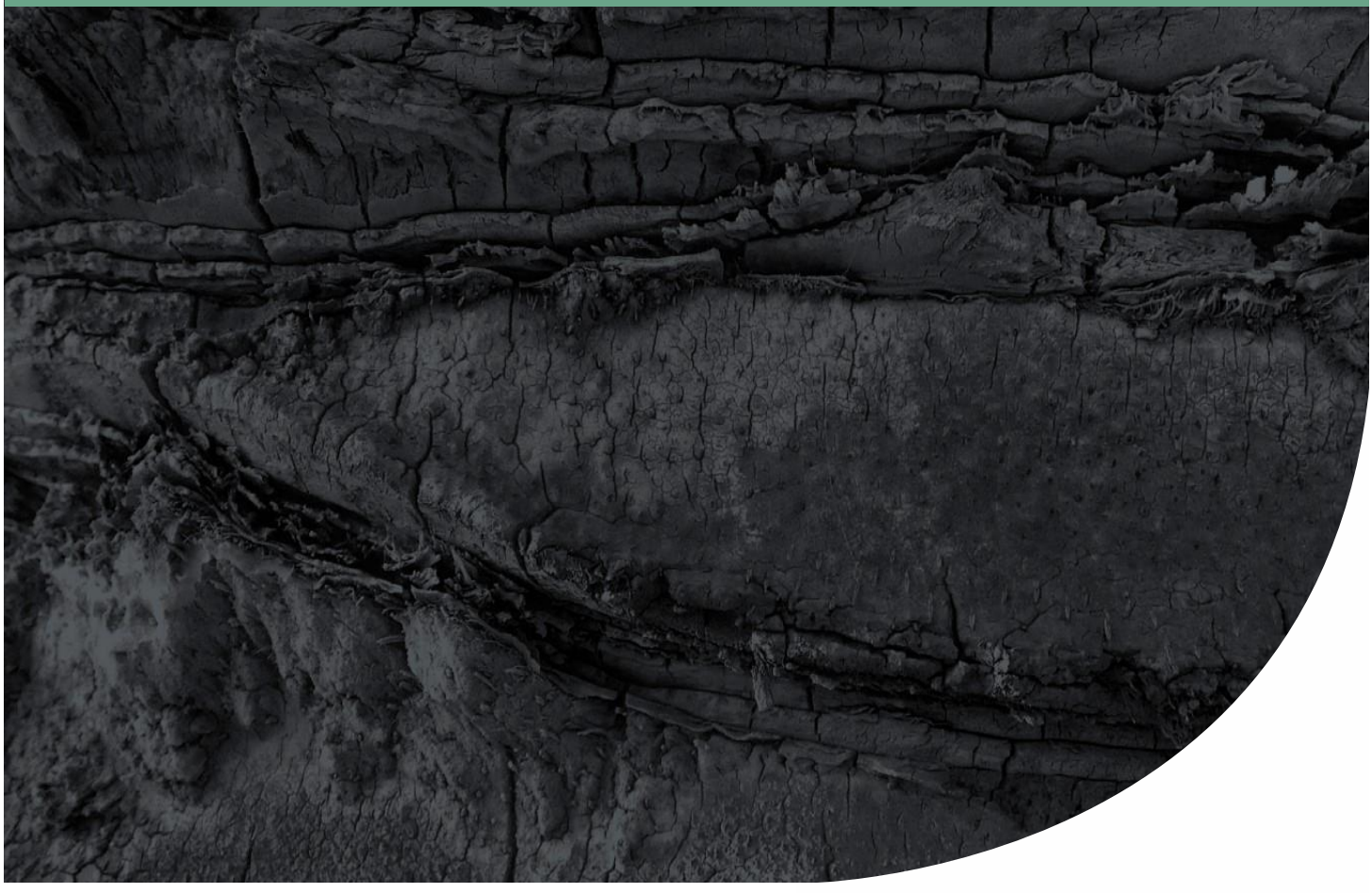
Bushfire Management Plan

Precinct 15 Structure Plan

Project No: EP22-019(16)

Prepared for Stockland
August 2023



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	Updated structure plan and minor amendments.				

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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" (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 threatened by the effects of bushfire attack.

Executive Summary

Stockland (the Proponent) are progressing a Structure Plan (SP) over 14 land parcels within the City of Wanneroo (CoW), an area also referred to as Precinct 15 of the East Wanneroo District Structure Plan (EWDSP). The collective land parcels (herein referred to as 'the site') extend over a 310 hectare (ha) area situated approximately 25 km north of the Perth Central Business District.

The proposed Precinct 15 SP will guide a transit orientated shopping and community hub serving the northern areas of East Wanneroo and will include a mix of uses including residential, commercial, recreation including a sports hub, public open space (POS) and conservation areas, in accordance with the overarching EWDSP.

The site is predominantly located within a 'bushfire prone area' under the state-wide *Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM 2021). The identification of a site within an area declared as bushfire prone necessitates that a further assessment of the determined bushfire risk affecting the site in accordance with *Australian Standard 3959:2018 Construction of buildings in bushfire prone areas* (AS 3959), and the satisfactory compliance of the proposal with the policy measures described in *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 1.4* (the Guidelines) (DPLH & WAPC 2021).

The purpose of this BMP is to assess the bushfire hazards, both within and nearby the site, and identify the 'management' strategies required to ensure the development of the land is consistent with the intent of SPP 3.7 – *to preserve life and reduce the impact of bushfire on property and infrastructure.*

This BMP has followed the requirements of SPP 3.7 to identify bushfire risk and the bushfire protection measures that will make the land suitable for its intended purpose. As part of this, a Bushfire Attack Level (BAL) assessment involving the classification and condition of vegetation within 150 m of the site has been undertaken.

As part of assessing the long-term bushfire risk to the site, vegetation classifications have been detailed for the post-development scenario (in accordance with AS 3959) in order to inform a bushfire attack level (BAL) assessment. Classified vegetation has been identified surrounding the site in all directions, in addition to selected areas within the site where existing or landscaped vegetation is proposed for future retention without further or ongoing hazard management (including wetlands, wetland buffers and drainage bio-retention areas).

In order to resolve the potential for bushfire to affect the site, a post development scenario has been assumed in which classified vegetation within proposed public open space (POS) in the site will be converted to low threat vegetation in accordance with Section 2.2.3.2 of AS 3959, with the exception of planted bio-retention areas which are assumed to comprise a hazard. Existing classified vegetation within resource enhancement wetlands and associated buffers will be retained and revegetated within the site and therefore will pose a bushfire risk to the site post-development. Existing classified vegetation within future subdivision and development areas within the site will be removed and converted to non-vegetated land and/or low threat vegetation. All classified vegetation outside the

site is assumed to remain in its existing condition and therefore pose a bushfire risk to the site in the long-term.

Compliance Assessment

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**: The majority of the site will be able to achieve a BAL rating of BAL-29 or less through the location of public roads, landscaped POS areas and in-lot setbacks. Future development is to be restricted in areas subject to BAL-40 and above.
- **Siting and Design**: All future habitable buildings can be sited within the proposed development so that BAL-29 or less can be achieved. Asset Protection Zones will be achieved for all lots through management of residential lots, non-vegetated areas and low threat vegetation in the future subdivision design including roadways and POS areas.
- **Vehicular Access**: The proposed Precinct 15 SP provides for access and egress opportunities via multiple points onto Lakeview Street to the south, Mariginiup Road to the west, Coogee Road to the north and Boundary Road to the east of the site. Presently existing Lakeview Street and Coogee Road provide access in two different directions. Additional access and egress opportunities will ultimately exist once development progresses within the site including the extension of Mariginiup Road adjacent to the western site boundary, the Coogee Road and Rousset Road upgrades and realignment through the centre of the site, and road upgrades of Boundary road (presently unsealed) to the east of the site. Given future development within the site might be staged, vehicular access arrangements in the short, medium and long term duration of development will need to ensure that all occupiers and visitors are provided with at least two vehicular access routes at all times. In the instance that roads external to the site boundary have not been constructed prior to subdivision within the site, temporary no-through roads with suitable turnaround areas will be constructed.
- **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 development of the site have been outlined as part of this BMP. If the current development layout changes at the future subdivision process, a revised BMP is likely to be required to support future subdivision applications.

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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
BMP	Bushfire Management Plan
BPAD	Bushfire Planning and Design
ESA	Environmentally Sensitive Area
REW	Resource enhancement wetlands
FDI	Fire Danger Index
FZ	Flame Zone
TEC	Threatened ecological community

Table A2: Abbreviations – Organisations

Organisations	
CoW	City of Wanneroo
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

Table A3: Abbreviations – Legislation and policies

Legislation	
AS 3959	Australian Standard 3959 Construction of Buildings in Bushfire Prone Areas
Guidelines	*Guidelines for Planning in Bushfire Prone Areas version 1.4* (DPLH & WAPC 2021)
SPP 3.7	State Planning Policy 3.7 Planning in Bushfire Prone Areas (WAPC 2015)

Table A4: Abbreviations – Planning and building terms

Planning and building terms	
EWDSP	East Wanneroo District Structure Plan
LMP	Landscape Master Plan
LPS	Local Planning Scheme
MRS	Metropolitan Region Scheme

Table A4: Abbreviations – units of measurement

Units of measurement	
ha	Hectare
m	Metre
m AHD	m in relation to the Australian height datum

1 Introduction

1.1 Background

Stockland (the Proponent) is progressing a structure plan (SP) over 14 land parcels within the City of Wanneroo (CoW), an area also referred to as Precinct 15 of the approved East Wanneroo District Structure Plan (EWDSP).

The land parcels (herein referred to as 'the site') extend over a 310 hectare (ha) area within the locality of Mariginiup and are generally bounded by the Gnangara-Moore River State Forest (existing and former pine plantation) to the east, remnant bushland and rural-residential areas to the north, rural-residential land and Mariginiup Lake (Bush Forever Site 147) to the west and Bush Forever Site 324 and rural-residential land to the south. The site is situated approximately 25 km north of the Perth Central Business District. The location of the site, cadastral boundaries and lot numbers are shown in **Figure 1**.

The proposed Precinct 15 SP will guide a transit orientated shopping and community hub serving the northern areas of East Wanneroo and will include a mix of land uses including residential, commercial, recreation (including a sports hub) public open space (POS) and conservation areas consistent with the overarching approved EWDSP. The intended land uses are shown in the SP in addition to an Indicative Master Plan provided in **Appendix A**.

The site is predominantly located within a 'bushfire prone area' under the state-wide *Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM 2021) as shown in **Plate 1**. The location of the site necessitates that a further assessment of the determined bushfire risk affecting the site in accordance with *Australian Standard 3959:2018 Construction of buildings in bushfire prone areas* (AS 3959), and the satisfactory compliance of the proposal with the policy measures described in *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 1.4* (the Guidelines) (DPLH & WAPC 2021).

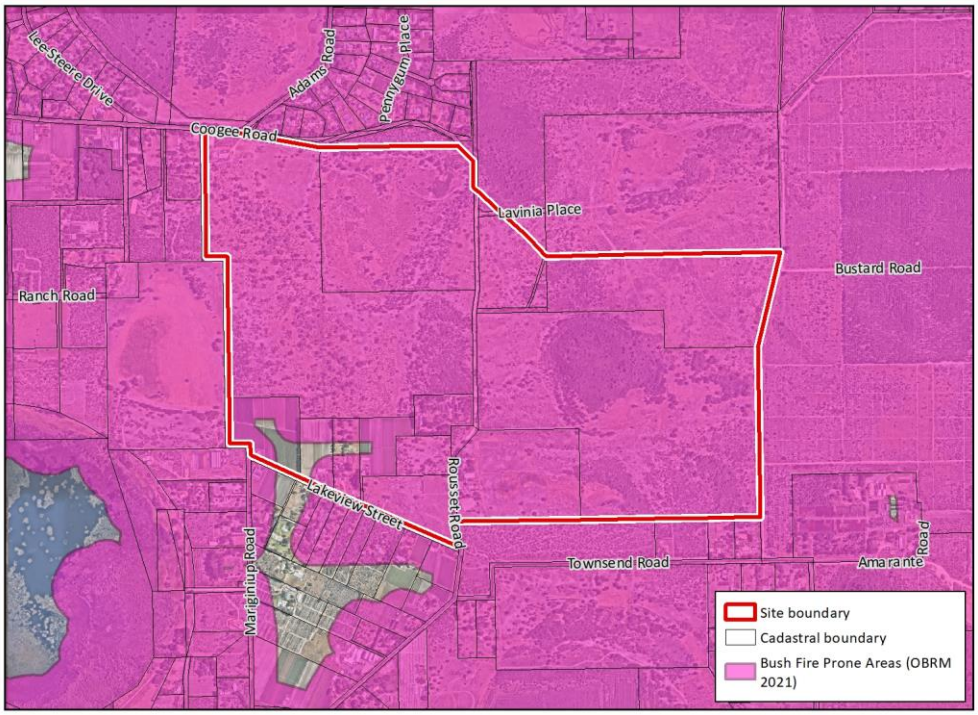

Plate 1: Areas within and surrounding the site identified as 'bushfire prone areas' (as indicated in purple) under the state-wide Map of Bush Fire Prone Areas (OBRM 2021).

The purpose of SPP 3.7 and its policy intent is to preserve life and reduce the impact of bushfire on property and infrastructure through effective risk-based land use planning. Importantly, it is risk-based, requiring a methodical approach to identify and evaluate the hazards and provide the treatments to ameliorate these hazards to an acceptable level.

> *SPP 3.7 does not require that there be no increase at all in the threat of bushfire to people property or infrastructure. Rather, as is seen in clause 2 of SPP 3.7, the intention of the policy is to 'implement effective, risk¬based land use planning and development to preserve life and* ***reduce the impact of bushfire on property and infrastructure'****.* (emphasis added) [1]

1.2 Aim of this report

The purpose of this BMP is to assess bushfire hazards both within and nearby to the site and demonstrate that the threat posed by any identified hazards can be appropriately mitigated and managed. This BMP has been prepared to support the structure planning process for the site and addresses the requirements of SPP 3.7, the Guidelines and AS 3959. The document includes:

- An assessment of the existing classified vegetation in the vicinity of the site (within 150 m) and consideration of bushfire hazards that will exist in the post development scenario (**Section 3**).
- Commentary on how the future development can achieve the bushfire protection criteria outlined within the Guidelines including an indication of BAL ratings likely to be applicable to future dwellings (**Section 5**).
- An outline of the roles and responsibilities associated with implementing this BMP (**Section 6**).

[1] Harmanis Holdings No. 2 Pty Ltd and Western Australian Planning Commission [2019] WASAT 43 (Harmanis).

1.3 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 1.4* (DPLH & WAPC 2021)
- *Australian Standard AS 3959 – 2018 Construction of buildings in bushfire prone areas* (Standards Australia 2018)

1.4 Description of the proposed Precinct 15 Structure Plan

The proposed Precinct 15 SP and the Indicative Master Plan (**Appendix A**) provide a framework for the provision of future land use, subdivisions and development within the site, consistent with the overarching EWDSP which covers an 8,300 ha area across East Wanneroo, comprising 28 separate SP precincts.

The EWDSP outlines the land use rationale for each precinct and specifies the information which is required to inform the preparation of the SP for each precinct. With respect to Precinct 15 (the site), the EWDSP proposes a shopping and community hub, comprising a neighbourhood centre and urban neighbourhoods integrated with natural features, with the site ultimately serving the northern areas of East Wanneroo. Additionally, the EWDSP intended for the site to provide for a 50 ha regional sporting facility with the balance of the site providing a transition from medium to low-rise built form, which has been factored into the proposed SP layout for the site. The SP and associated Indicative Master Plan (**Appendix A**) identifies the following land uses within the site:

- Approximately 109 ha of mixed density residential development for an estimated 3800 dwellings.
- Approximately 12 ha for Land Lease Community housing.
- A local neighbourhood centre providing retail and commercial opportunities.
- A primary school in the northern portion of the site and a combined primary and secondary school in the south.
- POS areas comprising more than 10% of the overall site's development footprint, providing vegetation retention opportunities and wetland retention areas, including buffer zones.
- Approximately 50 ha of regional sporting fields including ovals, tennis courts, playgrounds, club rooms, indoor sporting facilities, car parks and dog parks.
- A new Mariginiup train station including an associated Park n Ride facility.
- An integrated road network with connections to major roads such as to Lakeview Road, Franklin Road extension, Flynn Drive, Neaves Road and the proposed Whiteman Yanchep Highway to the east.

The site is predominantly zoned 'Urban Deferred', whilst a portion along the eastern site boundary is zoned 'Rural - Water Protection' under the Metropolitan Region Scheme (MRS), and zoned 'General Rural' and 'Rural Resource' under the CoW *District Planning Scheme No. 2* (DPS No. 2). The MRS zones and reserves are shown in **Plate 2**.

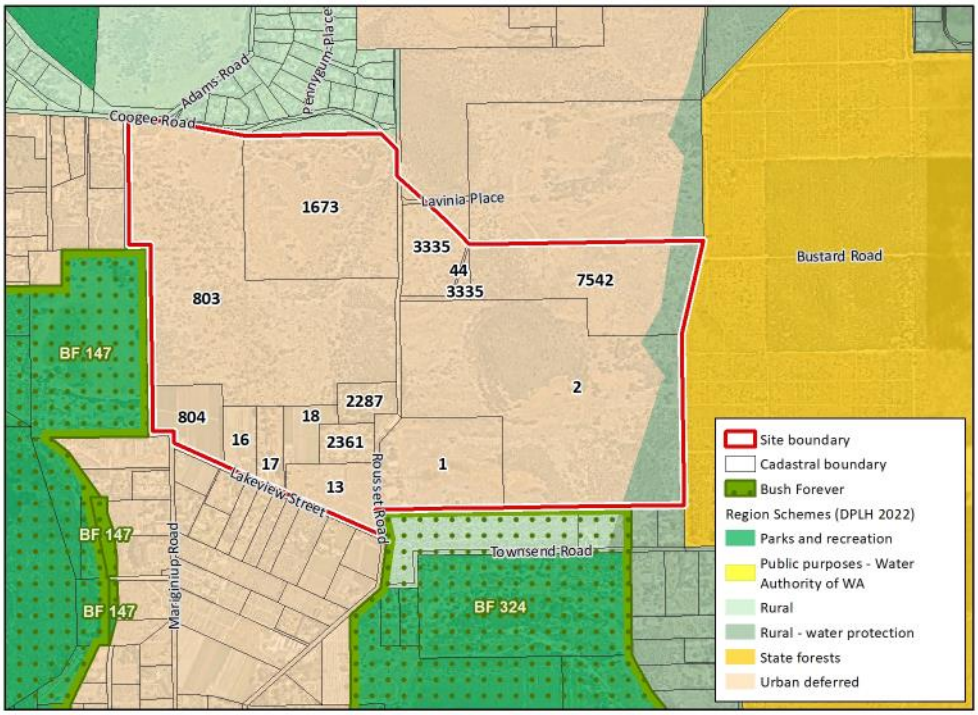

Plate 2: Metropolitan Region Scheme zones and reserves

1.5 Description of land characteristics

The site has been historically disturbed through agricultural land uses and was predominantly cleared of native vegetation prior to 1965, whilst significant regrowth of vegetation is evident from the 1980s and remains to date (Landgate 2023).

Surrounding land uses include:

- Bush Forever Site 147 (Mariginiup Lake) is located immediately to the west of the site.
- Bush Forever Site 324 (Jandabup Lake and Adjacent Bushland, Jandabup/Mariginiup) and rural residential lots and market gardens immediately to the south of the site.
- Gnangara-Moore River State forests comprising existing and historical pine plantations to the east of the site.
- Remnant vegetation and rural residential lots to the north of the site.

The site is generally flat with the exception of a ridgeline in the western portion of the site marking the transition from the Bassendean to the Spearwood dunal system. Elevations across the site range from 46 m Australian height datum (AHD) in the central portion of the site to 56 mAHD in the eastern portion and 59 mAHD along the ridgeline in the western portion of the site, as shown in **Figure 1**.

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 has been undertaken, with particular reference to the Shared Location Information Platform (SLIP) databases in addition to site-specific investigations undertaken by Emerge Associates in 2022 and 2023. A summary of the search results has been provided in **Table 1**.

The majority of the site has been historically cleared of vegetation and mostly comprises regrowth vegetation including patches of mature native trees with a dense native understorey, whilst the balance of the site comprises non-native paddock grasses with scattered native shrubs. As a result, the site contains predominantly areas with limited environmental values; however, patches of remnant native vegetation provide environmental values of conservation significance.

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

Key environmental feature (information in brackets refers to mapping data source)	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	No Conservation Category Wetlands (CCWs) intersect the site. However, four CCWs (UFI's #14241, #7960 and 7959 (Lake Adams) and #8161 (Little Mariginiup) occur within close proximity to the north, north-west and west of the site respectively. Multiple resource enhancement wetlands (REWs) occur within the site (UFI's #14247, #15443, #14254, #14253, #14245, #14261 and #14244). The proposed SP provides for the future retention of REWs UFI #15443, #14254, #14261 and #14244 in addition to a 30 m wide wetland buffer.
RAMSAR wetlands (DBCA-010)	No	No RAMSAR wetlands are identified within the mapping as occurring within the site or in close proximity.
Swan Bioplan Regionally Significant Natural Areas 2010 (DWER-070)	No	Not applicable. No Regionally Significant Natural Areas are identified within the site.
Aboriginal cultural heritage (ACH Inquiry System), (Horizon 2023)	Yes	A desktop assessment of the Aboriginal Cultural Heritage (ACH) Inquiry System identified ACH 'Directory Place 22160 Marrynginup' extending across the majority of the site Horizon Heritage Management (2023) has undertaken an Aboriginal Heritage Desktop Assessment of the site. The assessment determined the true extent of ACH Directory Place 22160 (Marrynginup), which is associated with a CCW feature to the north of the site. Marrynginup extends slightly into the northern-central portion of the site. This heritage site was determined to be of significance; however, it is noted that the section intersecting into the site has been historically disturbed. Notwithstanding, ACH artefacts have the potential to occur within the broader site.

Table 1: Summary of potential environmental considerations that may be associated with the site (based on a search of the SLIP databases) (continued).

Key environmental feature (information in brackets refers to mapping data source)	Yes / no / potentially occurring within the site	If yes / potentially, describe value that may be impacted
Non-indigenous heritage (SHO-003)	No	Not applicable. No registered non-indigenous heritage sites were identified within or nearby the site.
Threatened and priority flora (Emerge Associates 2023b)	Yes	No threatened flora species were identified within the site. Emerge Associates (2023) recorded two priority flora species within the site including 300 individuals of *Jacksonia sericea* (P4) in the western portion of the site and two individuals of *Conostylis bracteata* (P3) at two separate sampling locations. All other threatened and priority species that were identified within desktop database searches are unlikely to occur within the site as they were not recorded or due to lack of suitable habitat within the site (Emerge Associates 2023).
Threatened and priority fauna (Emerge Associates 2023a)	Yes	Based on the results of the detailed fauna surveys undertaken (Emerge Associates 2023) 10 broad fauna habitat types were identified within the site. Intact fauna habitat values within the site associated with patches of native vegetation provide potential habitat for 14 fauna species of conservation significance. Four conservation significant species were recorded within the site by Emerge Associates (2023) including Carnaby's black cockatoo (CBC) (endangered), forest red-tailed black cockatoo (FRTBC) (vulnerable), the black-striped burrowing snake (P3) and quenda (P4). Native vegetation within the site provides approximately 50 ha of suitable foraging habitat for CBC and 25 ha for FRTBC. Additionally, the site contains 365 potential nesting trees for black cockatoo, none of which were determined to contain suitable nesting hollows. No existing black cockatoo roost site or secondary evidence of roosting activity was observed within the site. The site also provides a habitat for quenda and the black striped burrowing snake, both of which have been recorded within the site. The habitat for these two species is widespread across the site in areas comprising dense understorey vegetation such as shrubs and tall grasses.
Bush Forever areas (DOP-071)	No	No Bush Forever sites occur within the site. Bush Forever Site 147 (Mariginiup Lake and Adjacent Bushland, Mariginiup) is directly abutting the south-western corner of the site, and Bush Forever Site 324 (Jandabup Lake and Adjacent Bushland, Jandabup/Mariginiup) lies adjacent to the southern boundary.
Clearing regulations – Environmentally Sensitive Areas (ESA) (DWER-046)	No	The site is not mapped as an ESA; however, multiple ESA's occur abutting the site boundary to the south and west associated with Bush Forever Sites 147 and 324 and to the north likely associated with CCW UFI 14241 and UFI 7959 (Lake Adams).

2.1 Native vegetation – modification and clearing

Within the site

As outlined in **Section 2**, the majority of the site has been previously cleared and now comprises patches of mature native trees with a dense native understorey and non-native paddock grasses with scattered native shrubs. Native vegetation within the site has been identified as providing suitable habitat for black cockatoo species; therefore, opportunities to retain native vegetation within future POS areas have been considered throughout the structure planning process, with the POS layout to be implemented as outlined in the proposed Precinct 15 SP (**Appendix A**).

At this stage, it is assumed that:

- Existing classified vegetation within the proposed POS areas (outside future wetland reserves and buffer zones) will be modified and managed to a low threat standard whilst retaining as many native trees as possible. Future vegetation retention within POS areas will be focused on mature native trees, as opposed to intact native vegetation communities.
- Native vegetation within the retained resource enhancement wetlands (REWs) and associated buffer zones will be retained, with revegetation of buffers also assumed, as a worst-case bushfire hazard scenario.

Clearing of native vegetation will be required for bushfire management purposes as part of implementing this BMP, specifically to enable the proposed urban development and associated buildings outside the POS areas to meet the relevant siting requirements of the Guidelines. It is envisaged that all clearing of native vegetation within the site will be exempt from requiring a clearing permit under Schedule 6 of the *Environmental Protection Act 1986* (EP Act) in accordance with a future subdivision approval under the *Planning and Development Act 2005*.

Where native vegetation clearing will, or is likely to, result in a significant environmental impacts on matters of national environmental significance (such as species of black cockatoo), a referral of that proposed action to the Commonwealth Department of Climate Change, Energy, the Environment and Water pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* will be required, even in the instance that native vegetation clearing is exempt under State legislation.

Outside the site

All vegetation outside the site is assumed to remain in its existing condition, with the exception of where vegetation exists in areas identified for future road construction, including:

- Mariginiup Road (west of the site), which has an existing road reserve but no constructed road carriageway.
- Coogee Road extension (north of the site), to extend the road carriageway into the Rousset Road reserve. This construction will occur within existing road reserves which currently do not support sealed public road carriageways.
- Boundary Road (east of the site), which is presently an unsealed track. The current track is situated on publicly owned land, but a new road reserve will ultimately need to be created.

It is anticipated that these road reserves will be cleared of vegetation (where required) and constructed as part of implementing the SP .

No other areas of native vegetation outside the site are proposed to be cleared by the proponent as part of the proposed future development within the site. Notwithstanding this, it is important to acknowledge that clearing of vegetation in areas external to the site will likely ultimately occur in the future as a result of the implementation of the EWDSP and associated structure planning for surrounding precincts. The timing of any development and the extent of any vegetation clearing surrounding the site is generally unknown; therefore, this BMP assumes any classified vegetation external to the site (unless where specified otherwise) will remain and this has been factored into the BAL assessment for the future development of the site.

2.2 Revegetation and landscape plans

A Landscape Master Plan (LMP) has been prepared for the site by Emerge Associates (2023) and is attached as **Appendix B**. The LMP provides an overarching framework to guide the future preparation, approval and implementation of landscape design within the site.

As shown in the LMP, road reserves and areas of POS are proposed to be landscaped as part of future development. These areas will be designed to achieve a low threat condition in accordance with Section 2.2.3.2 of AS 3959. Future verges and areas of turf and low shrub planting will be maintained and irrigated (if possible). The management of the POS and road reserves will be the responsibility of the proponent initially prior to the handover to the CoW. Ongoing management is likely to include:

- Irrigation of grass and garden beds (where achievable and 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).
- Application of ground/surface covers such as mulch or non-flammable materials as required.
- Regular mowing/slashing of grass to less than 100 mm in height.

Whilst the POS areas within the site will largely be managed to meet the definition of ‘low-threat vegetation’ outlined in AS 3959 Section 2.2.3.2(f), the following exceptions have been assumed in order to consider a potential worst-case bushfire hazard scenario:

- Bio-retention areas within POS areas will comprise grassland (Class G) vegetation, on the basis they will have relatively dense low planting and may not be routinely maintained and managed to reduce bushfire hazards. In contrast, this has not been assumed for larger-event storage drainage areas where irrigated turf and more active landscaping is permissible.
- Retained REW wetlands and their wetland buffers will comprise forest (Class A) vegetation, on the basis they are likely to be subject to revegetation and are unlikely to be routinely maintained and managed to reduce bushfire hazards.

3 Bushfire Assessment Results

Bushfire risk for the site has been appropriately considered both in context to the development of the site and potential impact upon the site using AS 3959 and the Guidelines.

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. AS 3959 measures the Bushfire Attack Level (BAL) as the radiant heat level (kW/m^2) over a distance of 100 m. AS 3959 also prescribes deemed-to-satisfy construction responses that can resist the determined radiant heat level at a given distance from the fire. It is based on six Bushfire Attack Level (BAL) ratings: BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ.

A BAL contour plan has been prepared in accordance with Appendix Three of the Guidelines and Method 1 of AS 3959 to determine the BAL ratings likely to be applicable to future buildings. This has been based on the vegetation classifications and the effective slope under the vegetation.

3.1 Assessment inputs

This bushfire attack level (BAL) assessment was undertaken in accordance with Method 1 of AS 3959. A site visit was undertaken on 10 February 2023.

3.1.1 Assumptions

The BAL assessment is based on the following assumptions:

- **Designated FDI**: 80
- **Flame temperature**: 1090 K
- **Effective slope beneath classified vegetation**: flat/upslope, downslope 0-5° (**Figure 2**)
- Vegetation to be retained within the site's future POS areas (excluding retained wetlands, associated wetland buffers and landscaped bio-retention drainage areas) will be modified to meet the exclusion criteria of clause 2.2.3.2 of AS 3959 and will be maintained in perpetuity.
- Areas of low threat vegetation outside the site within rural residential land holdings have been conservatively assumed to be either classified grassland (Class G) or classified woodland (Class B) vegetation post-development of the site based on existing vegetation structure. There is no guarantee that these land parcels will continue to be managed to a low threat condition in accordance with the CoW Fire Mitigation Notice.
- Areas of low threat vegetation outside the site, associated with existing market gardens, is assumed to remain low threat in accordance with Section 2.2.3.2 of AS 3959,.
- Classified vegetation that has been identified outside of the proponent's landholdings to the north, east, west and south of the site has been assumed to remain in its current state (unless stated otherwise, as above) and will therefore continue to be a bushfire hazard to development within the site until such a time development is progressed surrounding the site in accordance with future structure planning under the overarching EWDSP.
- Classified vegetation that has been identified directly adjacent to the entire western boundary of the site, within the road isolation for the future Mariginiup Road extension, is assumed to be

removed to enable road construction works and has therefore been excluded in accordance with clause 2.2.3.2(e) of AS 3959.

- Classified vegetation within REWs identified for future retention, as well as associated wetland buffer zones, has been assumed to remain as part of future development. Based on a conservative 'worst case' scenario, it was assumed the retained wetlands and associated buffers will be incorporated within POS areas and revegetated to a standard synonymous with the existing dominant wetland vegetation, ultimately comprising classified forest (Class A) vegetation at mature state. No management to reduce bushfire hazards has been assumed.
- Rehabilitated and revegetated areas associated with bio-retention drainage area across the site will be landscaped in accordance with the LMP and are expected to ultimately pose as a bushfire hazard based on the mature state of vegetation and are treated as classified grassland (Class G) vegetation based on the vegetation's mature state. No management to reduce bushfire hazards has been assumed.
- Areas of woodland vegetation (Class B) can include patches of mature trees with a 10%-30% foliage cover with a predominant understorey of grasses and occasional shrubs, in accordance with AS 3959.
- Areas of grassland vegetation (Class G) can include up to 10% foliage cover from shrubs and trees, as per AS 3959.

3.1.2 Vegetation Classification

All vegetation within 150 m of the site was classified in accordance with Clause 2.2.3 of AS 3959. Each distinguishable vegetation plot is described in **Table 2** and shown in **Figure 2**. A BAL Contour Plan has been prepared based on the developed condition of the site in accordance with Appendix Three of the Guidelines and is provided as **Figure 3**.

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) Vegetation of any 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.
d) Strips of vegetation less than 20 m in width (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 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 wind breaks.

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

*Table 2: AS 3959 Vegetation Classification (refer to **Figure 2**)*

Photo ID:	1	**Plot:**	1
Vegetation Classification or Exclusion Clause			
Forest (Class A) – Flat/upslope			
Description / Justification for Classification			
Forest vegetation has been identified to the south of the site within Bush Forever Site 324 (adjacent to Townsend Road) comprising predominantly mature trees growing to a height of up to approximately 6 m to 8 m, with a greater than 30% foliage cover, over a predominant understorey of low shrubs, grasses and juvenile trees. The forest vegetation to the south of the site within Bush Forever Site 324 is assumed to remain the same post development of the site.			

Photo ID:	2	**Plot:**	1
Vegetation Classification or Exclusion Clause			
Forest (Class A) – Flat/upslope			
Description / Justification for Classification			
Photo ID 2 shows the forest vegetation identified to the south of the site within Bush Forever Site 324 (adjacent to Townsend Road) comprising predominantly mature trees growing to a height of up to approximately 6 m to 8 m, with a greater than 30% foliage cover, over a predominant understorey of low shrubs, grasses and juvenile trees. The forest vegetation to the south of the site within Bush Forever Site 324 is assumed to remain the same post development of the site.			

Photo ID:	3	**Plot:**	1
Vegetation Classification or Exclusion Clause			
Forest (Class A) – Flat/upslope			
Description / Justification for Classification			
Forest vegetation has been identified to the south-east of the site within the Gnangara-Moore River State Forest comprising predominantly juvenile eucalypts growing to a height of approximately 6 m to 7 m, with a greater than 30% foliage cover, over a predominant understorey of low shrubs, grasses and juvenile trees. The forest vegetation to the south-east of the site is assumed to remain the same post development of the site.			

*Table 2: AS 3959 Vegetation Classification (refer to **Figure 2**) (continued)*

Photo ID:	4	**Plot:**	1
Vegetation Classification or Exclusion Clause			
Forest (Class A) – Flat/upslope			
Description / Justification for Classification			
Forest vegetation has been identified to the south-west of the site (abutting Lakeview Street) within rural residential lots comprising predominantly mature trees growing to a height of between 10 m and 15 m, with a greater than 30% foliage cover, over an understorey of predominantly low shrubs, juvenile trees and grasses. The forest vegetation is assumed to remain the same in the post development scenario of the site.			
Photo ID:	5	**Plot:**	1
Vegetation Classification or Exclusion Clause			
Forest (Class A) – Flat/upslope			
Description / Justification for Classification			
Forest vegetation has been identified in the eastern portion of the site comprising predominantly mature trees growing to a height of up to 15 m, with a greater than 30% foliage cover, over an understorey of low shrubs and grasses. The forest vegetation in the eastern portion of the site is associated with REW UFI 15443 and it is anticipated this vegetation will be retained as part of the wetland conservation (including a 30 m wide wetland buffer) and is therefore assumed to remain classified as forest (Class A) vegetation post-development of the site.			

*Table 2: AS 3959 Vegetation Classification (refer to **Figure 2**) (continued)*

Photo ID:	6	**Plot:**	1
Vegetation Classification or Exclusion Clause			
Forest (Class A) - Flat/upslope			
Description / Justification for Classification			
Forest vegetation has been identified in the eastern portion of the site comprising predominantly mature trees growing to a height of up to 15 m, with a greater than 30% foliage cover, over an understorey of low shrubs and grasses. The forest vegetation in the eastern portion of the site is associated with REW UFI 15443 and it is anticipated this vegetation will be retained as part of the wetland conservation (including a 30 m wide wetland buffer) and is therefore assumed to remain classified as forest (Class A) vegetation post-development of the site.			

Photo ID:	7	**Plot:**	1
Vegetation Classification or Exclusion Clause			
Forest (Class A) - Flat/upslope			
Description / Justification for Classification			
Forest vegetation has been identified in the eastern portion of the site comprising predominantly mature trees growing to a height of up to 15 m, with a greater than 30% foliage cover, over an understorey of low shrubs and grasses. The forest vegetation in the eastern portion of the site is associated with REW UFI 14244 and it is anticipated this vegetation will be retained as part of the wetland conservation (including a 30 m wide wetland buffer) and is therefore assumed to remain classified as forest (Class A) vegetation post-development of the site.			

*Table 2: AS 3959 Vegetation Classification (refer to **Figure 2**) (continued*

Photo ID:	8	**Plot:**	3
Vegetation Classification or Exclusion Clause			
Woodland (Class B) – Flat/upslope			
Description / Justification for Classification			
Woodland vegetation has been identified to the west of the site comprising mature trees growing to a height of up to 15 m, with less than 30% foliage cover over a predominantly grassy understorey. This classified woodland vegetation is assumed to remain post-development of the site.			
Photo ID:	9	**Plot:**	3
Vegetation Classification or Exclusion Clause			
Woodland (Class B) – Flat/upslope			
Description / Justification for Classification			
Woodland vegetation has been identified to the south of the site within rural residential lots comprising mature trees growing to a height of up to 10 m, with less than 30% foliage cover. Although this vegetation was managed to a low threat standard at the time of the assessment including tree branches pruned to a height of 2 m and grasses slashed to a height of <100 mm (or stripped), as a conservative measure and since management of this land parcel cannot be guaranteed, this vegetation is assumed to be classified as woodland (Class B) post-development of the site.			

*Table 2: AS 3959 Vegetation Classification (refer to **Figure 2**) (continued)*

Photo ID:	10	**Plot:**	3
Vegetation Classification or Exclusion Clause			
Woodland (Class B) – Flat/upslope			
Description / Justification for Classification			
Woodland vegetation has been identified to the north of the site within a rural residential lot comprising mature trees growing to a height of up to 15 m, with less than 30% foliage cover. Although this vegetation was managed to a low threat standard at the time of the assessment including tree branches pruned to a height of 2 m and grasses slashed to a height of <100 mm, as a conservative measure and since management of this land parcel cannot be guaranteed, this vegetation is assumed to be classified as woodland (Class B) post-development of the site.			
Photo ID:	11	**Plot:**	4
Vegetation Classification or Exclusion Clause			
Woodland (Class B) – downslope 0-5°			
Description / Justification for Classification			
Woodland vegetation has been identified to the west of the site comprising mature trees growing to a height of up to 15 m, with less than 30% foliage cover over a predominantly grassy understorey. This classified woodland vegetation is assumed to remain post-development of the site.			

*Table 2: AS 3959 Vegetation Classification (refer to **Figure 2**) (continued)*

Photo ID:	12	**Plot:**	5
Vegetation Classification or Exclusion Clause			
Scrub (Class D) – Flat/upslope			
Description / Justification for Classification			
Scrub vegetation was identified to the north- of the site associated with the conservation category wetland (CCW) UFI 14241. This vegetation is dominated by melaleuca species (paper bark), generally between 4 m and 5 m in height with greater than 30% foliage cover and a dense understorey. This scrub vegetation comprises a closed continuous fuel profile and is assumed to remain post-development of the site.			

Photo ID:	13	**Plot:**	5
Vegetation Classification or Exclusion Clause			
Scrub (Class D) – Flat/upslope			
Description / Justification for Classification			
Scrub vegetation was identified to the north of the site within a CoW conservation reserve dominated by shrubs generally between 2 m and 4 m in height with greater than 30% foliage cover and a dense understorey. This scrub vegetation comprises a closed continuous fuel profile and is assumed to remain post-development of the site.			

Photo ID:	14	**Plot:**	5
Vegetation Classification or Exclusion Clause			
Scrub (Class D) – Flat/upslope			
Description / Justification for Classification			
Scrub vegetation was identified to the east of the site dominated by shrubs generally between 2 m and 4 m in height with greater than 30% foliage cover and a dense understorey. This scrub vegetation comprises a closed continuous fuel profile and is assumed to remain post-development of the site.			

*Table 2: AS 3959 Vegetation Classification (refer to **Figure 2**) (continued)*

Photo ID:	15	**Plot:**	5
Vegetation Classification or Exclusion Clause			
Scrub (Class D) – Flat/upslope			
Description / Justification for Classification			
Scrub vegetation was identified to the north of the site dominated by shrubs generally between 2 m and 4 m in height with greater than 30% foliage cover and a dense understorey. This scrub vegetation comprises a closed continuous fuel profile and is assumed to remain post-development of the site.			

Photo ID:	16	**Plot:**	5
Vegetation Classification or Exclusion Clause			
Scrub (Class D) – Flat/upslope			
Description / Justification for Classification			
Scrub vegetation was identified in the central - eastern portion of the site associated with REW UFI 15443 dominated by shrubs generally between 4 m and 5 m in height with greater than 30% foliage cover and a dense understorey. This scrub vegetation comprises a closed continuous fuel profile and is assumed to remain post-development of the site as part of the retained wetland feature and associated 30 m wide buffer.			

Photo ID:	17	**Plot:**	5
Vegetation Classification or Exclusion Clause			
Scrub (Class D) – Flat/upslope			
Description / Justification for Classification			
Scrub vegetation was identified in the central eastern portion of the site associated with REW UFI 15443 dominated by shrubs generally between 4 m and 5 m in height with greater than 30% foliage cover and a dense understorey. This scrub vegetation comprises a closed continuous fuel profile and is assumed to remain post-development of the site as part of the retained wetland feature and associated 30 m wide buffer.			

*Table 2: AS 3959 Vegetation Classification (refer to **Figure 2**) (continued)*

Photo ID:	18	**Plot:**	6
Vegetation Classification or Exclusion Clause			
Scrub (Class D) – downslope 0-5°			
Description / Justification for Classification			
Scrub vegetation was identified to the west of the site dominated by shrubs generally between 2 m and 4 m in height with greater than 30% foliage cover and a dense understorey. This scrub vegetation comprises a closed continuous fuel profile and is assumed to remain post-development of the site.			
Photo ID:	19	**Plot:**	7
Vegetation Classification or Exclusion Clause			
Grassland (Class G) – Flat/upslope			
Description / Justification for Classification			
Grassland vegetation has been identified to the north of the site within a rural residential lot. Although at the time of the assessment, the grass vegetation has been managed to a low threat condition and slashed to a height of <100 mm, future management on a regular basis cannot be guaranteed and therefore this vegetation has been classified as grassland (Class G) post-development of the site.			
Photo ID:	20	**Plot:**	7
Vegetation Classification or Exclusion Clause			
Grassland (Class G) – Flat/upslope			
Description / Justification for Classification			
Unmanaged grassland vegetation has been identified to the west of the site characterised by open weedy pasture grass cover >100 mm in height with an overstorey of occasional trees with a foliage cover of less than 10%. This vegetation is assumed to remain the same in the post development scenario of the site.			

*Table 2: AS 3959 Vegetation Classification (refer to **Figure 2**) (continued)*

Photo ID:	21	**Plot:**	7
Vegetation Classification or Exclusion Clause			
Grassland (Class G) – Flat/upslope			
Description / Justification for Classification			
Unmanaged grassland vegetation has been identified to the east of the site characterised by open weedy pasture grass cover >100 mm in height with an overstorey of occasional shrubs with a foliage cover of less than 10%. This vegetation is assumed to remain the same in the post development scenario of the site.			
Photo ID:	22	**Plot:**	7
Vegetation Classification or Exclusion Clause			
Grassland (Class G) – Flat/upslope			
Description / Justification for Classification			
Unmanaged grassland vegetation has been identified to the north of the site characterised by open weedy pasture grass cover >100 mm in height with an overstorey of occasional trees and shrubs with a foliage cover of less than 10%. This vegetation is assumed to remain the same in the post development scenario of the site.			
Photo ID:	23	**Plot:**	9
Vegetation Classification or Exclusion Clause			
Exclusion clause 2.2.3.2(e) non-vegetated areas			
Description / Justification for Classification			
Coogee Road to the north of the site has been excluded in accordance with clause 2.2.3.2(e) of AS 3959. Coogee Road will likely undergo road widening and will ultimately connect to Rousset Road within the site as part of the SP implementation.			

*Table 2: AS 3959 Vegetation Classification (refer to **Figure 2**) (continued)*

Photo ID:	24	**Plot:**	9
Vegetation Classification or Exclusion Clause			
Exclusion clause 2.2.3.2(e) non-vegetated areas			
Description / Justification for Classification			
The existing Rousset Road within the site has been excluded in accordance with clause 2.2.3.2(e) of AS 3959. This portion of presently unsealed Rousset Road will undergo significant upgrades including road widening and realignment and will ultimately comprise a major integrator road and underground railway reserve as part of the SP implementation.			
Photo ID:	25	**Plot:**	9
Vegetation Classification or Exclusion Clause			
Exclusion clause 2.2.3.2(e) non-vegetated areas			
Description / Justification for Classification			
Non-vegetated areas associated with light industrial development and hardstand to the south-west of the site along Mariginiup Road and Lakeview Street has been excluded in accordance with clause 2.2.3.2(e) of AS 3959.			
Photo ID:	26	**Plot:**	9
Vegetation Classification or Exclusion Clause			
Exclusion clause 2.2.3.2(e) non-vegetated areas			
Description / Justification for Classification			
Non-vegetated areas associated with the corner of Lakeview Street and Mariginiup Road to the south-west of the site have been excluded in accordance with clause 2.2.3.2(e) of AS 3959. This section of Mariginiup Road will be extended further adjacent to the western site boundary as part of SP implementation.			

*Table 2: AS 3959 Vegetation Classification (refer to **Figure 2**) (continued)*

Photo ID:	27	**Plot:**	9
Vegetation Classification or Exclusion Clause			
Exclusion clause 2.2.3.2(e) non-vegetated areas			
Description / Justification for Classification			
Existing Lakeview Street to the south of the site has been excluded in accordance with clause 2.2.3.2(e) of AS 3959.			

Photo ID:	28	**Plot:**	9
Vegetation Classification or Exclusion Clause			
Exclusion clause 2.2.3.2(e) non-vegetated areas			
Description / Justification for Classification			
Non-vegetated areas associated with the existing Boundary Road to the east of the site have been excluded in accordance with clause 2.2.3.2(e) of AS 3959. Boundary Road will be subject to further road upgrades including road widening and realignment as part of the SP implementation.			

Photo ID:	29	**Plot:**	10
Vegetation Classification or Exclusion Clause			
Exclusion clause 2.2.3.2(f) low-threat vegetation			
Description / Justification for Classification			
Market gardens to the south of the site along Lakeview Street have been excluded in accordance with clause 2.2.3.2(f) of AS 3959.			

3.1.3 Assessment outputs

The BAL assessment completed for the site indicates that a BAL rating of BAL 29 or less can be achieved for the majority of the site. BAL 40 and BAL-FZ extend into the central portion of the site (due to future bushfire hazards associated with the retained wetland vegetation, future buffers and bio-retention drainage areas). However, it should be noted that the vegetation classifications pertaining to these hazards are conservative, assuming revegetation to a classified forest (Class A) vegetation applies to the full extent of the wetland buffers and classified grassland (Class G) vegetation applies to bio-retention drainage areas. Notwithstanding this, appropriate set back distances will result in habitable buildings achieving a BAL rating of BAL-29 or below.

Table 3 provides a summary of the setback distances necessary from classified vegetation to achieve the indicated BAL ratings, with the BAL contour plan, provided in **Figure 3**, being a visual representation of these distances. The setback distances are based on the post-development classified vegetation (**Figure 2**) and effective slope taken from Table 2.5 of AS 3959.

Table 3: Setback distances based on vegetation classification and effective slope and Table 2.5 of AS 3959, as determined by the method 1 BAL assessment

Plot number (see Figure 2)	Vegetation classification (see Figure 2)	Effective slope (see Figure 2)	Distance to vegetation (from Table 2.5 of AS 3959)	BAL rating (see Figure 3)
Plot 1	Forest (Class A)	Flat/upslope	< 16 m	BAL-FZ
			16 - < 21 m	BAL-40
			21 - < 31 m	BAL-29
			31 - < 42 m	BAL-19
			42 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW
Plot 2	Forest (Class A)	Downslope 0-5°	< 20 m	BAL-FZ
			20 - < 27 m	BAL-40
			27 - < 37 m	BAL-29
			37 - < 50 m	BAL-19
			50 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW
Plot 3	Woodland (Class B)	Flat/upslope	< 10 m	BAL-FZ
			10 - < 14 m	BAL-40
			14 - < 20 m	BAL-29
			20 - < 29 m	BAL-19
			29 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW

Table 3: Setback distances based on vegetation classification and effective slope and Table 2.5 of AS 3959, as determined by the method 1 BAL assessment (continued)

Plot number (see Figure 2)	Vegetation classification (see Figure 2)	Effective slope (see Figure 2)	Distance to vegetation (from Table 2.5 of AS 3959)	BAL rating (see Figure 3)
Plot 4	Woodland (Class B)	Downslope 0-5°	< 13 m	BAL-FZ
			13 - < 17 m	BAL-40
			17 - < 25 m	BAL-29
			25 - < 35 m	BAL-19
			35 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW
Plot 5	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
Plot 6	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
Plot 7	Grassland (Class 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
Plot 8	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

4 Identification of Bushfire Hazard Issues

From a bushfire hazard management perspective, based on the requirements of SPP 3.7 and the Guidelines, the key issues that are likely to require management and/or consideration as part of ongoing operation and any future development within the site include:

- Provision of appropriate separation distance from bushfire hazards to ensure a BAL rating of BAL-29 or less can be achieved at buildings (built form) (i.e. classified vegetation associated with the wetlands and associated buffer areas and surrounding the site).
- Ensuring site access is designed, constructed and managed to ensure safe access and egress for fire fighting vehicles and occupants. This may include the use of temporary no through roads with suitable turn around areas or temporary emergency access ways during staged development that meet the requirements of the Guidelines.
- Ensuring that any landscaped areas including POS areas (outside of the wetland buffers and potentially the bio-retention drainage areas) and public road reserves within the site are appropriately designed (as per the LMP, **Appendix B**), implemented and managed to achieve low threat standards to reduce the risk of fires starting onsite.
- Ensuring the provision of appropriate reticulated water supply and associated infrastructure.

4.1 Permanent hazards

The majority of the site is surrounded by areas comprising classified vegetation within Bush Forever Sites 324 to the south and 147 to the west in addition to classified vegetation to the east within the Gnangara-Moore River State Forest) utilised for existing and historical pine plantations, and to the north of the site within rural land holdings and CCW UFI 14241. Vegetation within the site associated with the REWs and associated wetland buffers will be retained within POS areas and will pose a permanent bushfire hazard. Classified vegetation surrounding and within the site includes:

- Class A – Forest vegetation adjoining the site to the south associated with Bush Forever Site 324 and within rural residential lots.
- Class A – Forest vegetation to the east of the site associated with historical pine plantations of the Gnangara-Moore River State Forest.
- Class A – Forest vegetation within REW UFI 14245, UFI 15443 and UFI 14244
- Class B – Woodland Vegetation within rural residential lots and part of Bush Forever Site 147 to the west of the site.
- Class B – Woodland Vegetation within rural residential lots to the north of the site along Coogee Road. Although vegetation within these lots was managed to a low threat condition during the site assessment, conservatively this vegetation has been classified as woodland (Class B).
- Class D – Scrub vegetation to the north of the site within CCW UFI 14241 and along Coogee Road within a CoW conservation reserve.
- Class D – Scrub vegetation to the west of the site within a rural lots and to the east of the site associated with historical pine plantations.
- Class D – Scrub vegetation within the site associated with REW UFI 15443.
- Class G – Unmanaged grassland vegetation to the north, west, south and east of the site.

4.2 Temporary hazards

It is acknowledged that portions of classified vegetation surrounding the site will ultimately be removed as part of future structure planning of precincts in the area, as outlined in the EWDSP. Notwithstanding this, as the timing of any future structure planning and development in the area is generally unknown, no temporary hazards have been assumed and all classified vegetation surrounding the site (unless otherwise specified) has been treated as a permanent hazard for the purposes of this BMP and the associated BAL Contour Plan (**Figure 3**).

4.3 Vegetation management and landscaping

Vegetation within the site's POS areas (except within wetlands, associated buffers and bio-retention drainage areas) has been assumed to be able to achieve a low threat condition as a result of the proposed SP development. Future landscaping plans will need to ensure that all vegetation within the site can comply with clause 2.2.3.2 of AS 3959. The ideal outcome is the retention of mature trees and native vegetation in 'good' or better condition comprising threatened and priority ecological communities (as feasible) and all vegetation managed to a minimal fuel condition within POS areas.

As highlighted in **Section 4.1**, vegetation within the REWs will be retained and therefore remain a bushfire hazard, whilst revegetation and rehabilitation within wetland buffers have been conservatively assumed to pose a bushfire threat post-development of the site. Notwithstanding this, it is possible that portions of the buffer associated with the REW values including bio-retention areas within POS may be maintained in the future to achieve low threat for public recreation purposes.

4.4 Access

The proposed Precinct 15 SP provides for access and egress opportunities via multiple points onto Lakeview Street to the south, Mariginiup Road to the west, Coogee Road to the north and Boundary Road to the east of the site. Presently existing Lakeview Street and Coogee Road provide access in two different directions. Additional access and egress opportunities will ultimately exist once development progresses within the site including the extension of Mariginiup Road adjacent to the western site boundary, the Coogee Road and Rousset Road upgrades and realignment through the centre of the site and road upgrades of Boundary road (presently unsealed) to the east of the site. All neighbourhood connector and transport corridors surrounding the site will be implemented in accordance with the EWDSP to which the internal road network, including the major transit corridor within the centre of the site, will ultimately connect.

Given future development within the site might be staged, vehicular access arrangements in the short, medium and long term duration of development will need to ensure that all occupiers and visitors are provided with at least two vehicular access routes at all times. In the instance that roads external to the site boundary have not been constructed prior to staged subdivision within the site, temporary no-through roads and suitable turnaround areas will be constructed.

5 Assessment Against the Bushfire Protection Criteria

This BMP provides an outline of the mitigation strategies that will ensure that as development progresses within the site, an acceptable solution can be adopted for each of the bushfire protection criteria detailed within Appendix Four of the Guidelines. 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.

A summary of how the 'acceptable solution' can be achieved and an associated compliance statement for each has been provided in Error! Reference source not found..

Table 4: Assessment against the bushfire protection criteria from the Guidelines

Bushfire protection criteria	Proposed bushfire management strategies
Element 1: Location	
A1.1 Development location	The BAL contour plan (**Figure 3**) indicates that the majority of the site will be able to achieve a BAL rating of BAL-29 or less. Based on the classified vegetation within the resource enhancement wetlands (REWs) and associated wetland buffers and bio-retention areas, some areas of the site are likely to be subject to a BAL rating exceeding BAL-29. Notwithstanding this, as part of future subdivision and detailed design, development can be designed to ensure habitable buildings achieve BAL-29 or less through the location of public roads, landscaped POS areas and in-lot setbacks compliant with A1.1. Further planning at the subdivision application and/or development application stage will inform the proposed lot layout for the site, with an updated BMP (and associated BAL assessment) to be prepared to ensure that future habitable buildings are able to achieve a BAL rating of BAL-29 or less.
Element 2: Siting and design	
A2.1 Asset Protection Zone	All lots are required to be managed to a low threat condition with a minimum Asset Protection Zone (APZ) equivalent to enable BAL-29 to be achieved. APZs are typically contained within a lot, but can also include areas of low threat vegetation managed in accordance with Section 2.2.3.2 (e) or (f) of AS 3959. For the site, this includes managed road reserves and POS areas (outside of wetlands and associated buffers). The proposal can and will comply with A2.1. The bushfire hazards in the post-development scenario that are relevant to the site are shown in **Figure 2**. These include retained forest and scrub vegetation within the site, associated with the REWs and the applicable wetland buffers and grassland vegetation associated with the bio-retention areas. Based on the outcomes of the BAL assessment and the BAL contour plan (see **Figure 3**), residential lots adjacent to the wetlands and associated wetland buffers may be exposed to a BAL rating exceeding BAL-29. However, the post development assumptions which have informed the assessment are based on a conservative approach that assumes the full extent of revegetation for the wetland buffers to result in vegetation being classified as forest (Class A) vegetation. It is possible portions of the buffer associated with the REW values may be maintained in the future to achieve low threat for public recreation purposes. This will provide appropriate separation between future residential areas and areas of potential revegetation. To ensure that future habitable buildings are not exposed to BAL ratings greater than BAL-29 in the future, the following management measures can be undertaken: • Landscaping at the interface of any potential revegetation areas, to enable these areas to be maintained to a 'low threat' standard to support this area being used as an APZ. • Internal lot setbacks. • Minor modifications to the road reserve and/or lot layout. Whilst the conservative assessment of the bushfire hazards indicates that some residential areas may be exposed to a BAL rating exceeding BAL-29, future habitable buildings will still be able to achieve a BAL rating of BAL-29 or less through the provision of in-lot setbacks and/or landscaping of small portions of the wetland buffer where it interfaces with residential development. Overall, the acceptable solution can be satisfied. Where habitable buildings proposed to be constructed within a designated bushfire prone area (Class 1, 2, 3 and 10a buildings) in an area subject to a BAL rating of BAL-12.5 or higher, these will need to satisfy higher construction standards in accordance with the National Construction Code (NCC) (i.e. AS 3959 or the National Association for Steel-framed Housing (NASH) Standard).

Table 4: Assessment against the bushfire protection criteria from the Guidelines (continued)

Bushfire protection criteria	Proposed bushfire management strategies
Element 3: Vehicular access	
A3.1 Public roads	All existing and proposed roads as part of the SP implementation, as shown in **Figure 4**, can and will comply with the minimum standards outlined in Appendix Four of the Guidelines (Table 6, column 1).
A3.2a Multiple access routes	The site will ultimately have access and provide egress via multiple points onto Lakeview Street, Mariginiup Road, Coogee Road, Rousset Road and Boundary Road to the east of the site. Presently Lakeview Street and Coogee Road provide access in two different directions compliant with A3.2a. Additional access and egress opportunities will ultimately exist once development progresses surrounding the site, associated with future structure planning within other precincts in accordance with the EWDSP. Where integrator arterial roads are located adjacent to the SP boundary (the site), these are assumed to be constructed prior to or concurrent with the development within the site to provide additional access and egress opportunities from and to the site's proposed interior road network. This includes the Mariginiup Road extension adjacent to the western site boundary, the future connection of Coogee Road and Rousset Road through the center of the site and Boundary Road along the eastern site boundary. All neighbourhood connector and transport corridors surrounding the site will be implemented in accordance with the EWDSP to which the internal road network, including the major transit corridor within the centre of the site, will ultimately connect. Given future development within the site might be staged, vehicular access arrangements in the short, medium and long term duration of development will need to ensure that all occupiers and visitors are provided with at least two vehicular access routes at all times. Where roads external to the site boundary have not been constructed prior to staged subdivision within the site, temporary no-through roads and suitable turnaround areas will need to comply with the technical requirements of the Guidelines Table 6 (**Plate 4**) and Figure 24.
A3.2b Emergency access way	There is no requirement for the proposed development to provide an emergency access way as the proposal is compliant with A3.2a. It is possible that as part of staged development, emergency access ways may be required to ensure future development has access to at least two different destinations, until the full public road network is constructed. This should be considered as part of each stage of development and where temporary no-through roads and suitable turnaround areas can not comply with the technical requirements of the Guidelines Table 6, as outlined in **Plate 4**. Any future emergency access way will need to meet the requirements of Table 6 of the Guidelines, provide through connection to a public road, be no more than 500 m in length and must be signposted and accessible at all times.
A3.3 Through-roads	The SP does not propose any no-through roads within the site. As highlighted above, where roads external to the site boundary have not been constructed prior to staged subdivision within the site, temporary no-through roads must be developed in accordance with A3.3, including having a maximum length of 200 m (unless where subject to BAL-LOW), a compliant turning head, and meet the minimum technical standards for a public road as detailed in Table 6, Column 1 of the Guidelines (**Plate 4**).

Table 4: Assessment against the bushfire protection criteria from the Guidelines (continued)

Bushfire protection criteria	Proposed bushfire management strategies
Element 3: Vehicular access (continued)	
A3.4a Perimeter roads	Public perimeter roads, meeting the requirements of Appendix Four of the Guidelines (Table 6, column 1), are proposed in the SP and would provide separation between the proposed lots and classified vegetation surrounding and within the site, compliant with A3.4a. Where perimeter roads are not proposed in the SP, these are adjacent to POS areas and vegetation that will be managed to a low threat condition. A3.4a of the Guidelines states that perimeter roads may not be required where the adjoining classified vegetation is Class G grassland. Based on this and provided any adjacent vegetation would be considered low threat vegetation in accordance with clause 2.2.3.2 of AS 3959, perimeter roads would not be required. Future planning at the subdivision stage will need to address the provision of temporary perimeter roads surrounding staged development.
Element 4: Water	
A4.1 Reticulated areas	The site will connect to the reticulated water supply network. Fire hydrants installed will meet the specifications of the Water Corporations and DFES. Fire hydrants on land zoned for residential purposes are generally required to be sited within 200 m of dwellings (Class 1a). Any commercial development will be subject to onsite hydrant requirements as specified by the National Construction Code.
A4.2 Provision of water for fire fighting purposes	Not applicable. The Guidelines state that the acceptable solutions do not apply at every stage of the planning process. The lot layout of the SP is not known at this stage of the planning process; therefore, on this basis A4.2 does not apply at this stage and although fire hydrants will be installed to meet the specifications of the Water Corporation and DFES, the general location of hydrants is unknown at this stage and will need to be addressed at future planning stages such as during subdivision.

Table 6: Vehicular access technical requirements

TECHNICAL REQUIREMENTS	1 Public roads	2 Emergency access way[1]	3 Fire service access route[1]	4 Battle-axe and private driveways[2]
Minimum trafficable surface (metres)	In accordance with A3.1	6	6	4
Minimum horizontal clearance (metres)	N/A	6	6	6
Minimum vertical clearance (metres)	4.5			
Minimum weight capacity (tonnes)	15			
Maximum grade unsealed road[3]	As outlined in the IPWEA Subdivision Guidelines	1:10 (10%)		
Maximum grade sealed road[3]		1:7 (14.3%)		
Maximum average grade sealed road		1:10 (10%)		
Minimum inner radius of road curves (metres)		8.5		

Notes:

[1] To have crossfalls between 3 and 6%.

[2] Where driveways and battle-axe legs are not required to comply with the widths in A3.5 or A3.6, they are to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision.

[3] Dips must have no more than a 1 in 8 (12.5% -7.1 degree) entry and exit angle.

Plate 4: Excerpt of Table 6 from The Guidelines

5.1 Additional management strategies

5.1.1 Future approval considerations

The BAL assessment is a conservative and cautious assessment of the 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 the SP 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 for future subdivision applications within the site, particularly in the instance the SP layout is different to that outlined within this BMP and will further need to respond to the subdivision design and/or stage of development.

5.1.2 Landscape management

5.1.2.1 Within the site

Public open space and public road reserves

Areas of POS (outside of wetland reserves and associated buffers) and public road reserves within the site will be designed and/or maintained to achieve low threat vegetation in accordance with Section 2.2.3.2 of AS3959, as shown in **Figure 2**, and will initially be the responsibility of the proponent and subsequently that of the CoW. The management and modification of proposed POS areas will include the modification of the existing vegetation identified for future retention within the site's proposed POS area as outlined in the SP and the LMP, as shown in **Appendix B**. it is acknowledged that managed vegetation within future bio-retention areas cannot be assumed; therefore, vegetation within POS bio-retention areas have been conservatively assumed as classified grassland (Class G) post development of the site, as shown in **Figure 2**. Notwithstanding this, it is possible that portions of the bio-retention areas within POS may be maintained in the future to achieve low threat for public recreation purposes.

Modification and future management of these areas will likely include the following:

- Clearing of understorey vegetation and the removal of mature trees of low retention value
- Low pruning of trees (branches below 2 m in height removed where appropriate)
- Regular maintenance including removal of weeds and dead material
- Application of ground covers such as mulch or non-flammable materials.
- Irrigation of grass and garden beds (where required).
- Regularly mowing/slashing grass to less than 100mm in height.

City of Wanneroo Fire Mitigation Notice

The CoW releases a fire mitigation notice annually (or as required) to provide a framework for bushfire management within the CoW. The CoW is able to enforce this order in accordance with Section 33 of the *Bush Fires Act 1954* and landowners will need to ensure compliance with the fire mitigation notice, as published, or any directions provided by the CoW. Once future subdivision occurs, all landholders of residential landholdings larger than 0.4 ha will be required to implement the following:

- Install and maintain mineral earth firebreaks as per firebreak specifications of at least 3 m wide (no more than 4 m wide, but may have a corner turning radius of up to 10 m) immediately inside and along all lot boundaries (including on boundaries adjacent to roads, rail and drain reserves and al public open space reserves);
- Ensure driveways and access ways to all buildings are maintained at a minimum of 3 m in width and a vertical clearance height of 4 m, with all overhanging vegetation trimmed back to clear access.

Staged development

The development of the site is likely to occur over multiple stages and potentially across multiple subdivision approvals. To ensure that bushfire hazards are satisfactorily managed at all stages of development and subdivision, the proponent will be required to manage vegetation outside each stage to ensure BAL ratings meet those demonstrated in the BAL contour plan in **Figure 3**.

5.1.2.2 Surrounding the site

Classified vegetation surrounding the site will remain a bushfire hazard post-development of the site, whilst it is acknowledged that areas comprising classified vegetation will ultimately be cleared to enable future structure planning in the area in accordance with the EWDSP. Notwithstanding, the timing of any future structure planning and associated development is not yet known and therefore this vegetation has been assumed to remain a bushfire hazard post-development of the site for the unforeseeable future.

5.1.3 Vulnerable or high-risk land uses

The proposed primary and secondary schools within the site would be considered a 'vulnerable' land use in accordance with the definitions provided in SPP 3.7 and the Guidelines. The buildings will accommodate groups of children (under the age of 18) who may have a reduced physical and mental ability to respond in a bushfire event and may present evacuation challenges. The proposed schools are located more than 100 m from bushfire hazards in the post development scenario (therefore are subject to BAL-LOW) and do not require specific construction in accordance with SPP 3.7.

Should vulnerable or high-risk land uses be proposed in the future, the requirements of SPP 3.7 may need to be addressed at future development approvals (i.e. subdivision/development application) (when specific detail on the land use is known) and may include the preparation of an emergency evacuation plan and/or risk assessment for onsite flammable materials where applicable. This is generally only a consideration where a BAL rating greater than BAL-LOW applies.

6 Responsibilities for Implementation and Management of Bushfire Measures

Subject to the approval of the SP, development within the site will be implemented through future subdivision and development approvals.

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

Table 5: Responsibilities for the implementation of this BMP

Developer – Management action	
No.	Implementation and management actions
1	Provide a copy of this BMP to the relevant decision makers to support approval of the proposed Precinct 15 SP.
2	Comply with the CoW Fire Mitigation Notice as published and/or in accordance with directions given by the local government.
3	If required, prepare a new/revised BMP in accordance with SPP 3.7, the Guidelines and AS 3959 to support future subdivision applications, based on a proposed subdivision layout and in consideration of existing bushfire hazards or those that will be present post-development of the site. In addition, if the assumptions regarding the ongoing management of the POS areas and public road reserves change as part of future detailed design stages, a revised BMP or BAL assessment will be required.
4	Where applicable, as part of the structure plan and/or subdivision process, make spatial provisions for: • A suitable public road network that provides egress to at least two different destinations and meets the technical requirements of Table 6 within Appendix Four of the Guidelines (or as otherwise determined by a bushfire consultant and relevant approval authority). This may include the use of temporary cul-de-sacs (no through roads) and/or emergency access ways where required by staging. • Where possible, avoid cul-de-sacs and battle-axe lots as part of the spatial layout. If these are proposed as part of future development, these will need to be justified from a planning/development perspective and consistent with the minimum requirements outlined in Appendix Four of the Guidelines (or as otherwise determined by a bushfire consultant and relevant approval authority). • Ensure future habitable buildings are able to be located in an area subject to BAL-29 or less. The minimum separation distances between habitable buildings and classified vegetation to achieve BAL-29 should be in accordance with Table 3 in this BMP or as specified in subsequent BAL assessments. These separation distances can be accommodated through locating public roads and/or managed public open space between the habitable building and classified vegetation and/or ensuring proposed residential lots are adequately sized to ensure BAL-29 is not exceeded at the future habitable buildings.
City of Wanneroo	
No.	**Management action**
1	Maintaining fuel loads in existing public road reserves and public open space (under their management) to appropriate standards to minimise fuel loads.
2	Monitoring compliance with the CoW Fire Mitigation Notice and enforcing requirements as required.

7 Applicant Declaration

7.1 Accreditation

This assessment report has been prepared by Emerge Associates who have a number of team members who have undertaken Bushfire Planning and Design (BPAD) Level 1 and Level 2 training and are Fire Protection Association of Australia (FPAA) accredited practitioners. Emerge Associates have been providing bushfire risk management advice for more than 10 years, undertaking detailed bushfire assessments (and associated approvals) to support the land use development industry.

7.2 Declaration

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

Signature:

Name: Anthony Rowe

Company: Envision Bushfire Protection/Emerge Associates

Date: 17/08/2023

BPAD Accreditation: Level 3 BPAD no. 36690

8 References

8.1 General references

The references listed below have been considered as part of preparing this document.

Department of Planning, Lands and Heritage, and Western Australian Planning Commission, (DPLH & WAPC) 2021, *Guidelines for Planning in Bushfire Prone Areas Version 1.4*, Perth, Western Australia.

Department of Water and Environmental Regulation (DWER) 2021, *Water Register*, Perth, <https://maps.water.wa.gov.au/#/webmap/register>.

Emerge Associates 2023a, *Detailed Fauna and Targeted Black Cockatoo Assessment Various Lots, Mariginiup*, EP22-019(02)--010 WJC, 1.

Emerge Associates 2023b, *Detailed Flora and Vegetation Assessment Various Lots, Mariginiup*, EP22-019(01)--011 SCM, 1.

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.

Horizon Heritage Management (Horizon) 2023, *Precinct 15 Central Mariginiup Local Structure Plan Aboriginal Heritage Desktop Assessment Report*.

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

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.

8.2 Online references

The online resources that have been utilised in the preparation of this report are referenced in **Section 8.1**, with access date information provided in **Table R-1**.

Table R 1 Access dates for online references

Reference	Date accessed	Website or dataset name
(DWER 2021)	February 2023	Landgate Map Viewer Plus

Figures

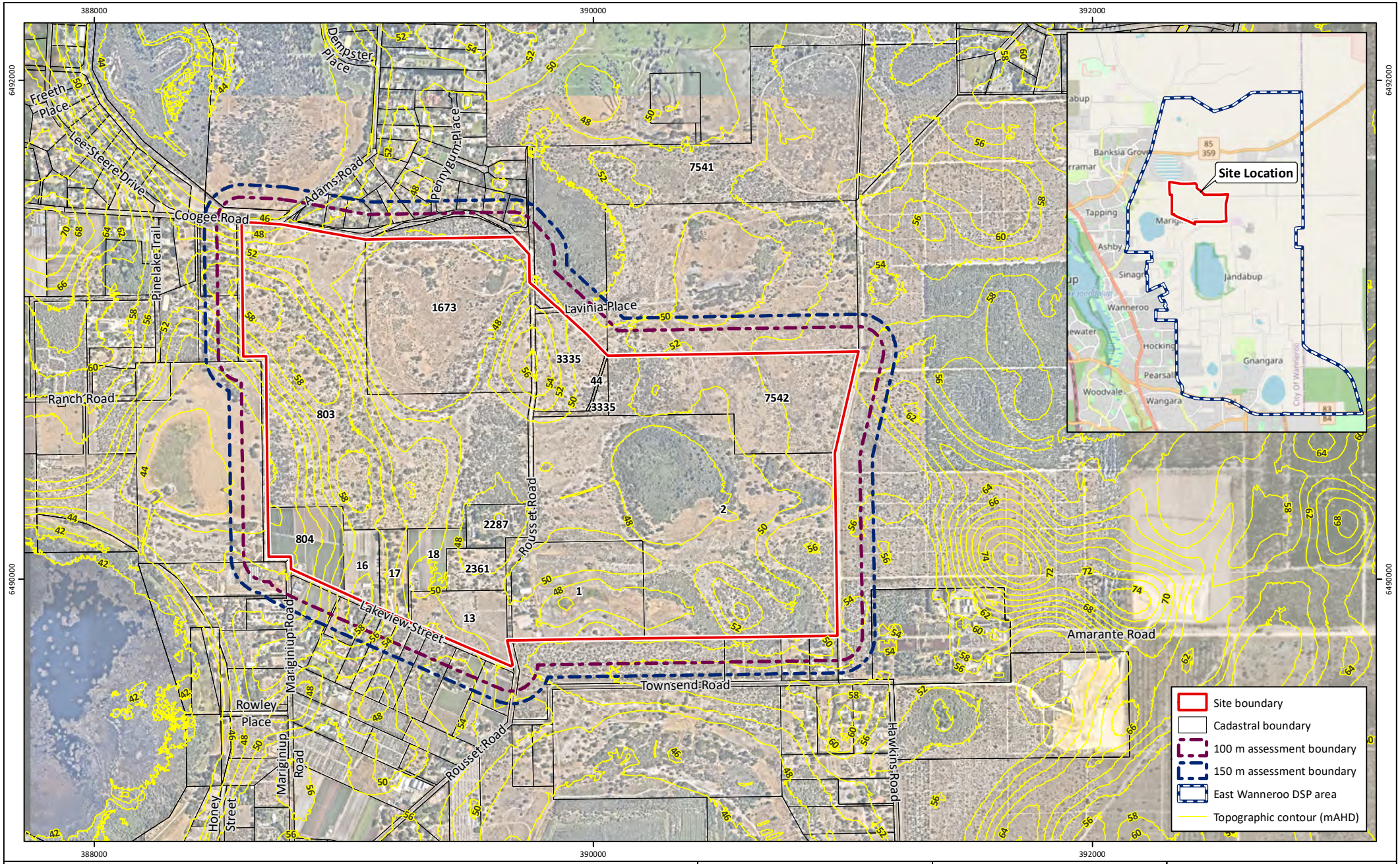

Figure 1: Site Location

Project:	Bushfire Management Plan Precinct 15 Structure Plan
Client:	Stockland

Plan Number:
EP22-019(16)--F26

Drawn:	GAR
Date:	17/02/2023
Checked:	PPS
Approved:	ADB
Date:	02/08/2023

N

0 200 400 600
Meters
Scale: 1:20,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

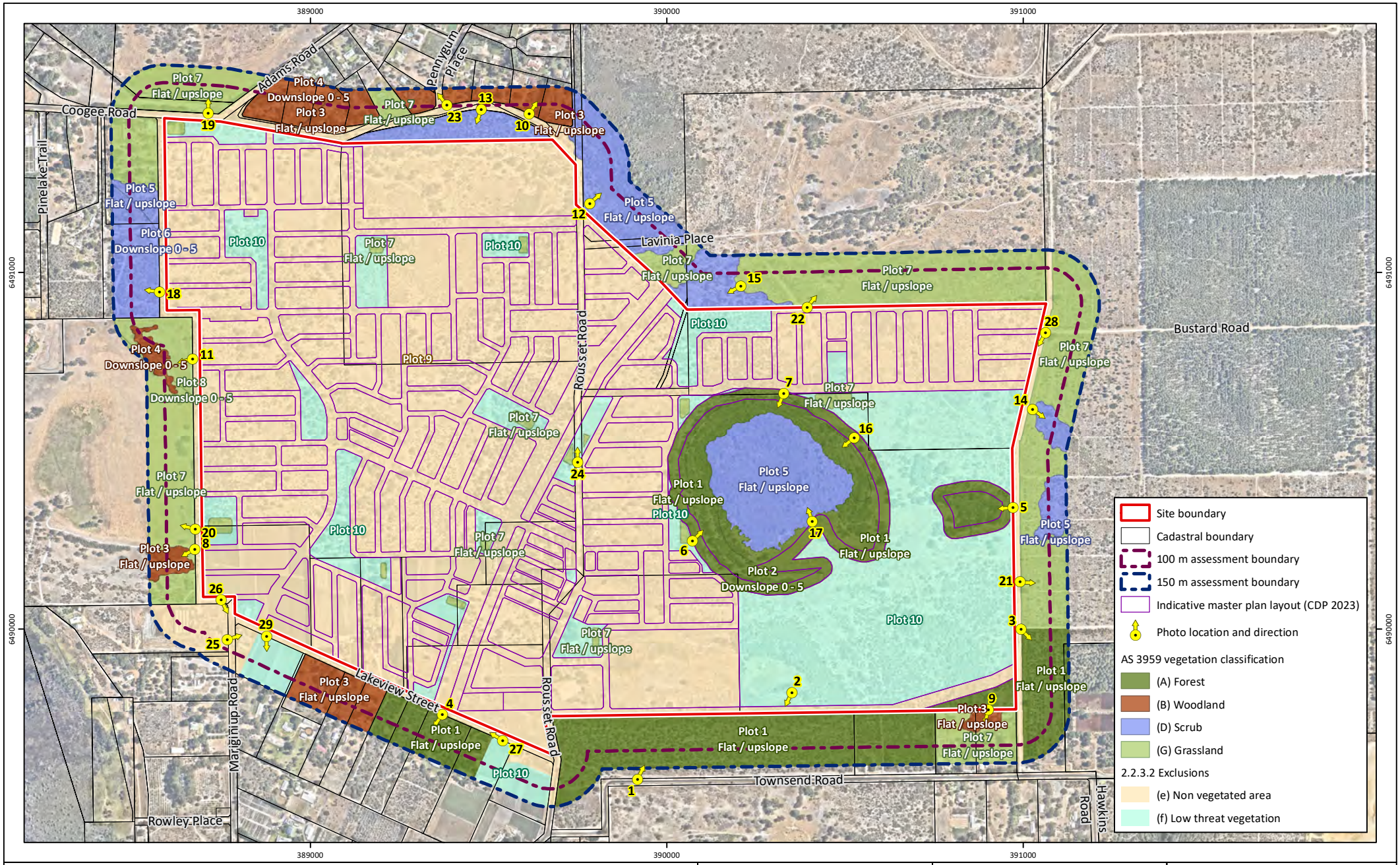

Figure 2: **AS 3959 Vegetation Classification and Effective Slope**

Project:	Bushfire Management Plan Precinct 15 Structure Plan
Client:	Stockland

Plan Number:
EP22-019(16)--F27

Drawn:	GAR
Date:	17/02/2023
Checked:	PPS
Approved:	ADB
Date:	02/08/2023

N

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Meters
Scale: 1:14,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

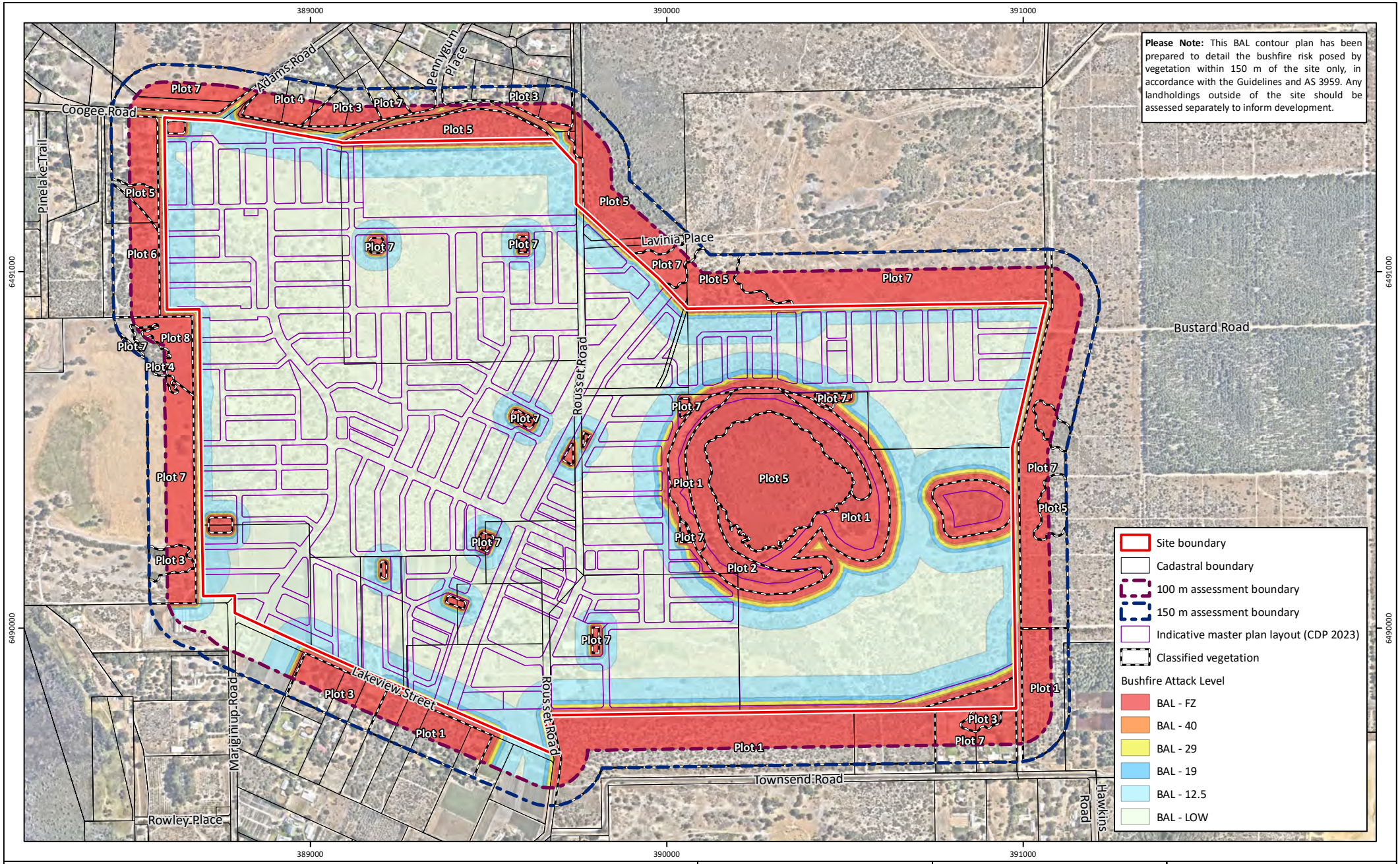

Figure 3: Bushfire Attack Level Contour Plan

Project:	Bushfire Management Plan Precinct 15 Structure Plan
Client:	Stockland

Plan Number:
EP22-019(16)--F28

Drawn:	GAR
Date:	17/02/2023
Checked:	PPS
Approved:	ADB
Date:	02/08/2023

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GDA 1994 MGA Zone 50

emerge ASSOCIATES

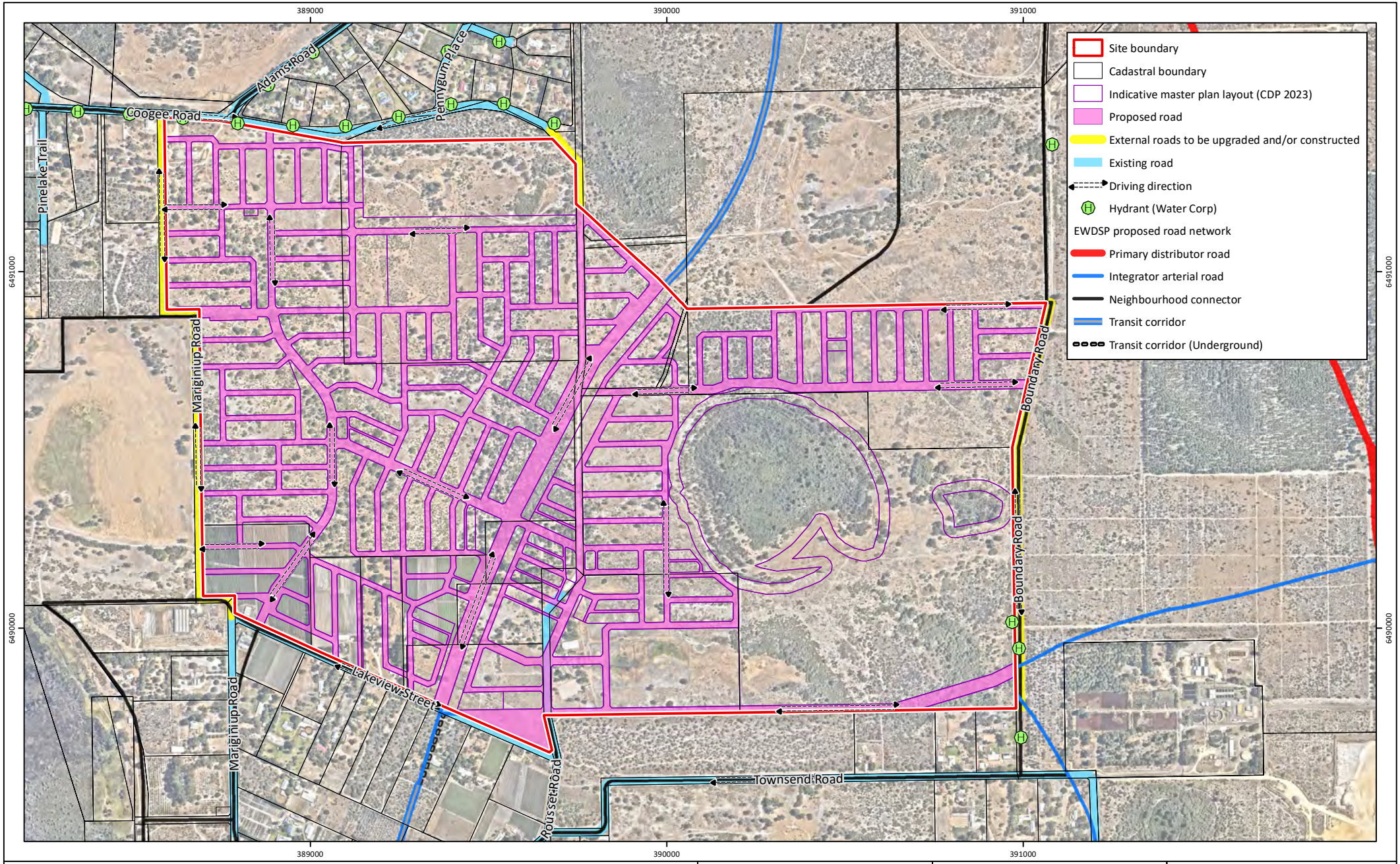


Figure 4: **Spatial Representation of Bushfire Managment Strategies**

Project:	Bushfire Management Plan Precinct 15 Structure Plan
Client:	Stockland

Plan Number:
EP22-019(16)--F29

Drawn:	GAR
Date:	17/02/2023
Checked:	PPS
Approved:	ADB
Date:	02/08/2023

N

0 200 400 600
Metres
Scale: 1:14,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

Appendix A

Precinct 15 Structure Plan and Indicative Master Plan (CDP 2023)

PRECINCT 15 STRUCTURE PLAN

Various Lots, MARIGINIUP

A Stockland Project

DRAFT

NORTH

Scale: 1:10 000 @ A3

0 100 200 300m

PLAN: STOMA-2-001 REVISION:
DATE: 24/07/2023 DRAWN: JP
PROJECTION: MGA 50 PLANNER: BK
DATUM: AHD CHECK: JH

cdp
Town Planning & Urban Design

Unit 2, 464 Murray Street
Perth WA 6000
(08) 6333 1888
info@cdpaus.com.au
www.cdpaus.com.au

LEGEND

- STRUCTURE PLAN BOUNDARY

METROPOLITAN REGION SCHEME RESERVES

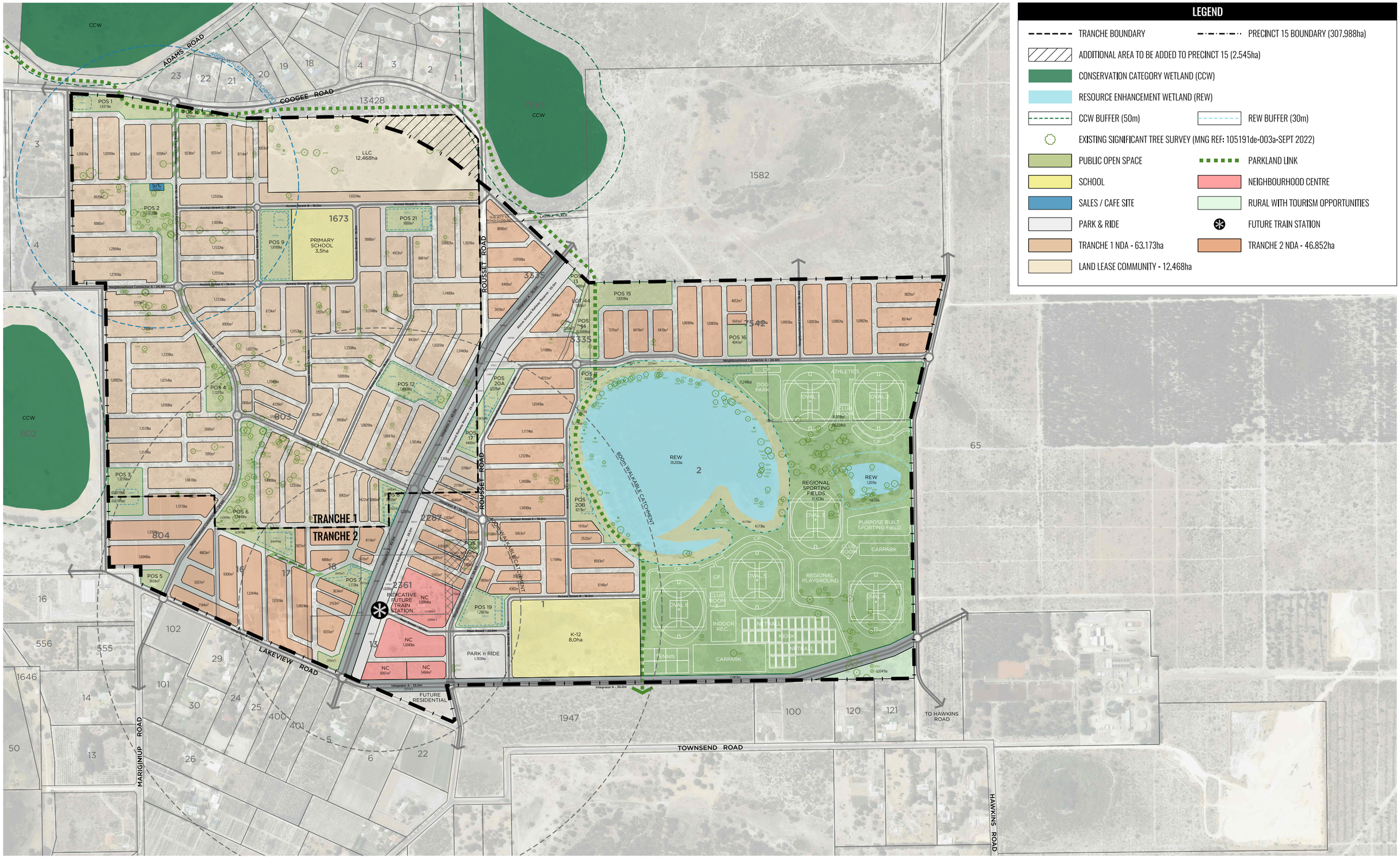
- PARKS AND RECREATION
- RAILWAY
- OTHER REGIONAL ROADS
- K-12 — PUBLIC PURPOSE - KINDERGARTEN TO YEAR 12 SCHOOL

LOCAL SCHEME RESERVES

- NEIGHBOURHOOD CENTRE
- RESIDENTIAL
- PS — EDUCATION - PRIMARY SCHOOL
- PUBLIC OPEN SPACE
- RURAL
- LOCAL ROAD

LAND USE PLANNING ELEMENTS THAT INFORM THE STRUCTURE PLAN

- INTEGRATOR A
- INTEGRATOR B
- NEIGHBOURHOOD CONNECTOR A
- NEIGHBOURHOOD CONNECTOR B
- ACCESS STREET B
- ACCESS STREET C
- TRANSIT STATION (INDICATIVE LOCATION)
- RESOURCE ENHANCEMENT WETLAND FOR RETENTION
- TREE RETENTION ZONE
- ADDITIONAL USE - LOCAL CENTRE
- PARKLAND LINK
- TOURISM OPPORTUNITIES
- R-CODES



INDICATIVE MASTER PLAN

Precinct 15

A Stockland Project

DRAFT

NORTH

Scale: 1:10 000 @ A3

0 100 200 300m

PLAN: STOMA-1-010 REVISION: M
DATE: 15/06/2023 DRAWN: JP
PROJECTION: MGA 50 PLANNER: BK
DATUM: AHD CHECK: JH

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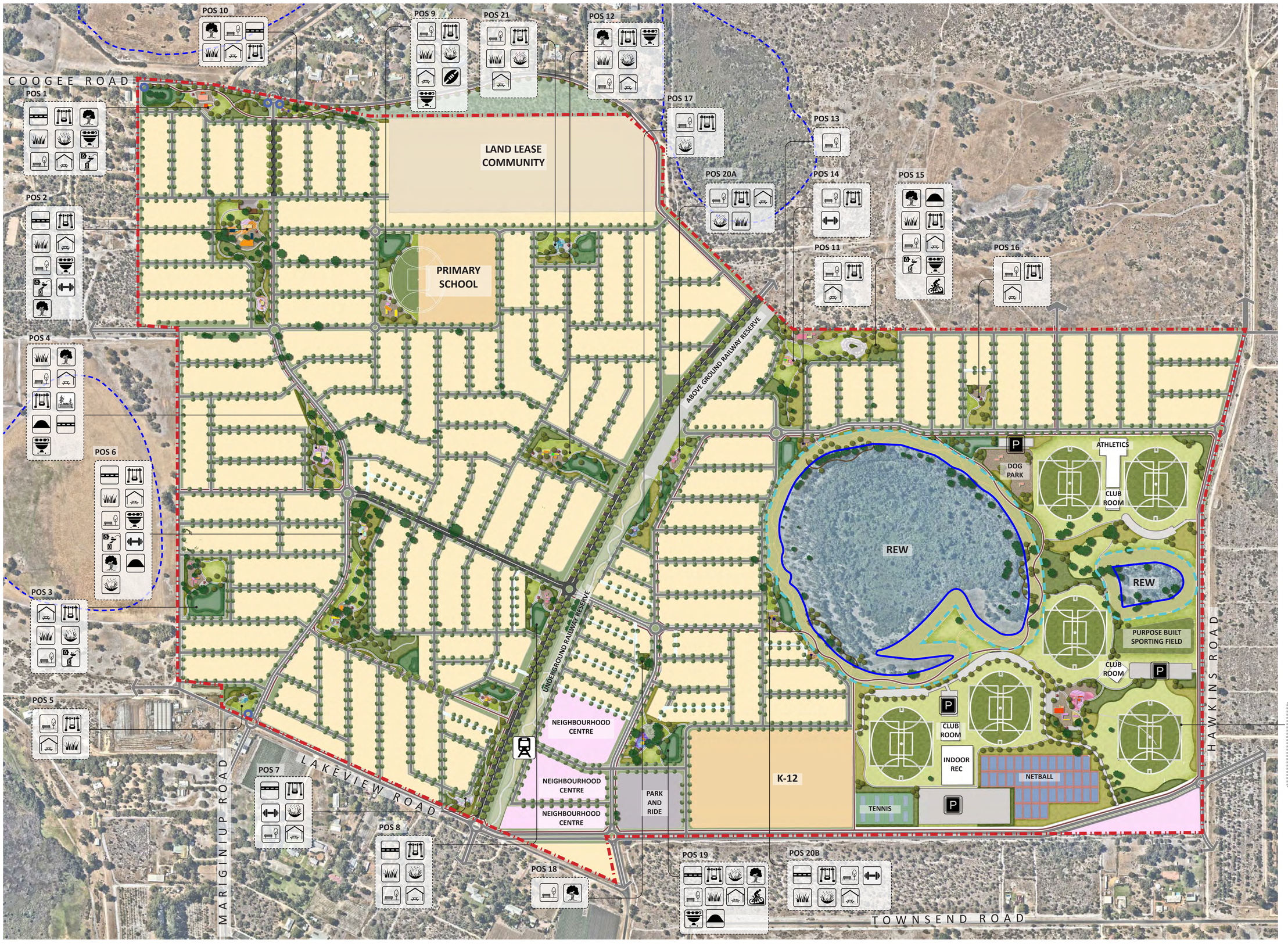
Appendix B

Landscape Master Plan (Emerge Associates 2023)



LEGEND

- EXISTING LARGE TREE
- OPEN TURF
- FITNESS AREA
- BOARDWALK
- BASIN & SWALES
- DUAL USE PATH
- PLAYING FIELD
- CARPARK
- PLAYGROUND
- PARK SHELTER
- BBQ
- PICNIC SETTING
- DOG PARK
- CRUSHED LIMESTONE TRACK
- DRINK FOUNTAIN
- BENCH SEAT
- BMX BIKE TRACK
- COMMUNITY GARDEN
- FUTURE TRAIN STATION
- TURF MOUND
- EXTENT OF WORK
- REW
- REW BUFFER
- CCW
- ENTRY SIGNAGE
- EXISTING TREES
- PROPOSED PLANTING
- PROPOSED TURF
- PROPOSED REVEGETATION/ UNIRRIGATED TUBESTOCK

REGIONAL SPORTING COMPLEX

MARIGINIUP- Stockland

LANDSCAPE MASTERPLAN

DWG **MAR01_DES**
REV **B**
DATE **2023-08-09**

0 40 80 120 160 200 m

SCALE **1 : 4000 @ A1**

emerge ASSOCIATES

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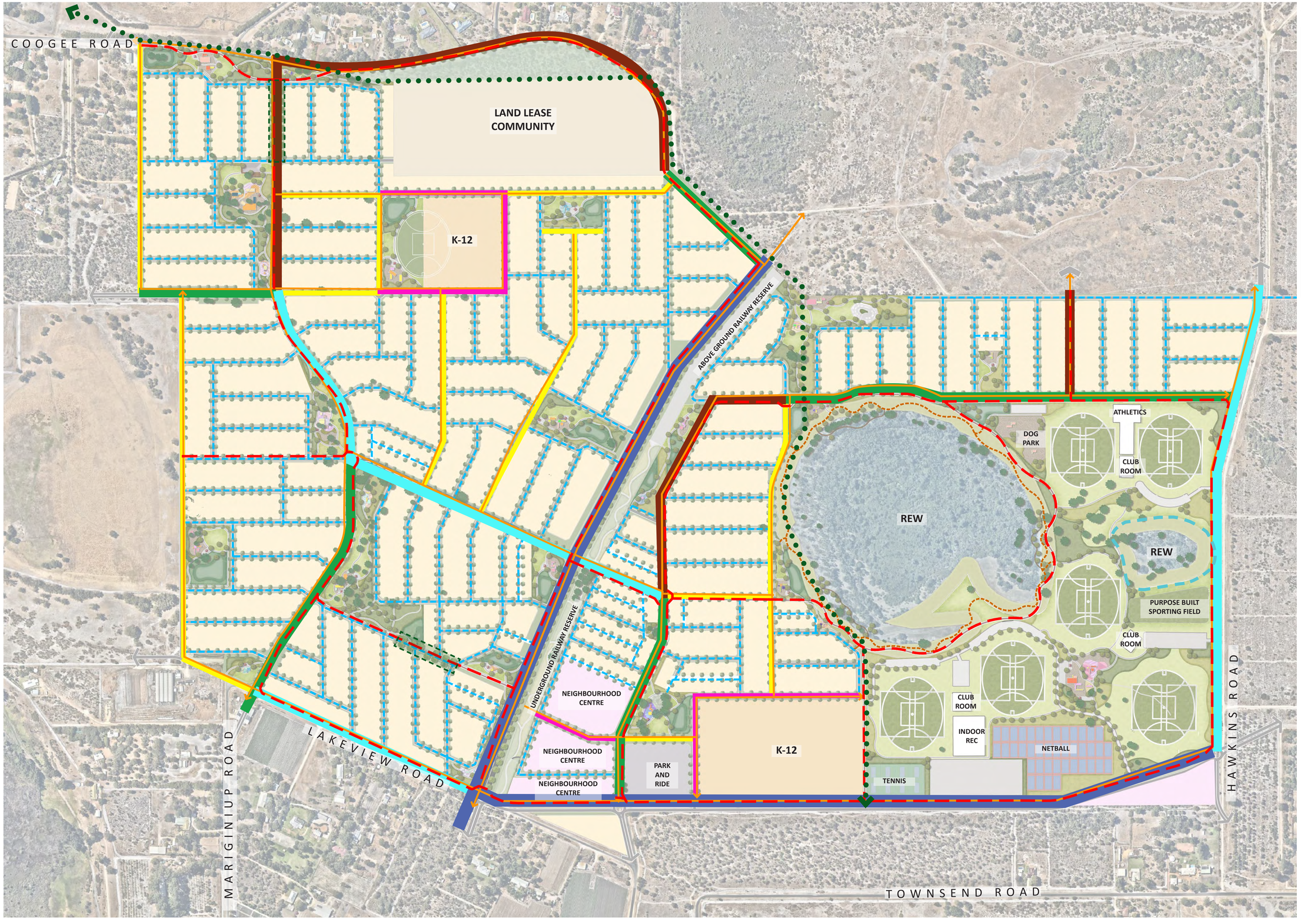

LEGEND

- Road Integrator A
- Road Integrator B
- Neighbourhood Connector A
- Neighbourhood Connector A
- Access Street A
- Access Street B
- Access Street D
- Pedestrian Footpath
- Crushed limestone/trail
- Dual Use Path
- Parkland Link
- Green Street

MARIGINIUP- Stockland

LANDSCAPE CIRCULATION PLAN

DWG **MAR01_DES**
REV **B**
DATE **2023-08-09**

0 40 80 120 160 200 m

SCALE **1 : 4000 @ A1**

emerge ASSOCIATES

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COOGEE ROAD

LAND LEASE COMMUNITY

K-12

ABOVE GROUND RAILWAY RESERVE

UNDERGROUND RAILWAY RESERVE

NEIGHBOURHOOD CENTRE

NEIGHBOURHOOD CENTRE

NEIGHBOURHOOD CENTRE

PARK AND RIDE

K-12

MARIGINIUP ROAD

LAKEVIEW ROAD

HAWKINS ROAD

ATHLETICS

DOG PARK

CLUB ROOM

REW

REW

PURPOSE BUILT SPORTING FIELD

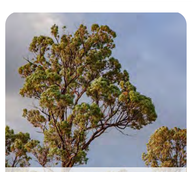
CLUB ROOM

CLUB ROOM

INDOOR REC

NETBALL

TENNIS



Eucalyptus gamphocephala
Tuart

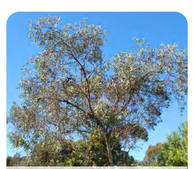
Melaleuca viridiflora
Broad Leafed Paperbark

Eucalyptus marginata
Jarrah

Brachychiton populneus
Kurrajong

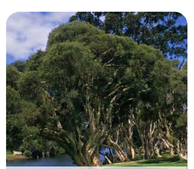
Eucalyptus torwood
Hybrid Coral Gum

Corymbia ficifolia
Red Flowering Gum



Eucalyptus woodwardii
Lemon-flowered Gum

Eucalyptus decipiens
Redheart



Melaleuca rhaphiophylla
Swamp Paperbark

Agonins flexuosa
Willow Myrtle

Hibiscus tiliaceus rubra
Cottonwood Hibiscus

Magnolia grandiflora
Southern Maganolia

MARIGINIUP- Stockland

LANDSCAPE STREET TREE MASTERPLAN

DWG **MAR01_DES**
REV **B**
DATE **2023-08-09**
0 40 80 120 160 200 m
SCALE **1 : 4000 @ A1**

emerge ASSOCIATES

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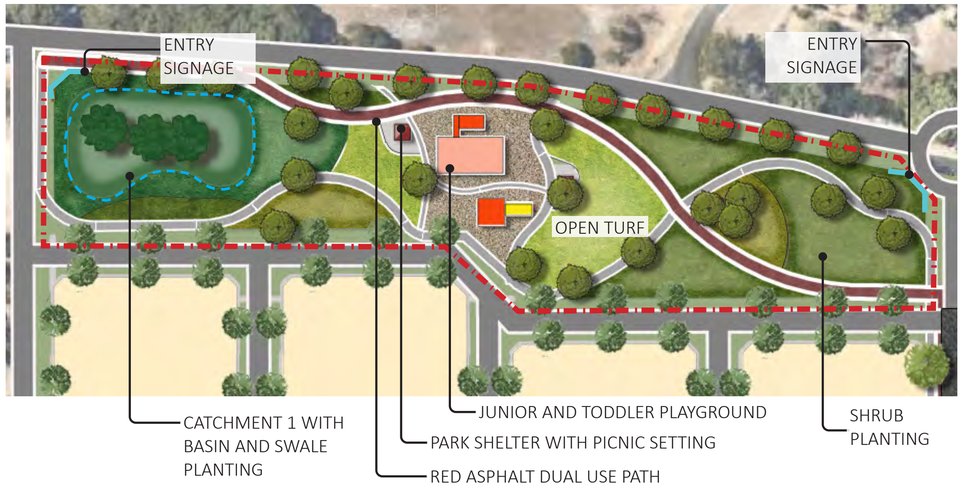
POS 1 CONCEPT



DRAINAGE LEGEND - CATCHMENT 1

FIRST 15mm BRA DETAILS

Depth(m):	0.30
Base Area(m^2)	1600
Top Area(mAHD):	1747
Slope	1:3

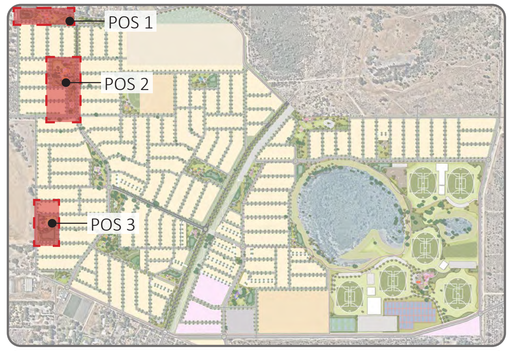
POS TYPOLOGY
- Neighborhood Park

SIZE
- 1.43 ha + Verge

CONCEPT
- D.U.P on northern side of the POS to provide connection to road integrators
- Existing trees to be retained
- Shrub revegetation under existing vegetation
- Provide a pedestrian link through estate
- Significant trees to be retained where possible
- Picnic area with shelter, picnic setting and BBQ area
- Playground to provide activity space
- Open turf to provide activity area to residents
- Provide entry signage
- Drainage basin as per LWMS

ENVIRONMENTAL CONSIDERATIONS
- Existing trees and vegetation to be retained where possible.
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.
- Provide a buffer to the adjacent road

FUNCTIONS / MATERIALS
- Existing trees to be retained
- Open turf area for outdoor activity
- Shelter with table settings and BBQ will provide opportunity for socialisation
- Playground for kids
- Connected path to open space perimeter, with connections to the broader path network.
- Entry signage to convey directions and enhance the character of the estate



LOCATION PLAN

POS TYPOLOGY
- Neighborhood Park

SIZE
- 1.3 ha + Verge

CONCEPT
- Concrete footpath to provide connection to road integrators
- Existing trees to be retained
- Shrub revegetation under existing vegetation
- Provide a pedestrian link through estate
- Provide Dog park with agility equiptment
- Significant trees to be retained where possible
- Picnic area with shelter and picnic setting
- playground to provide activity space
- Open turf to provide activity area to residents
- Drainage basin as per LWMS

ENVIRONMENTAL CONSIDERATIONS
- Existing trees and vegetation to be retained where possible.
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.
- Provide a buffer to the adjacent road

FUNCTIONS / MATERIALS
- Existing trees to be retained
- Open turf area for outdoor activity
- Shelter and picnic settings
- Nature Playground for kids
- Dog park for Dog agility play opportunities for residents
- Connected path to open space perimeter, with connections to the broader path network.

- TURF
- SHRUB PLANTING (AMENITY)
- LOW FUEL PLANTING
- BASIN
- LOT
- DUAL USE PATH
- FOOTPATH
- MULCH ONLY
- STREET TREES
- EXISTING TREES
- PROPOSED TREES
- CRUSHED LIMESTONE PATH
- BOARDWALK
- REVEGETATION
- EXTENT OF WORK
- REW
- REW BUFFER

POS 2 CONCEPT

POS TYPOLOGY
- Neighborhood Park

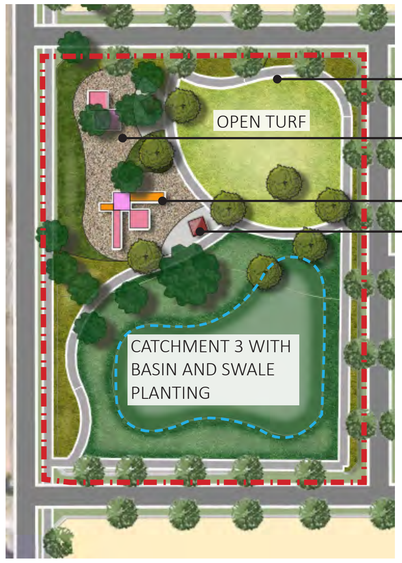
SIZE
- 2.02 ha + Verge

CONCEPT
- D.U.P on eastern side of the POS to provide connection to road integrators
- Existing trees to be retained
- Shrub revegetation under existing vegetation
- Provide a pedestrian link through estate
- Significant trees to be retained where possible
- Picnic area with shelter, picnic setting and BBQ area
- Playground to provide activity space
- Open turf to provide activity area to residents
- Provide fitness area for residents

ENVIRONMENTAL CONSIDERATIONS
- Existing trees and vegetation to be retained where possible.
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.

FUNCTIONS / MATERIALS
- Existing trees to be retained
- Open turf area for outdoor activity
- Shelter with table settings and BBQ will provide opportunity for socialisation
- Playground for kids
- Connected path to open space perimeter, with connections to the broader path network.
- Outdoor excercise area provide fitness oppotunities for the residents

POS 3 CONCEPT



DRAINAGE LEGEND - CATCHMENT 3

FIRST 15mm BRA DETAILS

Depth(m):	0.30
Base Area(m^2)	2500
Top Area(mAHD):	2683
Slope	1:3

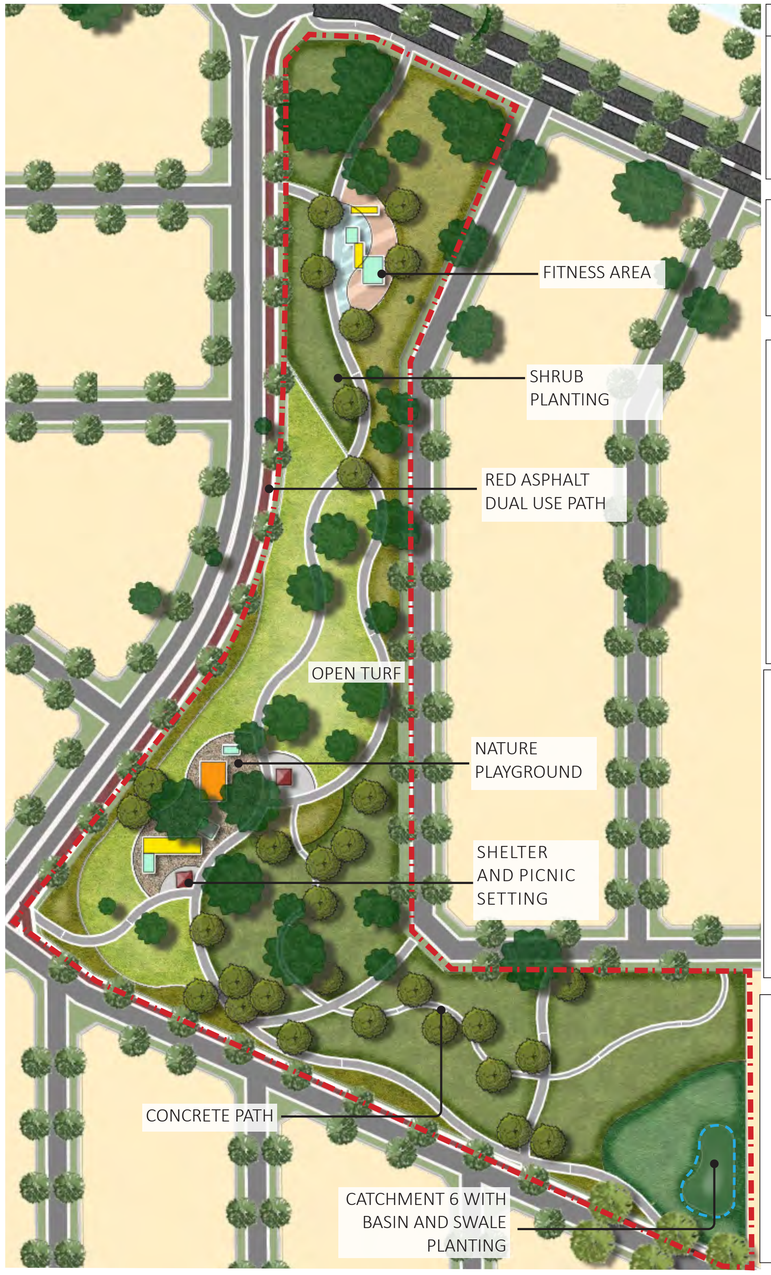
MARIGINIUP- Stockland

LANDSCAPE DETAILED PLAN POS 1, 2 AND 3

DWG **MAR01_DES**
REV **B**
DATE **2023-08-09**
0 10 20 30 40 50 m
SCALE **1 : 1000 @ A1**

emerge ASSOCIATES

POS 6 CONCEPT



DRAINAGE LEGEND - CATCHMENT 6

FIRST 15mm BRA DETAILS

Depth(m):	0.30
Base Area(m^2)	289
Top Area(mAHD):	353
Slope	1:3

POS TYPOLOGY
- Neighborhood Park

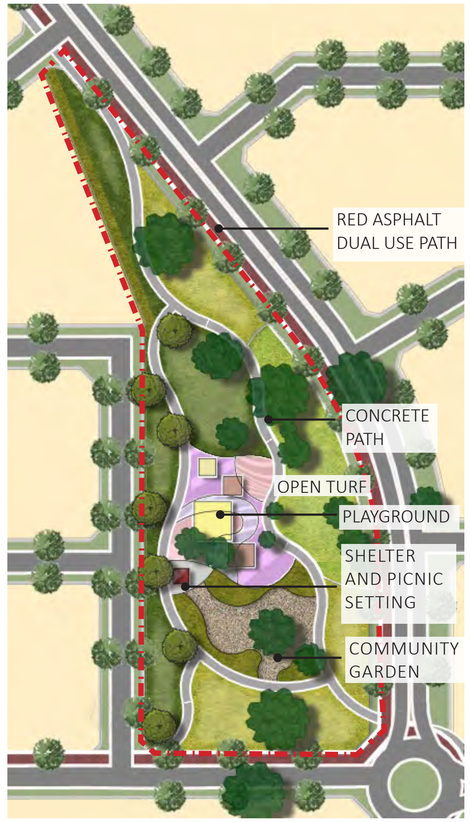
SIZE
- 2.94 ha + Verge

CONCEPT
- D.U.P on western side of the POS to provide connection to road integrators
- Existing trees to be retained
- Shrub revegetation under existing vegetation
- Provide a pedestrian link through estate
- Significant trees to be retained where possible
- Picnic area with shelter, picnic setting and BBQ area
- Playground to provide activity space
- Open turf to provide activity area to residents
- Provide fitness area
- Drainage basin as per LWMS

ENVIRONMENTAL CONSIDERATIONS
- Existing trees and vegetation to be retained where possible.
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.
- Provide a buffer to the adjacent road

FUNCTIONS / MATERIALS
- Existing trees to be retained
- Open turf area for outdoor activity
- Shelter with table settings and BBQ will provide opportunity for socialisation
- Playground for kids
- Outdoor excercise area provide fitness oppotunities for the residents
- Connected path to open space perimeter, with connections to the broader path network.

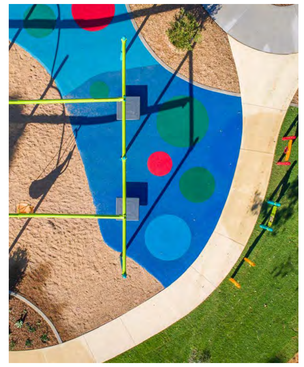
POS 4 CONCEPT

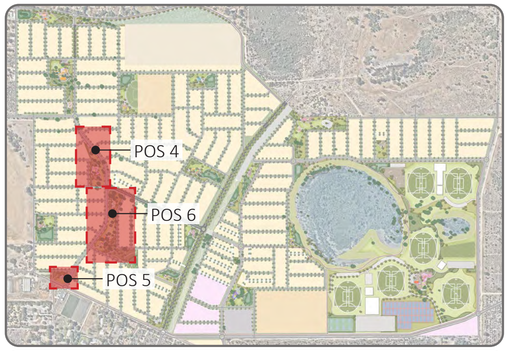


POS TYPOLOGY
- Neighborhood Park

SIZE
- 1.13 ha + Verge

CONCEPT
- D.U.P on eastern side of the POS to provide connection to road integrators
- Existing trees to be retained
- Shrub vegetation under existing vegetation
- Provide a pedestrian link through estate
- Significant trees to be retained where possible
- Picnic area with shelter, picnic setting and BBQ area
- playground to provide activity space
- Open turf to provide activity area to residents
- Provide fitness area for residents





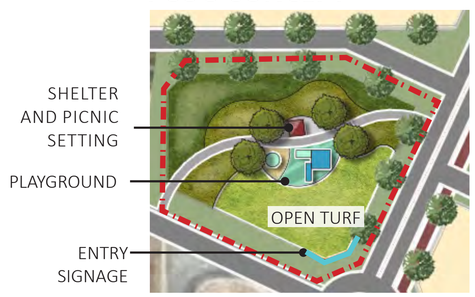
LOCATION PLAN

ENVIRONMENTAL CONSIDERATIONS
- Existing trees and vegetation to be retained where possible.
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.

FUNCTIONS / MATERIALS
- Existing trees to be retained
- Open turf area for outdoor activity
- Shelter with table settings and BBQ will provide opportunity for socialisation
- Playground for kids
- Connected path to open space perimeter, with connections to the broader path network.
- Community garden with recycled materials to provide family activity opportunity for residents

- TURF
- SHRUB PLANTING (AMENITY)
- LOW FUEL PLANTING
- BASIN
- LOT
- DUAL USE PATH
- FOOTPATH
- MULCH ONLY
- STREET TREES
- EXISTING TREES
- PROPOSED TREES
- CRUSHED LIMESTONE PATH
- BOARDWALK
- REVEGETATION
- EXTENT OF WORK
- REW
- REW BUFFER

POS 5 CONCEPT



POS TYPOLOGY
- Pocket Park

SIZE
- 3,658 m^2 + Verge

CONCEPT
- Playground for kids
- Shelter and picnic settings
- Plantings to provide buffer to external road
- Small turf area to provide open space
- Provide a pedestrian link through estate from the road
- Entry signage to convey directions and enhance the character of the estate

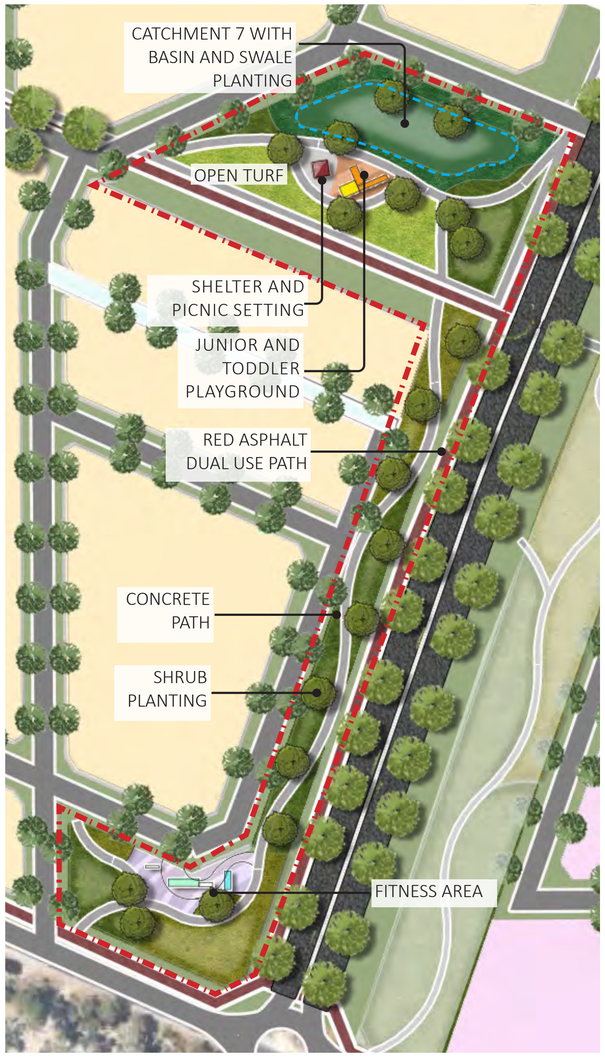
MARIGINIUP- Stockland

LANDSCAPE DETAILED PLAN POS 4, 5 AND 6

DWG **MAR01_DES**
REV **B**
DATE **2023-08-09**
0 10 20 30 40 50 m
SCALE **1 : 1000 @ A1**

emerge ASSOCIATES

POS 7 CONCEPT



DRAINAGE LEGEND - CATCHMENT 7

FIRST 15mm BRA DETAILS

Depth(m):	0.30
Base Area(m^2)	961
Top Area(mAHD):	1076
Slope	1:3

POS TYPOLOGY
- Neighborhood Park

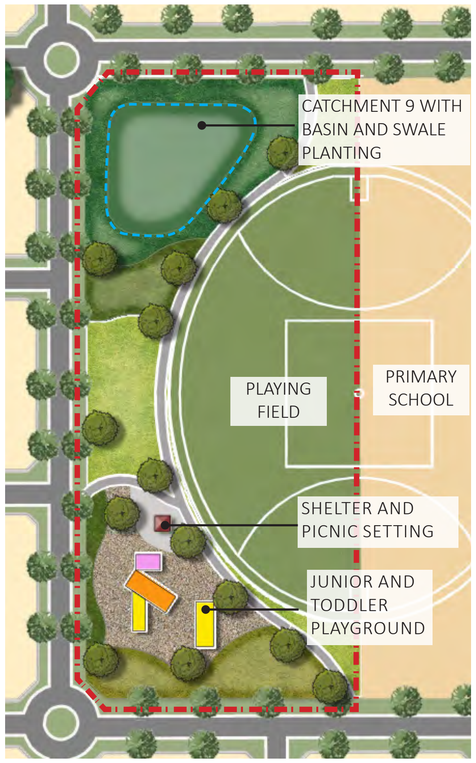
SIZE
- 1.17 ha + Verge

CONCEPT
- D.U.P most side of the POS to provide connection to road integrators
- Shrub vegetation to provide buffer along main integrator
- Provide a pedestrian link through estate
- Picnic area with shelter and picnic setting
- playground to provide activity space
- Open turf to provide activity area to residents
- Provide fitness area for residents
- Drainage basin as per LWMS

ENVIRONMENTAL CONSIDERATIONS
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.
- Provide a buffer to the adjacent road

FUNCTIONS / MATERIALS
- Open turf area for outdoor activity
- Shelter and picnic settings
- Playground for kids
- Fitness area for residents
- Connected path to open space perimeter, with connections to the broader path network and DUP
- Outdoor excercise area provide fitness oppotunities for the residents

POS 9 CONCEPT



DRAINAGE LEGEND - CATCHMENT 9

FIRST 15mm BRA DETAILS

Depth(m):	0.30
Base Area(m^2)	1521
Top Area(mAHD):	1665
Slope	1:3

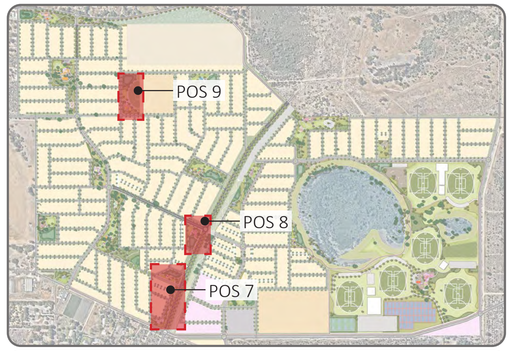
POS TYPOLOGY
- Neighbourhood Park

SIZE
- 1.81 ha + Verge

CONCEPT
- Concrete footpath to provide connection to road integrators
- Picnic area with shelter, picnic setting and BBQ area
- playground to provide activity space
- Open turf to provide activity area
- Provide Playing field to share with Primary School
- Drainage basin as per LWMS

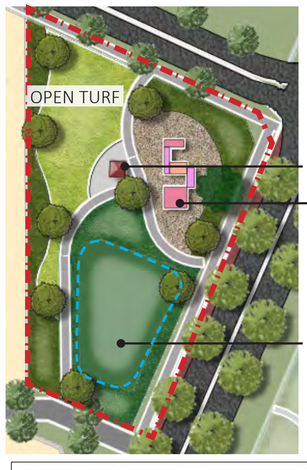
ENVIRONMENTAL CONSIDERATIONS
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.
- Provide a buffer to the adjacent road

FUNCTIONS / MATERIALS
- Open turf area for playing field and outdoor activity
- Shelter with table settings and BBQ will provide opportunity for socialisation
- Playground for kids
- Connected path to open space



LOCATION PLAN

POS 8 CONCEPT



DRAINAGE LEGEND - CATCHMENT 8

FIRST 15mm BRA DETAILS

Depth(m):	0.30
Base Area(m^2)	1024
Top Area(mAHD):	1142
Slope	1:3

POS TYPOLOGY
- Local Park

SIZE
- .660 ha + Verge

CONCEPT
- Concrete footpath to provide connection to road integrators and DUP
- Picnic area with shelter and picnic setting
- playground to provide activity space
- Open turf to provide activity area
- Significant trees to be retained where possible
- Drainage basin as per LWMS

FUNCTIONS / MATERIALS
- Open turf area for playing field and outdoor activity
- Shelter and picnic settings
- Playground for kids
- Connected path to open space

ENVIRONMENTAL CONSIDERATIONS
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.
- Provide a buffer to the adjacent road

- TURF
- SHRUB PLANTING (AMENITY)
- LOW FUEL PLANTING
- BASIN
- LOT
- DUAL USE PATH
- FOOTPATH
- MULCH ONLY
- STREET TREES
- EXISTING TREES
- PROPOSED TREES
- CRUSHED LIMESTONE PATH
- BOARDWALK
- REVEGETATION
- EXTENT OF WORK
- REW
- REW BUFFER

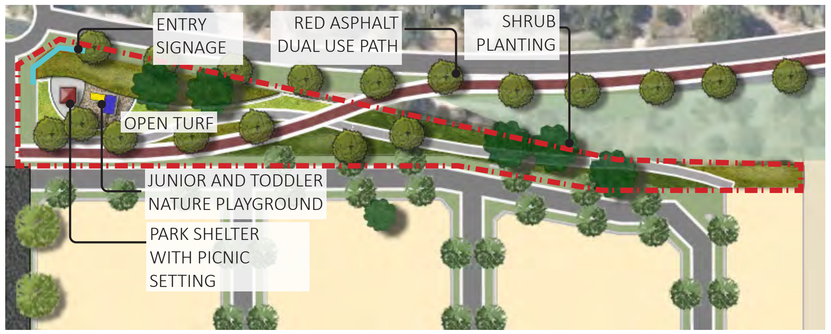
MARIGINIUP- Stockland

LANDSCAPE DETAILED PLAN POS 7, 8 AND 9

DWG **MAR01_DES**
REV **B**
DATE **2023-08-09**
0 10 20 30 40 50 m
SCALE **1 : 1000 @ A1**

emerge ASSOCIATES

POS 10 CONCEPT



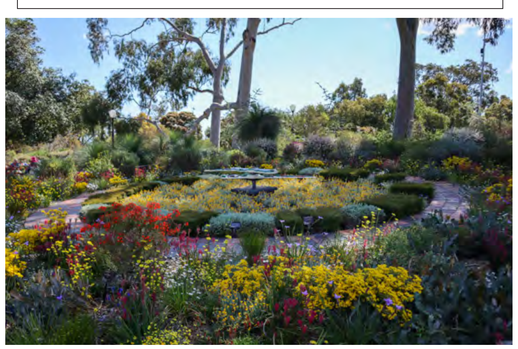
POS TYPOLOGY
- Pocket Park

SIZE
- .4231 ha + Verge

CONCEPT
- D.U.P on northern side of the POS to provide connection to road integrators
- Shrub vegetation to provide buffer along main integrator
- Provide a pedestrian link through estate
- Significant trees to be retained where possible
- Picnic area with shelter and picnic setting
- playground to provide activity space
- Open turf to provide activity area to residents
- Provide entry signage

ENVIRONMENTAL CONSIDERATIONS
- Existing trees and vegetation to be retained where possible.
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.
- Provide a buffer to the adjacent road

FUNCTIONS / MATERIALS
- Existing trees to be retained
- Open turf area for outdoor activity
- Shelter and picnic settings
- Playground for kids
- Entry signage to convey directions and enhance the character of the estate
- Connected path to open space perimeter, with connections to the broader path network.



POS 12 CONCEPT

DRAINAGE LEGEND - CATCHMENT 12

FIRST 15mm BRA DETAILS	
Depth(m):	0.30
Base Area(m²)	1521
Top Area(mAHD):	1665
Slope	1:3

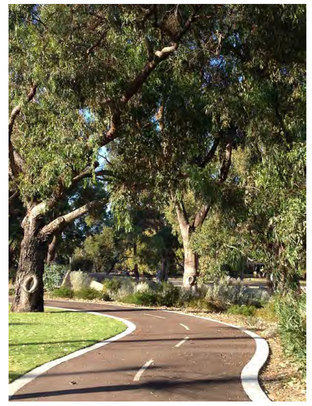
POS TYPOLOGY
- Neighborhood Park

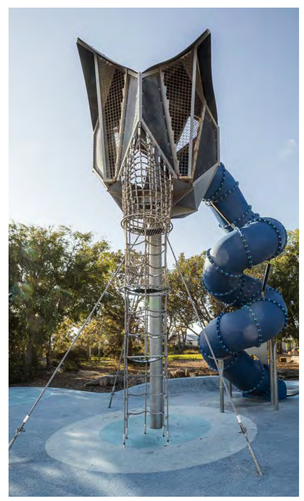
SIZE
- 1.4 ha + Verge

CONCEPT
- D.U.P near eastern side of the POS to provide connection to road integrators
- Significant trees to be retained where possible
- Shrub vegetation
- Provide a pedestrian link through estate
- Picnic area with shelter, picnic setting and BBQ area
- All ages playground to provide activity space
- Open turf to provide activity area to residents
- Drainage basin as per LWMS

ENVIRONMENTAL CONSIDERATIONS
- Existing trees and vegetation to be retained where possible.
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.
- Provide a buffer to the adjacent road

FUNCTIONS / MATERIALS
- Existing trees to be retained
- Open turf area for outdoor activity
- Shelter with table settings and BBQ will provide opportunity for socialisation
- Playground for all ages
- Connected path to open space with connections to the broader path



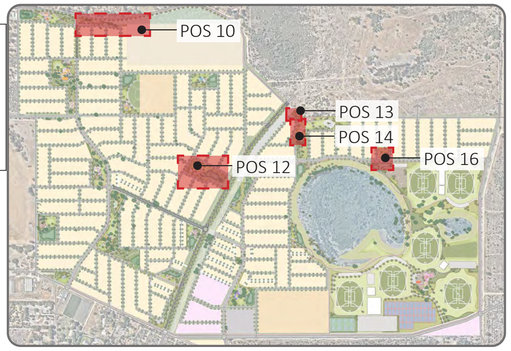


POS 13 CONCEPT

POS TYPOLOGY
- Pocket Park

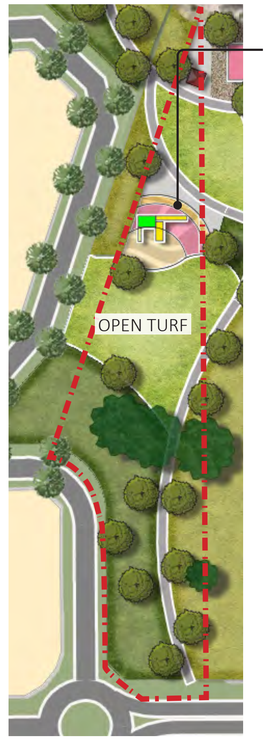
SIZE
- 1,488 m² + Verge

CONCEPT
- Plantings to provide buffer to external road
- Provide a pedestrian link through estate and



LOCATION PLAN

POS 14 CONCEPT

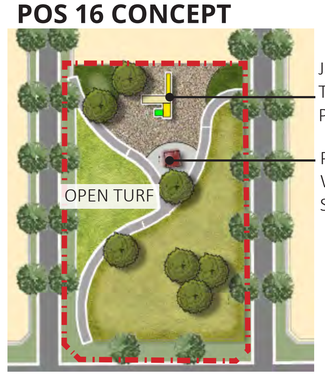


POS TYPOLOGY
- Local Park

SIZE
- 5,686 m² + Verge

CONCEPT
- Shelter and picnic settings
- Plantings to provide buffer to external road
- Small turf area to be part of connecting POS turf area to provide a wider open space
- Significant trees to be retained where possible
- Outdoor excercise area provide fitness oppotunities for the residents
- Provide a pedestrian link through estate from the road through connecting POS

POS 16 CONCEPT



POS TYPOLOGY
- Pocket Park

SIZE
- 4,941 m² + Verge

CONCEPT
- Plantings to provide buffer to external road
- Small Playground for kids
- Provide a pedestrian link through estate and from the road
- Drainage basin as per LWMS

- TURF
- SHRUB PLANTING (AMENITY)
- LOW FUEL PLANTING
- BASIN
- LOT
- DUAL USE PATH
- FOOTPATH
- MULCH ONLY
- STREET TREES
- EXISTING TREES
- PROPOSED TREES
- CRUSHED LIMESTONE PATH
- BOARDWALK
- REVEGETATION
- EXTENT OF WORK
- REW
- REW BUFFER

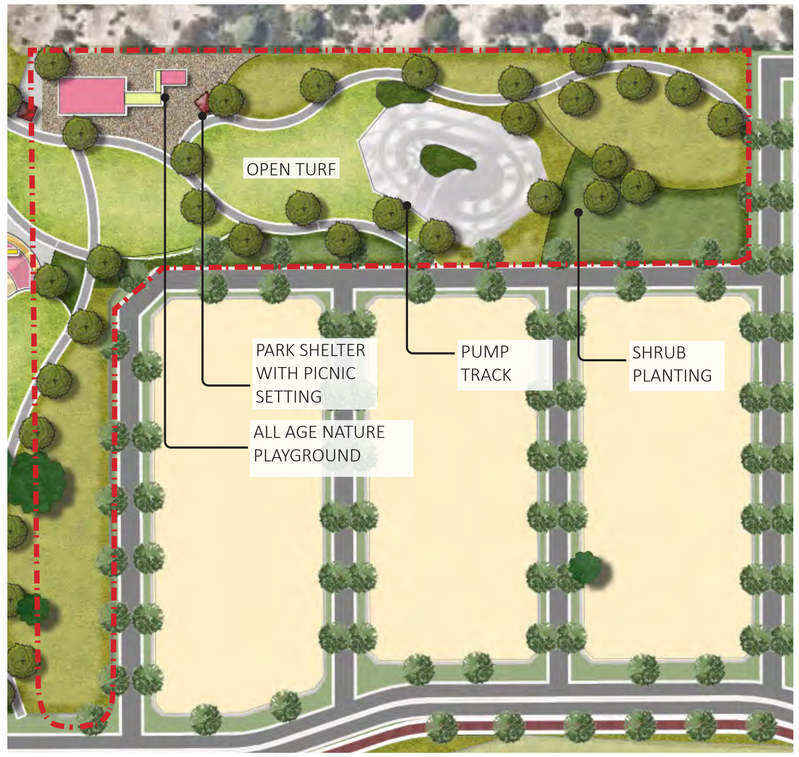
MARIGINIUP- Stockland

LANDSCAPE DETAILED PLAN POS 10, 12, 13, 14 and 16

DWG **MAR01_DES**
REV **B**
DATE **2023-08-09**
0 10 20 30 40 50 m
SCALE **1 : 1000 @ A1**

emerge ASSOCIATES

POS 15 CONCEPT



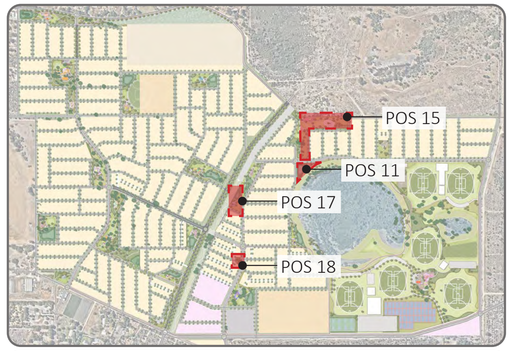
POS TYPOLOGY
- Neighbourhood Park

SIZE
- 1.92 ha + Verge

CONCEPT
- Concrete footpath to provide a pedestrian link through estate and connecting the POS to road integrators
- Shrub vegetation to provide as a buffer to adjacent road
- Picnic area with shelter, picnic setting and BBQ area
- All ages playground to provide activity space
- Provide pump track
- Open turf to provide activity area to residents
- Turf mounding to create a unique landscape topography
- Drainage basin as per LWMS

ENVIRONMENTAL CONSIDERATIONS
- Existing trees and vegetation to be retained where possible.
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.
- Provide a buffer to the adjacent road

FUNCTIONS / MATERIALS
- Existing trees to be retained
- Open turf area for outdoor activity
- Shelter with table settings and BBQ will provide opportunity for socialisation
- All age Nature Playground for kids
- Pump track will create exercise and play opportunity as well as socialisation
- Connected path to open space perimeter, with connections to the broader path network.
- Provide a pedestrian link through estate and connecting POS from the road



LOCATION PLAN

POS 11 CONCEPT

DRAINAGE LEGEND - CATCHMENT 11

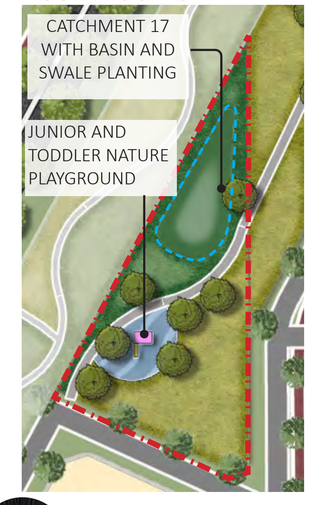
FIRST 15mm BRA DETAILS	
Depth(m):	0.30
Base Area(m^2)	1089
Top Area(mAHD):	1211
Slope	1:3

POS TYPOLOGY
- Pocket Park

SIZE
- 4,941 m^2 + Verge

CONCEPT
- Plantings to provide buffer to external road
- Small Playground for kids
- Provide a pedestrian link through estate and from the road
- Drainage basin as per LWMS

POS 17 CONCEPT



DRAINAGE LEGEND - CATCHMENT 17

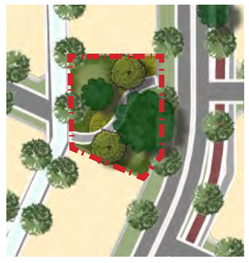
FIRST 15mm BRA DETAILS	
Depth(m):	0.30
Base Area(m^2)	576
Top Area(mAHD):	666
Slope	1:3

POS TYPOLOGY
- Pocket Park

SIZE
- 4,480 m^2 + Verge

CONCEPT
- Plantings to provide buffer to external road
- Small Playground for kids
- Provide a pedestrian link through estate and connecting POS from the road
- Drainage basin as per LWMS

POS 18 CONCEPT



POS TYPOLOGY
- Pocket Park

SIZE
- 1,020 m^2 + Verge

CONCEPT
- Plantings to provide buffer to external road
- Significant trees to be retained where possible
- Provide a pedestrian link through estate from the road

- TURF
- SHRUB PLANTING (AMENITY)
- LOW FUEL PLANTING
- BASIN
- LOT
- DUAL USE PATH
- FOOTPATH
- MULCH ONLY
- STREET TREES
- EXISTING TREES
- PROPOSED TREES
- CRUSHED LIMESTONE PATH
- BOARDWALK
- REVEGETATION
- EXTENT OF WORK
- REW
- REW BUFFER

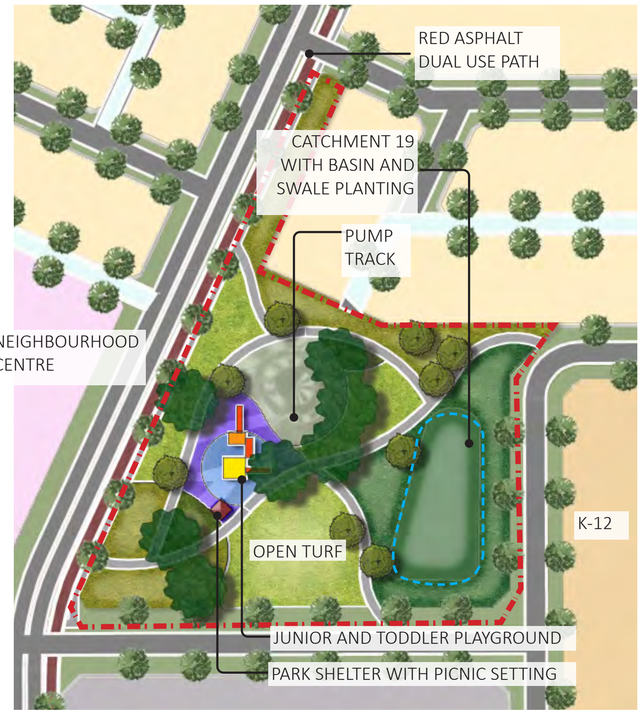
MARIGINIUP- Stockland

LANDSCAPE DETAILED PLAN POS 15,17 AND 18

DWG **MAR01_DES**
REV **B**
DATE **2023-08-09**
0 10 20 30 40 50 m
SCALE **1 : 1000 @ A1**

emerge ASSOCIATES

POS 19 CONCEPT



DRAINAGE LEGEND - CATCHMENT 19

FIRST 15mm BRA DETAILS

Depth(m):	0.30
Base Area(m^2)	1089
Top Area(mAHD):	1211
Slope	1:3

POS TYPOLOGY
- Neighbourhood Park

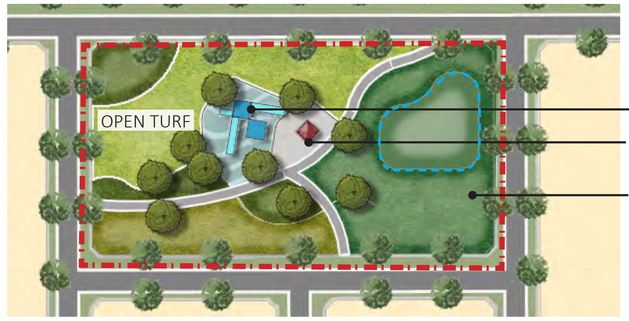
SIZE
- 1.28 ha + Verge

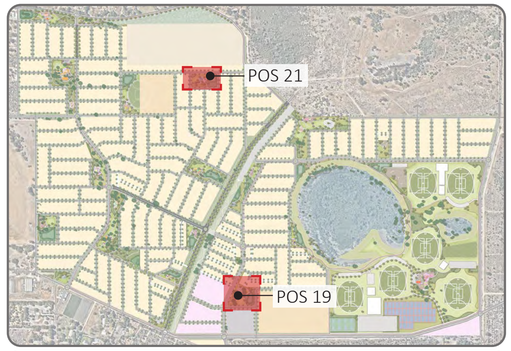
CONCEPT
- D.U.P on western side of the POS to provide connection to road integrators
- Concrete footpath to provide connection to road integrators
- Shrub vegetation to provide buffer from adjacent road
- Provide a pedestrian link through estate from neighbourhood centre
- Opportunity of BMX bike tracks to be implemented in existing tree canopy at where is appropriate
- Open turf to provide activity area to residents
- Turf mounding to create a unique landscape topography
- Significant trees to be retained where possible
- Picnic area with shelter, picnic setting and BBQ area
- Playground to provide activity space
- Drainage basin as per LWMS

FUNCTIONS / MATERIALS
- Playground for kids
- Turf mounding to create unique landscape topography
- Pump track will create exercise and play opportunity as well as socialisation
- Shelter with table settings and BBQ will provide opportunity for socialisation
- Existing trees to be retained
- Open turf area for outdoor activity
- Connected path and pedestrian link to open space perimeter, with connections to the neighbourhood centre, school and train station

ENVIRONMENTAL CONSIDERATIONS
- Existing trees and vegetation to be retained where possible.
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.
- Provide a buffer to the adjacent road

POS 21 CONCEPT





LOCATION PLAN

DRAINAGE LEGEND - CATCHMENT 21

FIRST 15mm BRA DETAILS

Depth(m):	0.30
Base Area(m^2)	676
Top Area(mAHD):	773
Slope	1:3

POS TYPOLOGY
- Local Park

SIZE
- .9 ha + Verge

FUNCTIONS / MATERIALS
- Existing trees to be retained
- Open turf area for outdoor activity
- Shelter and picnic settings
- Playground for kids
- Connected path to open space perimeter, with connections to the broader path network.

CONCEPT
- Shrub vegetation to provide as buffer to adjacent road
- Provide a pedestrian link through estate
- Significant trees to be retained where possible
- Picnic area with shelter and picnic setting
- playground to provide activity space
- Open turf to provide activity area to residents
- Drainage basin as per LWMS

ENVIRONMENTAL CONSIDERATIONS
- Existing trees and vegetation to be retained where possible.
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.
- Provide a buffer to the adjacent road

TURF
SHRUB PLANTING (AMENITY)
LOW FUEL PLANTING
BASIN
LOT
DUAL USE PATH
FOOTPATH
MULCH ONLY
STREET TREES
EXISTING TREES
PROPOSED TREES
CRUSHED LIMESTONE PATH
BOARDWALK
REVEGETATION
EXTENT OF WORK
REW
REW BUFFER

MARIGINIUP- Stockland

LANDSCAPE DETAILED PLAN POS 19 AND 21

DWG **MAR01_DES**
REV **B**
DATE **2023-08-09**
0 10 20 30 40 50 m
SCALE **1 : 1000 @ A1**

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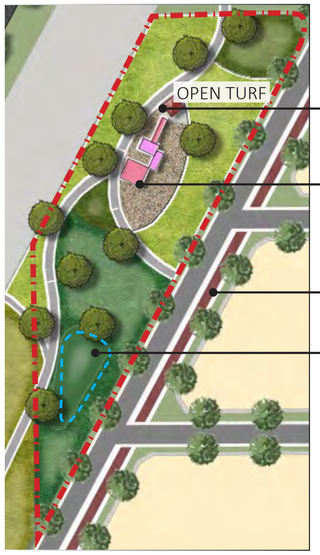
POS 20A CONCEPT



CONCEPT
- Shrub vegetation to provide buffer to adjacent road
- Provide a pedestrian link through estate and connecting POS from the road
- Picnic area with shelter and picnic setting
- Playground to provide activity space
- Open turf to provide activity area to residents
- Drainage basin as per LWMS

ENVIRONMENTAL CONSIDERATIONS
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.
- Provide a buffer to the adjacent road

DRAINAGE LEGEND - CATCHMENT 20A

FIRST 15mm BRA DETAILS	
Depth(m):	0.30
Base Area(m^2)	289
Top Area(mAHD):	353
Slope	1:3

POS TYPOLOGY
- Local Park

SIZE
- .6329 ha + Verge

FUNCTIONS / MATERIALS
- Open turf area for outdoor activity
- Shelter and picnic settings
- Playground for kids
- Connected path to open space perimeter, with connections to the broader path network.

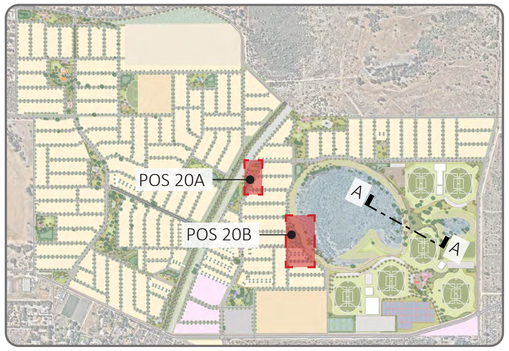
DRAINAGE LEGEND - CATCHMENT 20B

FIRST 15mm BRA DETAILS	
Depth(m):	0.30
Base Area(m^2)	1225
Top Area(mAHD):	1354
Slope	1:3

POS TYPOLOGY
- Local Park

SIZE
- .8273 ha + Verge

FUNCTIONS / MATERIALS
- Open turf area for outdoor activity
- Shelter and picnic settings
- Playground for kids
- Outdoor excercise area provide fitness oppotunities for the residents
- Connected path to open space perimeter, with connections to the broader path network and DUP



LOCATION PLAN

CONCEPT
- D.U.P on southern side of the POS to provide connection to road integrators
- Provide fitness area for residents
- Shrub vegetation to provide buffer to adjacent road
- Provide a pedestrian link through estate and REW
- Picnic area with shelter and picnic setting
- playground to provide activity space
- Open turf to provide activity area to residents
- Drainage basin as per LWMS

ENVIRONMENTAL CONSIDERATIONS
- Low fuel planting to minimise the threat area intensity for bushfire prone areas
- Water-wise native planting and planting
- Source local materials where possible to minimise transport requirements and provide local employment.
- Consider long-term maintenance requirements.

LEGEND
- TURF
- SHRUB PLANTING (AMENITY)
- LOW FUEL PLANTING
- BASIN
- LOT
- DUAL USE PATH
- FOOTPATH
- MULCH ONLY
- STREET TREES
- EXISTING TREES
- PROPOSED TREES
- CRUSHED LIMESTONE PATH
- BOARDWALK
- REW
- REVEGETATION
- EXTENT OF WORK
- REW
- REW BUFFER

REGIONAL POS SECTION

SECTION A-A

SCALE **1 : 200 @ A1**

MARIGINIUP- Stockland

LANDSCAPE DETAILED PLAN POS 20A AND 20B

DWG **MAR01_DES**
REV **B**
DATE **2023-08-09**
0 10 20 30 40 50 m
SCALE **1 : 1000 @ A1**

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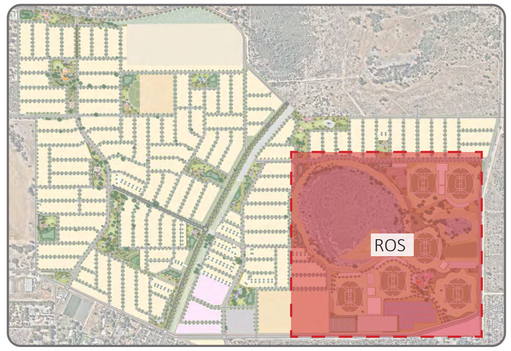
POS TYPOLOGY
- Sports POS

SIZE
- 47.423 ha + Verge

CONCEPT POS 7
- Playing field to provide with senior 6xAFL oval, 2
- Dual use path to provide cyclists and pedestrian with connection to wetland area
- Connected path to open space perimeter, with connections to the broader path network and DUP
- Provide a pedestrian link through estate, REW and road integrators
- All age playground to provide play space
- Fitness area to provide exercise space
- 2x Shelter with picnic settings to provide BBQ area
- Shrub vegetation to provide buffer to adjacent road
- Open turf to provide activity area to residents
- Mounded turf to create good views to the playing field as well as to provide opportunities for sitting, laying, and gathering
- Large area of existing vegetation & significant trees to be retained and protected
- Dog park with agilities to be included in the POS
- Drainage basin as per LWMS design

ENVIRONMENTAL CONSIDERATIONS
- Large area of existing vegetation to be retained and protected for local flora and fauna habitat
- Revegetation planting around REW buffers to enhance local flora and fauna habitat. Palette aligns with spring survey results
- Significant existing trees to be retained in open space where possible
- Water-wise native planting.
- Consider long-term maintenance requirements.
- Source local materials where possible to minimise transport requirements and provide local employment.
- Dirt and crushed limestone track/path in existing vegetation area instead of



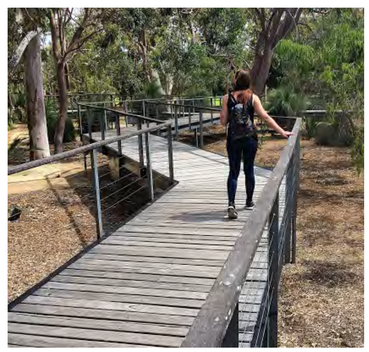
LOCATION PLAN

FUNCTIONS / MATERIALS
- Significant existing trees to be retained
- Playing field including 6x AFL Senior oval
- Open turf area for outdoor activity
- Mounded turf to create good views
- Shelter with table settings and BBQ will provide opportunity for socialisation
- All-age playground for all people
- Dog park for dog agility play opportunity for residents
- Turf mounding to create unique landscape topography
- Boardwalk to provided good view above drainage basin
- Limestone path in shrub planting
- Outdoor excercise area provide fitness oppotunities for the residents
- Connected path to open space perimeter, with connections to the broader path network and DUP

LEGEND
- TURF
- SHRUB PLANTING (AMENITY)
- LOW FUEL PLANTING
- BASIN
- LOT
- DUAL USE PATH
- FOOTPATH
- MULCH ONLY
- STREET TREES
- EXISTING TREES
- PROPOSED TREES
- CRUSHED LIMESTONE PATH
- BOARDWALK
- REW
- REVEGETATION
- EXTENT OF WORK
- REW
- REW BUFFER

DRAINAGE LEGEND - CATCHMENT 16

FIRST 15mm BRA DETAILS	
Depth(m):	0.30
Base Area(m^2)	2401
Top Area(mAHD):	2582
Slope	1:3



MARIGINIUP- Stockland
LANDSCAPE DETAILED PLAN REGIONAL SPORTING COMPLEX

DWG MAR01_DES
REV B
DATE 2023-08-09
0 10 20 30 40 50 m
SCALE 1 : 1000 @ A1

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STREET TREE PLANTINGS


Eucalyptus gomphocephala

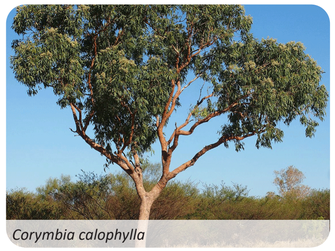

Jacaranda mimosifolia


Olea europaea (Swan Hill)

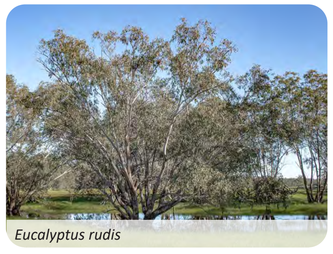

Melaleuca leucadendron

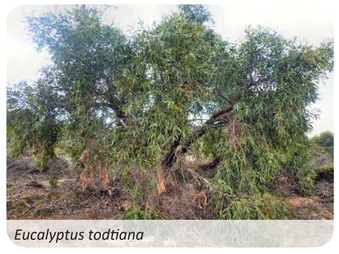

Agonis flexuosa


Callistemon 'KPS'


Corymbia calophylla


Eucalyptus gomphocephala


Eucalyptus rudis


Eucalyptus todtiana


Eucalyptus marginata


Melaleuca rhaphiophylla

SHRUB PLANTING


Acacia lasiocarpa


Conostylis aculeata ssp. preissii


Dianella revoluta


Dampiera linearis


Eremophila maculata


Grevillea crithmifolia


Grevillea thelemanniana


Hemiandra pungens


Patersonia occidentalis


Olearia axillaris


Rhagodia baccata


Darwinia citriodora


Dianella cassa blue


Eremophila glabra


Lepidosperma calcicola


Lepidosperma gladiatum


Lomandra longifolia


Meeboldina scariosa

MARIGINIUP- Stockland

LANDSCAPE PLANTING PALETTE - PUBLIC OPEN SPACE AND STREETSCAPE

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REVEGETATION PLANTING


Anigozanthos manglesii


Adenanthos cygnorum


Adenanthos cygnorum

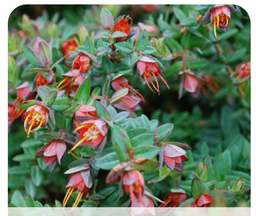

Acacia pulchella


Beaufortia squarrosa


Baumea juncea


Banksia grandis


Calothamnus sanguineus


Darwinia citriodora


Eucalyptus rudis


Hypocalymma angustifolium


Juncus pallidus


Jacksonia sternbergiana


Kunzea glabrescens


Kennedia prostrata


Regelia inops


Verticordia densiflora

LOW FUEL PLANTING


Anigozanthos manglesii


Austrostipa compressa


Conostylis aculeata


Dampiera linearis


Juncus pallidus


Kennedia prostrata


Kunzea recurva


Melaleuca thymoides


Patersonia occidentalis

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LANDSCAPE PLANTING PALETTE - PUBLIC OPEN SPACE AND STREETSCAPE

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