



WESTERN
ENVIRONMENTAL

Bushfire Management Plan

Carabooda Urban Precinct
District Structure Plan

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Bushfire Management Plan

Carabooda Urban Precinct District Structure Plan

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1. Introduction

1.1 Proposal Details

Acumen Development Solutions, on behalf of Carabooda Landowners Pty Ltd, are seeking to progress a District Structure Plan (DSP) across 959.16 ha of land in Carabooda (hereafter referred to as the subject site (Figure 1). The proposed Carabooda Urban Precinct DSP will provide broad level guidance for future land use and development through subsequent planning stages, including scheme amendments, local structure plans, subdivision and development of land within the subject site. The Carabooda Urban Precinct seeks to create a master planned community with an estimated 9,221 dwellings, multiple activity centres, schools and amenities to support an estimated population of 21,000 residents (Figure 2).

The subject site is within a designated bushfire prone area as per the *Western Australia State Map of Bush Fire Prone Areas* (DFES 2024; Figure 3), which triggers bushfire planning requirements under *State Planning Policy 3.7 Bushfire* (SPP 3.7; WAPC, 2024a) and the associated *Planning for Bushfire Guidelines* (the Guidelines; WAPC, 2024b).

Western Environmental Approvals Pty Ltd (WEPL) was commissioned to prepare a Bushfire Management Plan (BMP) to support the DSP. This BMP has been prepared by Associate Bushfire Consultant Dylan Wray (FPAA BPAD Level 2 Certified Practitioner No. BPAD44656) and Senior Principal Bushfire Consultant Daniel Panickar (FPAA BPAD Level 3 Certified Practitioner No. BPAD37802).

1.1.1 Site context

The subject site is located within the City of Wanneroo and is predominantly zoned Rural Resource under District Planning Scheme No. 2 (DPS2) and Rural under the Metropolitan Region Scheme (MRS). The subject site comprises of unmanaged, classifiable vegetation, as well as market gardens, turf farms, limestone quarries and rural residential properties.

The subject site is bound by a Bush Forever Site to the east, Wesco Road to the south, Karaborup Road and Gibbs Road to the west and Carabooda Road to the north (Figure 1).

1.2 Purpose and Application of the BMP

This BMP has been prepared in accordance with SPP 3.7 and the Guidelines to support the assessment of the DSP for the subject site submitted to the Western Australian Planning Commission (WAPC).

In addition, this BMP provides strategies and guidance to reduce the level of bushfire risk exposure for the subject site through implementation of a range of bushfire management measures in accordance with the Guidelines.

1.2.1 Subsequent Planning Stages

The Guidelines acknowledge that specific details may not be known at the strategic level and that certain requirements may need to be considered at subsequent planning stages. This BMP provides a high-level assessment of the bushfire requirements relevant to the DSP and demonstrates how compliance with the bushfire protection criteria will be achieved at subsequent planning stages.

1.2.2 Limitations and Future BMPs

The subject site and surrounding land comprise of multiple private properties under different ownership. Permission to access to each private property was unable to be obtained, and the existing public road network only provides visibility over some of the properties within the assessment area. Consequently, the vegetation classification assessment in this BMP has been undertaken through a combination of desktop analysis and visual inspection from within the subject site, surrounding public road network and drone footage. This is discussed further in Section 3.

Given these limitations, a conservative approach was adopted for vegetation classification which likely overestimates bushfire risk. Future BMPs supporting subsequent planning stages will refine the vegetation classifications in this BMP and may result in reduced setbacks in response to bushfire risk and/or lower Bushfire Attack Levels (BALs).

Despite the limitations described above, the level of assessment undertaken is considered suitable for this strategic planning proposal and provides a platform for future planning stages and supporting BMPs to build on. The limitations are outside of the control of the developer, and we ask the decision-making authorities and referral agencies reviewing this BMP to exercise discretion in this regard.

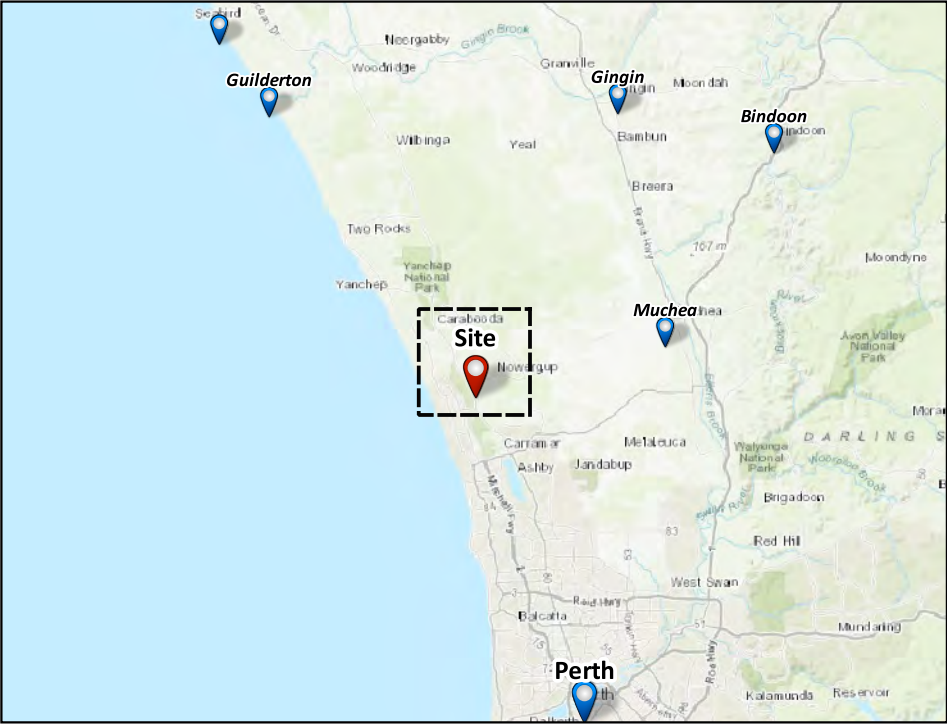
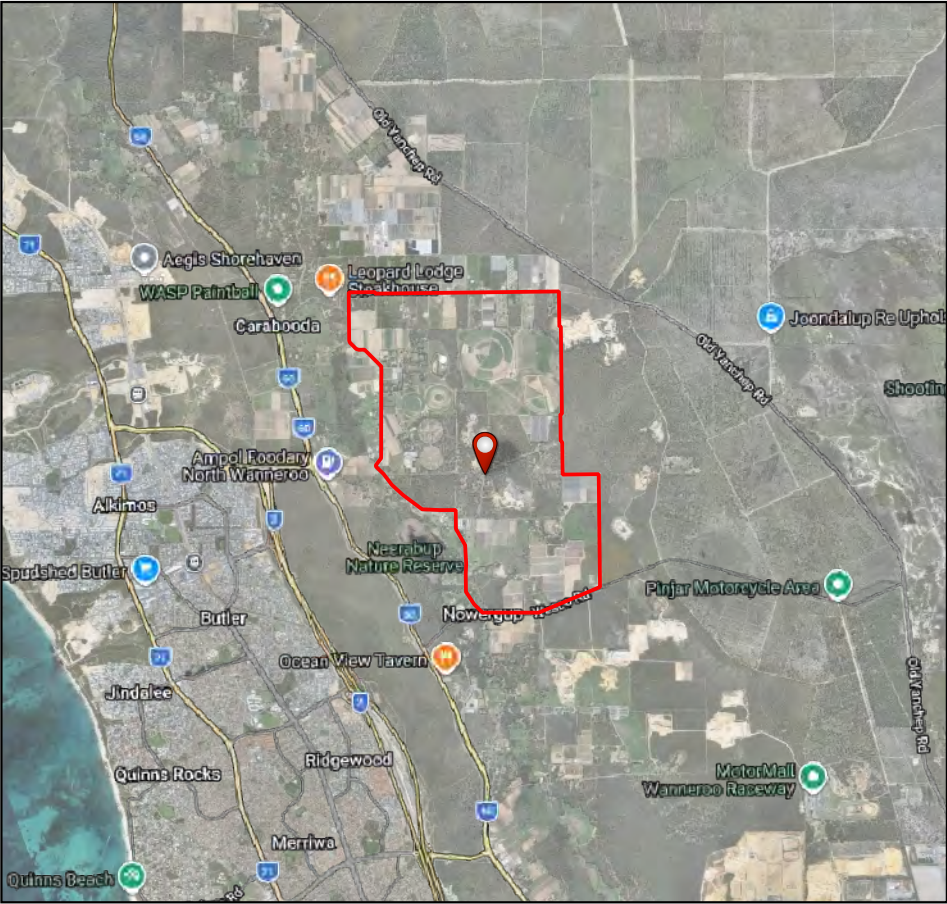
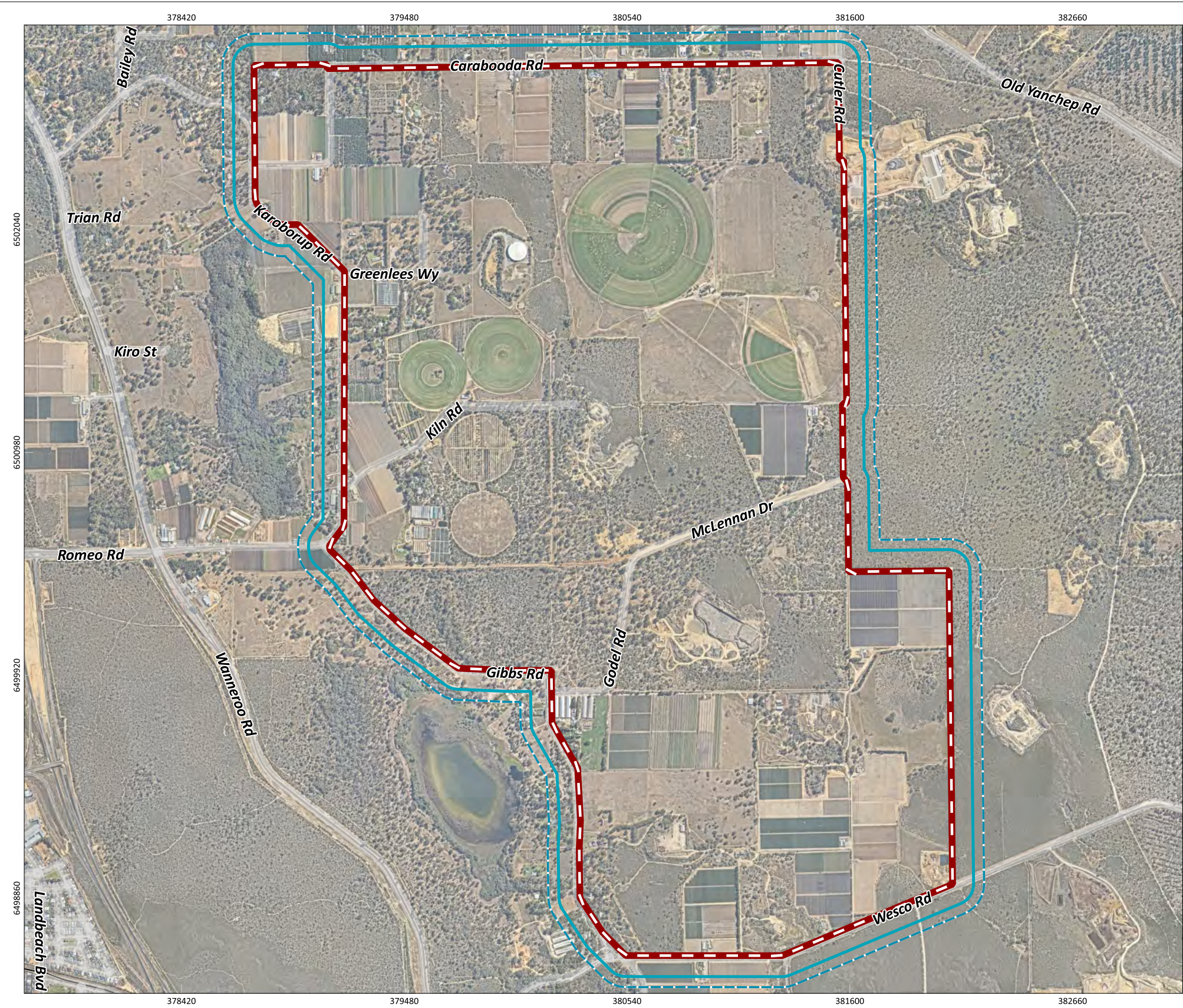


Figure 1: Site Overview

03006009001,200 m SCALE 1:21,200 SHEET SIZE A3 COLOUR	PROJECT/REPORT NAME Bushfire Management Plan: Carabooda District Structure Plan Carabooda	Legend Subject Site Buffer 100m Buffer 150m
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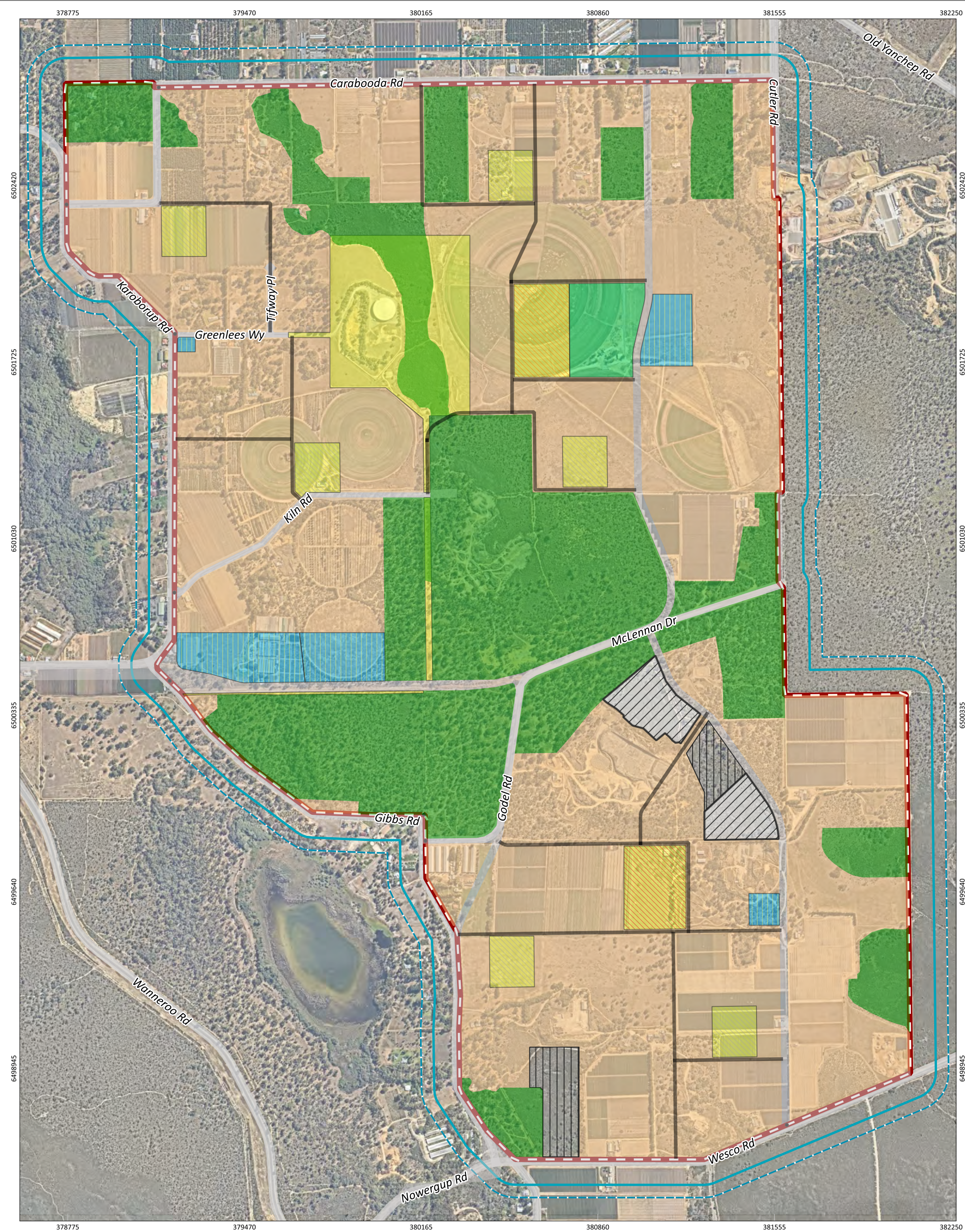


Figure 2: District Structure Plan

0100200300400m

N

SCALE

1:13,900

SHEET SIZE

A3 COLOUR

COORDINATE REFERENCE SYSTEM

GDA2020 / MGA zone 50

DATA SOURCE

Nearmap Imagery (3rd April 2026)

PROJECT/REPORT NAME

Bushfire Management Plan: Carabooda District Structure Plan Carabooda

CLIENT

Acumen Development Solutions

PROJECT NUMBER

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VERSION

0

DRAWN BY / REVIEWED BY

JP/BF

DATE

16/7/2026

Legend

Subject Site

Buffer 100m

Buffer 150m

Urban

Centre

Conservation

High School

Primary School

Private College

District Open Space

Water Authority of WA

Potential clearing and BRM extraction

Local Open Space For Conservation

Integrator/Connector

Other Neighbourhood Connector

No	Description	Drawn	Approved	Date
A	Original issue	JP	BF	16/7/2026

NOTES:
Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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2. Environmental Considerations

SPP 3.7 policy objective 5.4 recognises the need to consider bushfire risk management measures alongside environmental, biodiversity and conservation values.

2.1.1 Native Vegetation - Modification and Clearing

The Environmental Assessment Report (EAR; WEPL, 2024) outlines the environmental values associated with the subject site, with the DSP being prepared to preserve high value conservation areas and the establishment of public open space (POS) throughout the precinct. Environmental impacts through the clearing of native vegetation have been considered in the EAR.

2.1.2 Revegetation

Areas identified for conservation on the DSP have been classified as Class A Forest on the assumption that the vegetation will be retained and/ or revegetated. This is a conservative analysis based on a worst-case scenario. Future BMPs prepared at subsequent planning stages will address any changes to the assumptions made for the conservation areas.

2.1.3 Vegetation Retention

Areas identified for local open space for conservation on the DSP have been classified based on the existing vegetation types given vegetation in these areas will be retained.

2.1.4 Landscaping

At the time of subdivision, a condition of approval is to be imposed requiring a detailed landscape plan to be prepared for the POS and approved by the City of Wanneroo. While the areas of POS have conservatively been classified as Class A Forest, this could be subject to change depending on the landscape design. POS established and maintained as low threat in accordance with AS 3959: 2018 may result in reduced setbacks and/or lower Bushfire Attack Levels (BALs). Future BMPs prepared at subsequent planning stages will address any changes to the assumptions made on the POS areas.

All road verges and median strip drainage swales shall be established and maintained in a “low threat state” in accordance with AS 3959: 2018

3. Bushfire Assessment Results

3.1 Broader Landscape Assessment

A Broader Landscape Assessment (BLA) is required in accordance with SPP 3.7 and the Guidelines to determine compliance with Element 1: Location. The BLA (WEPL, 2024; Appendix C) has been prepared in accordance with Appendix A.1 of the Guidelines and determines that the subject site is Broader Landscape Type (BLT) B.

3.2 BHL Assessment Inputs

A Bushfire Hazard Level (BHL) assessment is required in accordance SPP 3.7 and the Guidelines to determine compliance with Element 2: Siting and Design. The BHL assessment has been prepared in accordance with Appendix A.2 of the Guidelines.

3.2.1 Fire Danger Index

A blanket Fire Danger Index (FDI) 80 is adopted for Western Australia, as outlined in *Australian Standard AS 3959: 2018 Construction of Buildings in Bushfire Prone Areas* (AS 3959: 2018; SA, 2018).

3.2.2 Vegetation Classification and Slope under Vegetation

Vegetation and effective slope (i.e. slope under vegetation) within the subject site and surrounding 150 m (the assessment area) were assessed on 19/09/2024 in accordance with the Guidelines and AS 3959: 2018.

The subject site and surrounding land comprise multiple private properties under different ownership. Permission to access to each property was unable to be obtained, and the existing public road network only provides visibility over some of the properties within the assessment area. Consequently, the vegetation classification assessment in this BMP has been undertaken through desktop analysis, aided by a drone and onsite validation, where access was available.

Given these limitations, a conservative approach was adopted for vegetation classification which likely overestimates bushfire risk. This conservatism entails adopting worst-case vegetation classifications for vegetation which could not be accessed fully (e.g. areas that appear to be Class D Scrub which extend to inaccessible areas have been assigned a Class A classification). Future BMPs supporting more detailed planning applications will refine the vegetation classifications and assumptions in this BMP which may result in improved development outcomes.

Slope under vegetation has been based on the worst-case of 0 - 5 degrees downslope over the entire assessment area. This is a conservative, simplified approach given the location of future development within the subject site is unknown and accounts for the worst-case change in topography over the assessment area. Slope under vegetation is unable to be calculated in accordance with AS 3959: 2018 given there are no future

assets to measure against. Future BMPs supporting subsequent planning stages will refine the slope analysis based on the direction and slope of vegetation measured from the future development site.

The classified vegetation and effective slope for the subject site from each of the identified vegetation plots are identified below in Table 1 and Figure 4. Photographs relating to each area and vegetation type are included in Appendix A.

3.2.3 Post-Development Bushfire Assessment

An assessment of vegetation and slope was undertaken based on the proposed development concept in Appendix B. A summary of the post-development bushfire assessment is provided below and is depicted in Figure 5:

- Portions of classified vegetation in the pre-development scenario (Figure 4) have been excluded post development (Figure 5) as these areas are proposed to be cleared to facilitate future development. The areas proposed to be cleared correspond with areas identified for urban, centre, schools, BRM extraction and public roads on the DSP (Appendix B).
- Some areas of vegetation are to be retained and revegetated as conservation areas as detailed in the EAR (WEPL, 2024) which is reflected in Figure 5. The bushfire threat posed by this vegetation will continually be considered in future BMPs and mitigated through appropriate setbacks in accordance with AS 3959: 2018.

Table 1: Classified Vegetation as per AS 3959: 2018

Plot	Vegetation classification	Effective slope*	Post Development Summary
1	Class A Forest	Downslope >0 to 5 degrees	Portions of Plot 1 within the subject site will be cleared to facilitate future development. Remaining areas will be retained as part of the conservation areas.
2	Class B Woodland	Downslope >0 to 5 degrees	Plot 2 within the subject site will be cleared to facilitate future development.
3	Class C Shrubland	Downslope >0 to 5 degrees	Portions of Plot 3 within the subject site will be cleared to facilitate future development. Remaining areas will be retained as part of the conservation areas and revegetated to Class A Forest classification.
4	Class D Scrub	Downslope >0 to 5 degrees	Portions of Plot 4 within the subject site will be cleared to facilitate future development. Remaining areas will be retained as part of the conservation areas and revegetated to Class A Forest classification.
5	Class G Grassland	Downslope >0 to 5 degrees	Plot 5 within the subject site will be cleared to facilitate future development.
6	Excluded - clause 2.2.3.2 (e) & (f)	-	Non-vegetated areas and low threat vegetation will be cleared to facilitate future development.

*See notes regarding simplification of slopes above.

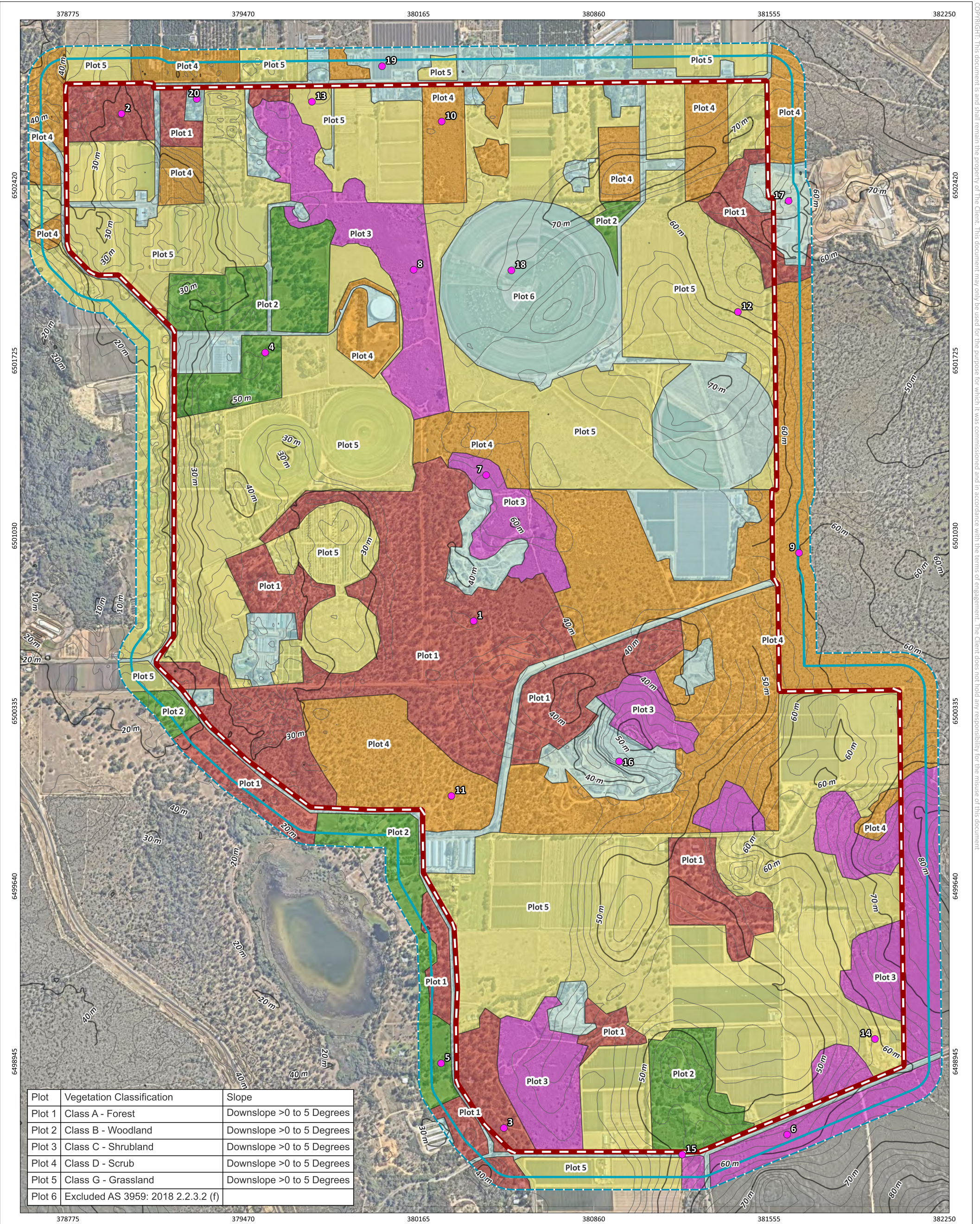


Figure 4: Vegetation Classification (Pre-Development)

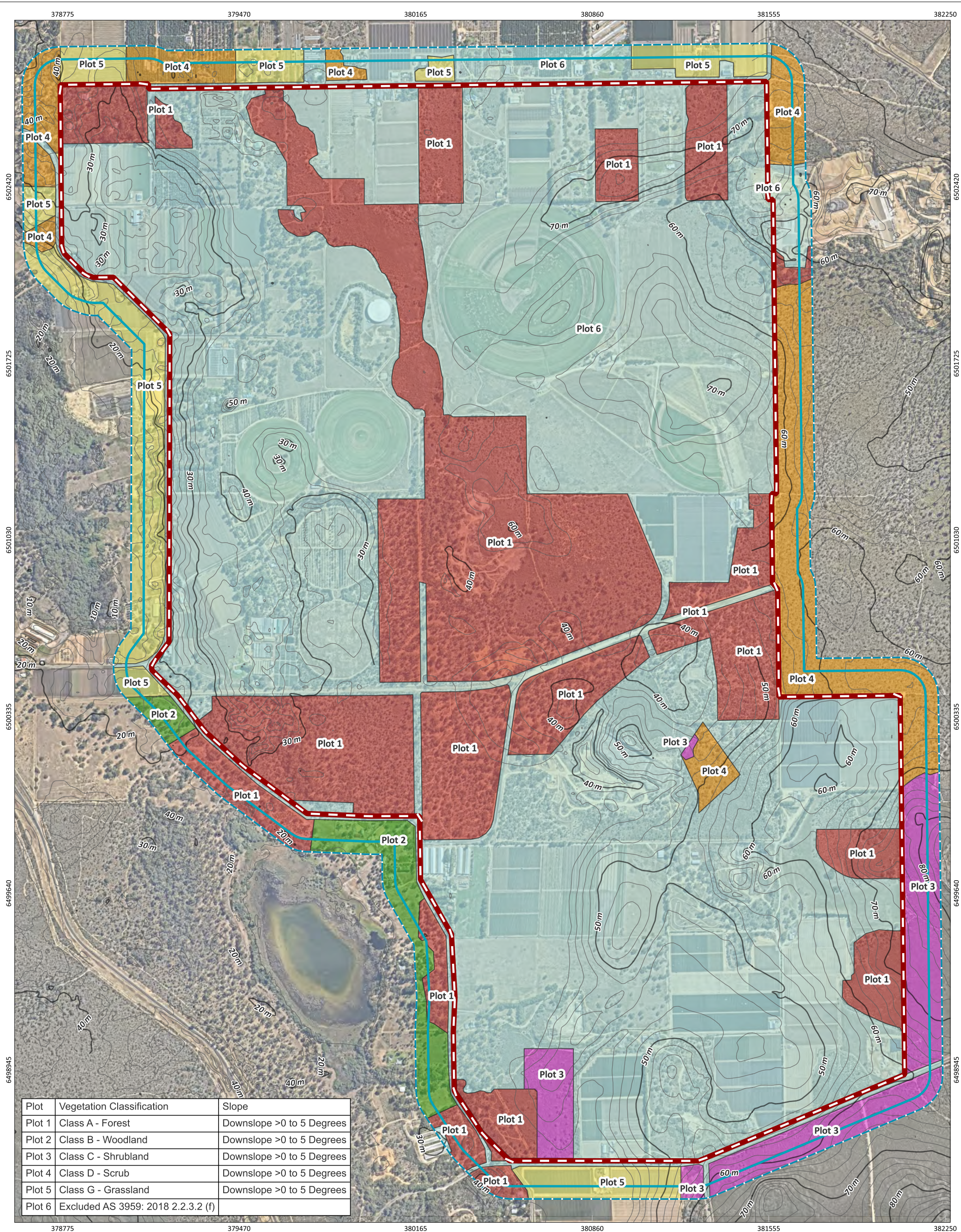
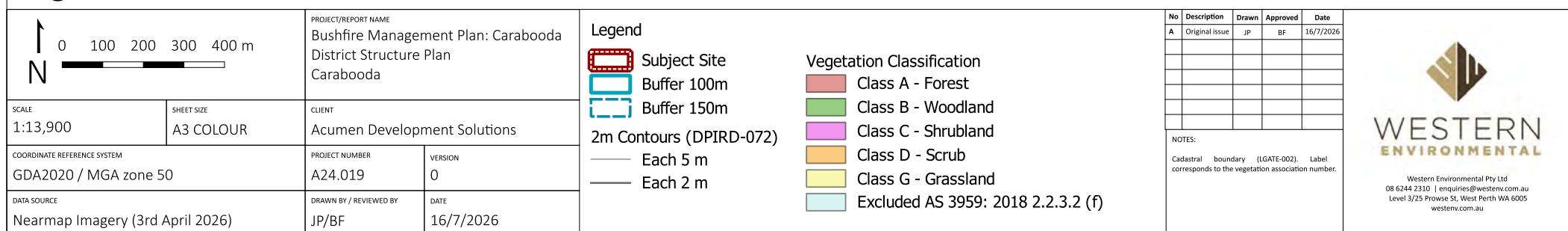


Figure 5: Vegetation Classification (Post-Development)



3.3 Bushfire Assessment Outputs

All land located within 100 m of the classified vegetation depicted in Figure 4 is considered bushfire prone and is subject to a BHL assessment in accordance with the Guidelines.

Pre-development BHLs have been assessed for the subject site in accordance with the methodology contained within the Guidelines and incorporates the following factors:

- Vegetation class.
- Slope under classified vegetation.

Table 2 contains a summary of the BHL assessment for each vegetation plot depicted in Figure 4. All land within 100 m of Extreme and Moderate BHLs has also been mapped as a Moderate hazard as per the Guidelines, and the final result is depicted in Figure 6. Descriptions of each vegetation classification are with each of the plates in Appendix A.

Clearing and landscaping will be undertaken within the subject site for development purposes as detailed in Section 3.2.2, and consequently the pre-development BHLs are subject to change. A post development BHL assessment is provided in Table 2 and Figure 7 based on expected changes to vegetation within the subject site depicted in Figure 5.

Table 2: Bushfire Hazard Level (BHL) Assessment

Plot	Vegetation classification	Effective slope	BHL
1	Class A Forest	Downslope >0 to 5 degrees	Extreme
2	Class B Woodland	Downslope >0 to 5 degrees	Extreme
3	Class C Shrubland	Downslope >0 to 5 degrees	Moderate
4	Class D Scrub	Downslope >0 to 5 degrees	Extreme
5	Class G Grassland	Downslope >0 to 5 degrees	Moderate
6	Excluded - clause 2.2.3.2 (e) & (f)	-	Moderate / Low*

*Areas of low threat vegetation within 100 m of vegetation classified as a moderate or extreme hazard has been assessed as a moderate hazard.

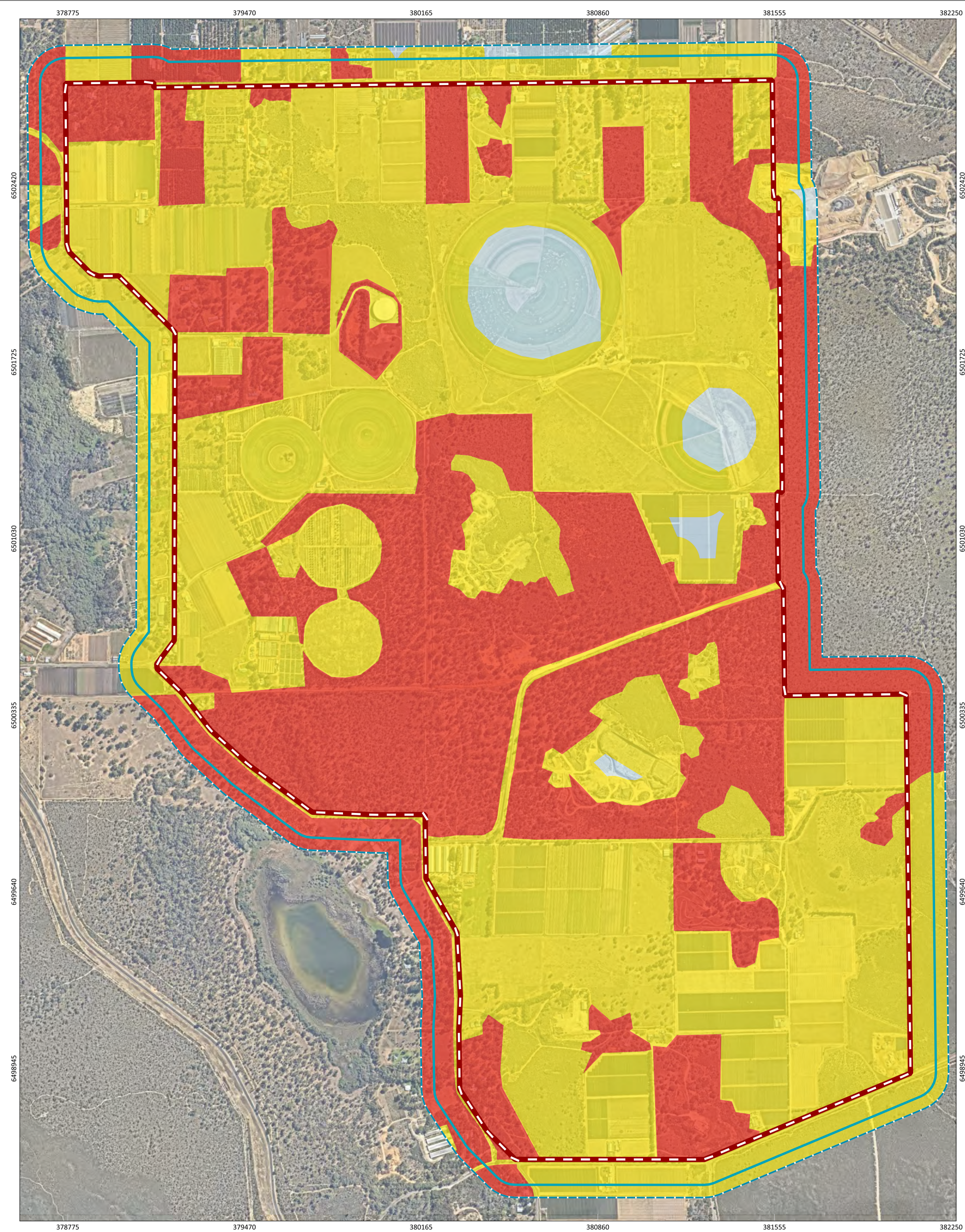


Figure 6: Bushfire Hazard Level (Pre-Development)

0

100

200

300

400 m

N

SCALE

1:13,900

COORDINATE REFERENCE SYSTEM

GDA2020 / MGA zone 50

DATA SOURCE

Nearmap Imagery (3rd April 2026)

PROJECT/REPORT NAME

Bushfire Management Plan: Carabooda District Structure Plan Carabooda

CLIENT

Acumen Development Solutions

PROJECT NUMBER

A24.019

VERSION

0

DRAWN BY / REVIEWED BY

JP/BF

DATE

16/7/2026

Legend

Subject Site

Buffer 100m

Buffer 150m

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low

No	Description	Drawn	Approved	Date
A	Original issue	JP	BF	16/7/2026

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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4. Identification of Issues Arising from the BHL Assessment

Large extents of on-site vegetation are proposed to be cleared to facilitate urban development amongst areas of landscaped/managed Public Open Space (POS) and conservation reserves. Therefore, for the purposes of strategic level planning, WEPL does not consider the current on-site vegetation extent to be a bushfire hazard issue post-development, since these hazards can be managed through a staged clearing process, adequate separation of future built assets from classified vegetation (both external and internal [e.g. retained vegetation] to the subject site), and ongoing fuel management that can be undertaken in and around individual development stages.

Land to the north, east and south of the subject site has the potential to support a landscape scale bushfire, as identified in the Broader Landscape Assessment (Appendix C). Predominant winds in the area during the bushfire season (from the east in the mornings and the southwest in the afternoons [BoM 2024]) may spread bushfires towards the subject site through these large tracts of vegetation. However, such occurrences have been considered as part of the planning process undertaken for this application and the risk from these occurrences has been significantly reduced through bushfire management measures in this BMP (detailed further in Section 5) which will be further refined in future BMPs to support subsequent planning stages.

On the basis of the above information, WEPL considers that the bushfire hazards within and adjacent to the subject site and the associated bushfire risk is readily manageable through standard management responses and compliance with acceptable solutions outlined in the Guidelines. These management measures will need to be factored into the development design as early as possible to ensure a suitable, compliant and effective bushfire management outcome is achieved to ensure protection of future life and property assets.

Demonstration of compliance with the relevant requirements of SPP 3.7, the Guidelines and AS 3959: 2018 at future planning stages will also depend on the developer's ability to coordinate the timing and staging of clearing and development works within the subject site with the aim of avoiding bushfire impacts from temporary or permanently retained vegetation.

5. Assessment Against the Bushfire Protection Criteria

5.1 Compliance Table

The proposed DSP is required to comply with the policy outcomes of SPP 3.7 and Bushfire Protection Criteria 4 in the Guidelines.

Table 3 outlines the acceptable solutions (AS) that are relevant to the proposal and summarises how the intent of each Bushfire Protection Criteria has been achieved through the application of bushfire risk management measures. An outcomes-based assessment (AO) has been undertaken for Element 1 given the strategic planning proposal is located within Broader Landscape Type (BLT) B. All other Elements have been addressed through compliance with the acceptable solutions. The management measures relevant to the DSP are depicted in Figure 11.

Implementation of this BMP is expected to meet police outcomes 6.1 - 6.4 of SPP 3.7.

Table 3: Assessment Against the Bushfire Protection Criteria

Bushfire Protection Criteria 4: Strategic Planning	AS	OA	N/A
Element 1: Location			
A1.1a Broader Landscape Type A	☐	☐	✓
Not applicable - the subject site is not located in an area that is a BLT A.			
A1.1b Broader Landscape Type B	☐	✓	☐
The subject site is located in an area that is a BLT B, as determined in the BLA in Appendix C. An outcomes-based approach has been undertaken to demonstrate that the risk can be appropriately managed and/or mitigated (refer Section 5.2).			
Element 2: Siting and Design			
A2.1 Siting and design	✓	☐	☐
The areas identified for future land use intensification under the DSP will have a post-development BHL of moderate (Figure 7). The proposed DSP is considered to be compliant with A2.1.			
A2.2 Clearing of native vegetation	✓	☐	☐
The DSP minimises the clearing of native vegetation through the preservation of high value conservation areas as discussed in Section 2. The proposed DSP is considered to be compliant with A2.2.			
Element 3: Vehicular Access			
A3.1 Public roads	✓	☐	☐
The subject site is accessed via existing public roads. WEPL assumes the existing public road network meets the technical specifications under the IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards and/or any applicable standard in the local government area, as detailed in Appendix D.			

Bushfire Protection Criteria 4: Strategic Planning	AS	OA	N/A
Proposed roads within the subject site will be subject to detailed design and will be assessed as part of future BMPs to accompany subsequent planning stages. The existing and proposed public access arrangements will provide suitable access and egress for community and emergency services personnel in the event of a bushfire. The proposed DSP is considered to be compliant with A3.1.			
A3.2 Access routes	✓	☐	☐
Multiple access routes from the subject site to more than two suitable destinations are available via the existing public network (Figure 11). Access to the subject site is available via: • Carabooda Road which connects to Cutler Road and Old Yanchep Road to the north; and • Karaborup Road which connects to Wanneroo Road to the west. Proposed public roads within the subject site will be subject to detailed design and will be assessed as part of future BMPs to accompany subsequent planning stages. The proposed DSP is considered to be compliant with A3.2.			
A3.3a No-through roads	☐	☐	✓
Not applicable - the subject site is not accessed via a no-through road.			
A3.3b No-through roads requirements	☐	☐	✓
Not applicable - the subject site is not accessed via a no-through road.			
Element 4: Water Supply	✓	☐	☐
A4.1 Water supply	✓	☐	☐
There is existing and planned water infrastructure which is anticipated to adequately supply potable water to future development. A network of hydrants will also be provided to meet Water Corporation specifications, with details to be provided at subsequent planning stages. The DSP is considered to be compliant with A4.1.			

Note: AS - Acceptable solution, PS - Performance solution, N/A - Not applicable.

5.2 Element 1 - Outcomes Based Approach

The BLA (Appendix C) determines that the subject site is located in an area that is BLT B. The Guidelines state that sites assessed as BLT B present an unacceptable risk of a landscape scale bushfire resulting in impacts to people, property and infrastructure. Strategic planning proposals located in an area that is BLT B require an outcomes-based approach to be prepared in accordance with Policy Measure 7.5 of SPP 3.7.

An assessment has been undertaken against the outcomes-based assessment criteria under Policy Measure 7.5 of SPP 3.7, as detailed in Table 4. The response takes guidance from Appendix B.1 of the Guidelines.

Table 4: Outcomes-Based Assessment Criteria

Assessment Criteria	DSP Response
Address the acceptable solution to the greatest extent possible.	The subject site is exposed to bushfire hazards on all aspects, resulting in the site being assessed as BLT B. However, land to the north-west is planned to be developed for future urban and the Mitchell Freeway extension, as envisaged under the Alkimos Eglinton District Structure Plan. This large tract of vegetation will ultimately become a mosaic pattern once clearing has been undertaken to facilitate future development. In addition, vegetation to the south-west of the subject site extends approximately 1.7km before reaching an existing urban area of Butler and Alkimos. Once the subject site has been developed, the potential for a landscape scale bushfire to the south-west of the subject site will be limited by the hard edges of the existing and future urban development.
Identify the non-compliance with the acceptable solutions and why these cannot be achieved.	Compliance with the acceptable solution is unable to be achieved given the large tracts of vegetation surrounding the subject site. While the subject site is on the urban fringe, the BLA points system results in maximum points due to the extent of vegetation within 2km of the subject site. Logically however, the proposed development is an extension of the existing northwest Perth metropolitan area which is recommended by the Guidelines, instead of an isolated development front, surrounded by vegetation. The examples on pages 72-75 in the Guidelines, whilst not intended for justification for planning proposals, in our view demonstrate typical BLT-B development is intended to be (i.e. isolated site, remote from urban areas, surrounded by classified vegetation with a limited road network).
Detail how the design addresses bushfire risk and where additional bushfire risk management measures have been deemed necessary and included to minimise the risk.	The proposed DSP includes expansive areas which will have a Low BHL post development, as detailed in Figure 7. These areas are considered suitable for refuge in the event of a landscape scale bushfire event. Bushfire scenario planning (refer to Section 5.3) has also been undertaken to contextualise the bushfire risk associated with each mapped aspect, and determine if evacuation can occur under different fire scenarios. In addition, hazard separation between areas of permanent vegetation and future residential lots will be achieved through perimeter roads and managed POS (to be detailed in updated bushfire assessments to support future planning applications). This hazard separation and ongoing management of the conservation areas through a Conservation Management Fund will minimise the bushfire risk to future development. This is detailed further in Section 5.4 below.
Detail if there are any community net-benefits such as improvements to the public road network.	The proposed DSP seeks to deliver the following community benefits: • The proposed public road network within the subject site will vastly improve the ability for existing and future residents to evacuate the area in a bushfire emergency, if deemed required by DFES. The subject site is located in close proximity to Wanneroo Road and Mitchell Freeway which provide access south and north to multiple suitable destinations for offsite refuge. • The DSP identifies large conservation areas which equate to approximately 20% of the subject site. The retention of vegetation and proposed revegetation within the conservation areas will strengthen the ecological linkages between Yanchep National Park and Neerabup National Park. Furthermore, a Conservation Management Fund will be established which will guarantee funding for the ongoing management of the conservation areas in perpetuity (refer to Section 5.4 below).

Assessment Criteria	DSP Response
Include any fire engineering solutions or written evidence such as publications and State Administrative Tribunal decision to support the proposal (where available).	Not applicable - fire engineering solutions are not relevant to strategic planning proposals and no cases have been before the State Administrative Tribunal relating to the broader landscape requirements under SPP 3.7 and the Guidelines.
Outline how the policy outcomes have been achieved.	The policy outcomes of SPP 3.7 have been achieved as follows: • The broader landscape does not present an unacceptable bushfire risk to people, property and infrastructure based on the post-development scenario. There will be expansive areas within the subject site which will have a BHL of LOW post development, providing areas for onsite refuge in the event of a bushfire. • The bushfire management measures contained within this BMP and future BMPs to accompany subsequent planning proposals will ensure the bushfire risk to people, property and infrastructure is reduced to an acceptable level. • The proposed public road network throughout the subject site will vastly improve the capacity for access and egress, enabling efficient and effective evacuation to multiple suitable destinations. • Water infrastructure will be extended to ensure sufficient water is available for emergency services to enable people, property and infrastructure to be defended from bushfire.
Outline why approval is warranted by the decision-maker in this instance.	Approval of the DSP is warranted given the bushfire risk can be reduced to an acceptable level, addressing the following bushfire related matters under Clause 67 of the Deemed Provisions: • The suitability of the land for the development taking into account the possible risk of flooding, tidal inundation, subsidence, landslip, bushfire, soil erosion, land degradation or any other risk; and • The suitability of the land for the development taking into account the possible risk to human health and safety. As determined through the BHL Assessment, areas identified for future land use intensification will be subject to a BHL of moderate which is considered an acceptable outcome. The subdivision design will need to ensure future development sites are subject to a radiant heat impact not exceeding 29kW/m² (BAL-29) to ensure the bushfire risk to people, property and infrastructure is managed and/or mitigated. In addition, consultation has been undertaken with the Department of Fire and Emergency Services (DFES) since January 2024 through the Technical Advisory Group established by the Department of Planning, Lands and Heritage (DPLH) for the project. In-principle support for the project was received by DFES, albeit prior to the introduction of the new SPP 3.7 and Guidelines in November, 2024.

5.3 Bushfire Scenario Planning

Bushfire Scenario Planning has been undertaken for the proposed DSP in response to a request for further information from the Department of Planning, Lands and Heritage (DPLH) and the Department of Fire and Emergency Services (DFES) regarding landscape scale bushfire risk.

The DSP will be delivered in stages across multiple Local Structure Plans (LSPs). The general pattern of development will be across two concurrent fronts (north and south of the central conservation area) moving from west to east. Indicative LSP boundaries and staging is depicted in Figure 8.

The purpose of this analysis is to understand the impact a bushfire may have on evacuation routes from the subject site. Six bushfire scenarios have been considered in this analysis as detailed in Table 5 and illustrated Figure 9 and Figure 10.

The initial five scenarios (Figure 9) assume that only the existing roads within and adjacent to the subject site exist. This is a conservative approach and overestimates the risk presented following completion of the DSP, however is considered appropriate given the likely lengthy delivery time of the DSP.

The final scenario (Figure 10) is a highly unlikely, but not impossible scenario whereby the entire eastern interface and the central conservation area are on fire. Examination of this scenario was requested by DFES. Development at the eastern interface will only occur after the west has been developed (as indicated in Figure 8). Therefore, this scenario includes neighbourhood connector roads (linking Kiln Rd to McLennan Dr; and Gibbs Rd to McLennan Dr) as depicted in the DSP.

As demonstrated in the analysis provided in Table 5, the subject site is surrounded by a well-developed network of public roads. Egress to at least two suitable destinations is available in the event of a landscape scale bushfire approaching from any one of the identified aspects. In addition, development of the subject site will further reduce the vulnerability of the subject site to landscape scale bushfire risk by removing fuels, increasing the resilience of the road network, and creating suitable destinations. Significant hazard separation between future dwellings and the bushfire prone vegetation to the east of the site will also be provided, as detailed later in this technical note.

No additional bushfire risk management measures are considered necessary.

Table 5: Bushfire Scenario Planning

Scenario	Bushfire hazard description and egress routes
1. Fire approaching from the northwest	Whilst a landscape scale bushfire could occur in the land to the northwest of the subject site, this scenario is considered to pose a relatively lower risk than the others assessed. Vegetation in this aspect comprises a mixture of forested areas and unmanaged grassland, interspersed by a significant amount of non-vegetated areas/low threat vegetation in the form of market gardens and rural land uses. It is expected that a landscape scale fire from this aspect would be slowed or able to be arrested before it arrives at the subject site, however ember showers could occur. In the event of a landscape scale bushfire from this aspect, egress to two suitable destinations (east along Carabooda Rd, Cutler Rd and Old Yanchep Rd to Banksia Grove; and south along Gibbs Rd and Wanneroo Rd to Clarkson) is available.
2. Fire approaching from the northeast	This scenario represents one of the highest landscape scale bushfire risks to the subject site. Vegetation within Bush Forever Site 290 and the Gnangara-Moore River State Forest to the east has the potential to support a landscape scale bushfire that may impact the subject site, particularly under the easterly winds that are common during the mornings over the bush fire danger period on the Swan Coastal Plain. It is important to note however, that vegetation adjacent to the subject site at this interface is predominantly shrubland and scrub vegetation on flat to gentle slopes. Whilst fires generally travel faster through these vegetation types than in forested areas, the residence times of such fires is generally not as long, and the extreme and/or eruptive fire behaviour associated with crown fires in extreme to catastrophic conditions generally does not occur. This is attributable to the lower amounts of available fuel, lack of a distinct canopy and in particular, an absence of significant bark fuels that can contribute to high intensity ember showers. There are also large breaks in bushfire hazards in the form of quarries and major roads. Whilst there is a genuine landscape scale bushfire risk from this aspect, it is not expected to be as extreme as if there were large, contiguous stands of forest vegetation present. In the event of a landscape scale bushfire from this aspect, egress to two suitable destinations (west along Romeo Rd to Alkimos/Yanchep; and south/east along Wesco Rd and Old Yanchep Rd to Banksia Grove) is available. In addition, the northeast frontier of the subject site will be developed after the west. This staging will likely provide multiple additional roads which would be used for egress, and large areas of non-bushfire prone land within the subject site itself, which could be treated as suitable destinations.
3. Fire approaching from the southwest	A landscape scale bushfire could occur in the land to the southwest of the subject site, through Neerabup National Park and Neerabup Nature Reserve, particularly under the southwest winds that are common during the afternoons over the bush fire danger period on the Swan Coastal Plain. It is expected that a landscape scale fire from this aspect would be slowed or able to be arrested before it arrives at the subject site (as it travels through the rural properties and Gibbs Rd) separating landscape scale hazards from the subject site, however ember showers could occur. In the event of a landscape scale bushfire from this aspect, egress to two suitable destinations (east along Wesco Rd and Old Yanchep Rd to Banksia Grove; and north/west along Karoborup Rd and Wanneroo Rd to Yanchep) is available.

Scenario	Bushfire hazard description and egress routes
4. Fire approaching from the southeast	Similar to the northeast bushfire scenario, this scenario represents one of the highest landscape scale bushfire risks to the subject site. Vegetation within Bush Forever Site 290 and the Gngara-Moore River State Forest to the east has the potential to support a landscape scale bushfire that may impact the subject site, particularly under the easterly winds that are common during the mornings over the bush fire danger period on the Swan Coastal Plain. A fire occurred in this aspect on 30 October, 2024 (refer to Plate 1 and Plate 2). A summary of our observations from the fire are below: • Length of run appears to be approx. 500m with a width of approx. 250m; • The fire appears to have been approx.. 13 ha in size; • Winds of the day were roughly SSE at 9am and SW around 2pm; • The fire appears to have started in the SW and travelled to the NE; • Fuels appear to have been Shrubland in the southern area and Scrub in the north. Based on our post-fire observations, the fire appears to reflect our have burned at high intensity and moved quickly through the landscape. It appears to have been arrested through a combination of direct firefighting and establishment of firebreaks. This information has assisted in developing our understanding of likely fire behaviour in this aspect as detailed below. As with the northwest bushfire scenario, vegetation adjacent to the subject site at this interface is predominantly shrubland and scrub vegetation on flat to gentle slopes. Whilst fires generally travel faster through these vegetation types than in forested areas, the residence times of such fires is generally not as long, and the extreme to eruptive fire behaviour associated with crown fires in extreme to catastrophic conditions generally does not occur. This is attributable to the lower amounts of available fuel, lack of a distinct canopy and in particular, an absence of significant bark fuels that can contribute to high intensity ember showers. There are also large breaks in bushfire hazards in the form of quarries, market gardens, agricultural land and major roads. Whilst there is a genuine landscape scale bushfire risk from this aspect, it is not expected to be as extreme as if there were large, contiguous stands of forest vegetation present. In the event of a landscape scale bushfire from this aspect, egress to two suitable destinations (north along McLennan Dr, Carabooda Rd, Cutler Rd and Old Yanchep Rd to Yanchep; and west along Gibbs Rd, Romeo Rd and Marmion Ave to Alkimos/Yanchep) is available. In addition, the southeast of the subject site will be developed after the west. This staging will likely provide multiple additional roads which would be used for egress, and large areas of non-bushfire prone land within the subject site itself, which could be treated as suitable destinations.
5. Fire approaching from the conservation area	The large conservation area in the centre of the subject site may also pose a landscape scale bushfire risk. Whilst the risk associated with a fire starting within the conservation areas is real, the more significant risk is that which is associated with a fire starting in one of the above aspects and spreading into the site through the conservation area. Vegetation within the conservation area will be largely forested and whilst a landscape scale fire within this area would be slowed or able to be arrested before it arrives at future homes within the site (as it reaches perimeter roads and managed Public Open Space), ember showers could occur. Whilst the large conservation area bisects the subject site, egress during a fire to two suitable destinations for both the northern and southern ‘halves’ of the site is available: • Northern ‘half’: North along Carabooda Rd, Cutler Rd and Old Yanchep Rd to Yanchep; and west along Kiln Rd/McLennan Dr, Romeo Rd and Marmion Ave to Alkimos/Yanchep). • Southern ‘half’: South along Gibbs Rd, Wesco Rd and Wanneroo Rd to Clarkson; and east along Wesco Rd and Old Yanchep Rd to Banksia Grove.

Scenario	Bushfire hazard description and egress routes
6. Fire approaching from the entire eastern interface and the Conservation Area	The risk associated with the eastern interface and the conservation area is discussed in the rows above. A scenario whereby the entire eastern interface and the conservation area is on fire is not considered likely, however is possible and DFES has requested it to be investigated. Development at the eastern interface will only occur after the west has been developed (as indicated in Figure 8). Therefore, this scenario includes neighbourhood connector roads (linking Kiln Rd to McLennan Dr; and Gibbs Rd to McLennan Dr) as depicted in the DSP. Whilst the large conservation area bisects the subject site, egress during a fire to two suitable destinations for both the northern and southern ‘halves’ of the site is available: - Northern ‘half’: West along either Kiln Rd or Carabooda Rd to Karoborup Rd and then Wanneroo Rd, where access in multiple directions to either Yanchep, Alkimos or Clarkson is available. - Southern ‘half’: South along either McLennan Dr or Gibbs Rd to Wesco Rd, then west to Wanneroo Rd, where access in multiple directions to either Yanchep, Alkimos or Clarkson is available. Further detail regarding evacuation during this scenario is provided in Section 5.3.1.

5.3.1 Vehicular Access and Evacuation

A transport engineering assessment has been undertaken by PJA Australia testing a whole-of-site evacuation scenario involving 9,200 vehicles exiting simultaneously. The assessment concluded:

- The road network has an effective evacuation capacity of approximately 11,060 vehicles per hour;
- A theoretical evacuation time of approximately 50 minutes is achievable under full network conditions; and
- Under constrained scenarios involving only western access routes, complete evacuation could occur within approximately 85 minutes. (Refer Appendix E).

Importantly, these findings do not account for emergency traffic management measures, including signal control optimisation through Main Roads WA, which would further improve network performance during an emergency response. Additional calculations indicate that evacuation using emergency traffic management measures could reduce potential evacuation times to approximately 48 minutes using only the 4 western exits, or 71 minutes using only 2 of the western exits.

The proposed road network is considered legible, and the west-to-east staging of development will assist with familiarity of routes and delivery of road upgrades before the eastern interface is developed.

It is acknowledged that DFES advises human behaviour, such as people delaying evacuation or returning home, may impact evacuation timeframes. However, for the purposes of this assessment, analysis indicates the road network will have sufficient capacity, redundancy and operational flexibility to support timely evacuation of the future DSP population.

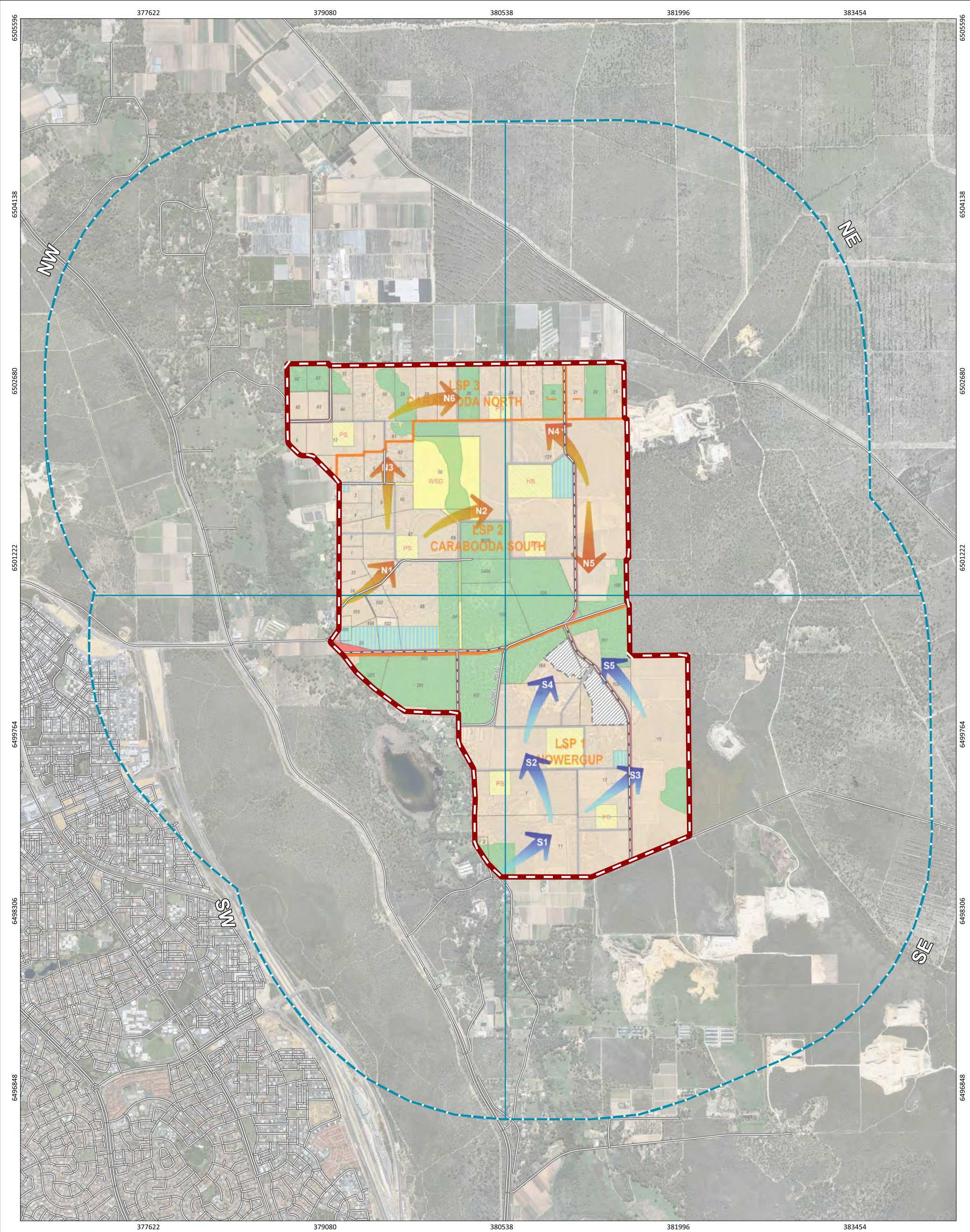


Figure 8: Bushfire Landscape Assessement Aspects

0200400600800m

N

SCALE

1:29,150

SHEET SIZE

A3 COLOUR

COORDINATE REFERENCE SYSTEM

GDA2020 / MGA zone 50

DATA SOURCE

LANDGATE AERIAL IMAGERY NOW

PROJECT/REPORT NAME

Bushfire Management Plan: Carabooda District Structure Plan Carabooda

CLIENT

Acumen Development Solutions

PROJECT NUMBER

A24.019

VERSION

0

DRAWN BY / REVIEWED BY

SM/BF

DATE

16/7/2026

Legend

Subject Site

Buffer 2km

Road Network (MRWA)

Proposed Internal Road

No	Description	Drawn	Approved	Date
A	Original Issue	SM	BF	16/7/2026

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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\\TVSNAS01\DataMgmt\GIS\Project Data\2024\A24.019\A24.019_BroaderLandscape\A24.019.qgz

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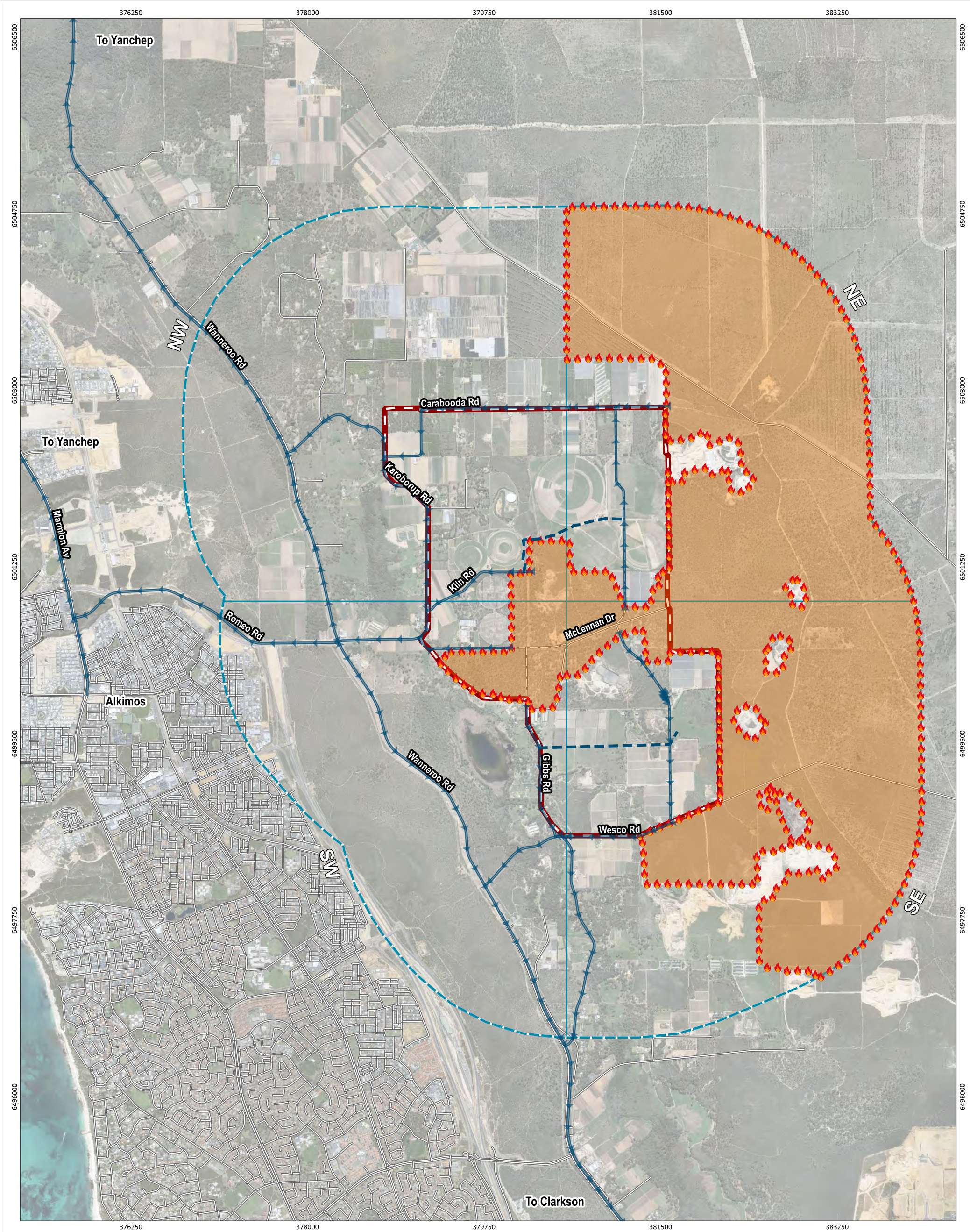


Figure 10: Escape Routes- Central Conservation Area and Eastern Fire Interface

0

300

600

900

1,200 m

N

SCALE

1:35,000

SHEET SIZE

A3 COLOUR

COORDINATE REFERENCE SYSTEM

GDA2020 / MGA zone 50

DATA SOURCE

LANDGATE AERIAL IMAGERY NOW

PROJECT/REPORT NAME

Bushfire Management Plan: Carabooda District Structure Plan Carabooda

CLIENT

Acumen Development Solutions

PROJECT NUMBER

A24.019

VERSION

0

DRAWN BY / REVIEWED BY

SM/BF

DATE

16/7/2026

Legend

Subject Site

Buffer 2km

Road Network (MRWA)

Proposed Internal Road

Fire Interface Line

Escape

Neighbourhood Connectors

No	Description	Drawn	Approved	Date
A	Original Issue	SM	BF	16/7/2026

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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\\TVSNAS01\DataMgmt\GIS\Project Data\2024\A24.019\A24.019_BroaderLandscape\A24.019.qgz



Plate 1: Fire scar (30 October, 2024)



Plate 2: Fire location (30 October, 2024)

5.4 Hazard Separation and Fuel Management

Future residential lots within the subject site will be separated from permanent bushfire hazards including the revegetated conservation areas, retained vegetation in the local open space for conservation and vegetation on adjacent properties. The nature and extent of this separation is not yet known, given the DSP represents high-level, strategic planning, to be followed by more detail as the planning process progresses. However, broadly, it is expected that the separation will involve the construction of public roads, footpaths and low threat landscaping along the perimeter of high-risk areas, which will enable future development to achieve compliance with SPP 3.7 and the Guidelines by ensuring all future dwellings are exposed to a radiant heat impact not exceeding 29kW/m^2 (BAL-29). Indicative hazard separation has been shown in Figure 11 and Appendix E, with the extent of hazard separation to be determined during subsequent planning stages. More detailed consideration has been given to hazard separation on the eastern interface and central conservation area in response to the results of the bushfire scenario planning, as detailed below.

The combination of hazard separation and ongoing management of the conservation areas will minimise the bushfire risk on future development to an acceptable level.

5.4.1 Eastern Interface

In response to the landscape scale bushfire risk from the east of the subject site, consideration has been given to hazard separation at this early, strategic stage of planning. This hazard separation is illustrated in Appendix F. These sketches are indicative only and are intended to demonstrate that appropriate hazard separation is possible. Refinements to the extent and nature of the hazard separation will be made and documented in Bushfire Management Plans supporting future stages of planning.

The width of the hazard separation reflects a Bushfire Attack Level (BAL) rating of BAL-19 for future dwellings on the eastern interface. The required separation between mapped bushfire hazards and future dwellings to achieve BAL-19 are:

- Class D Scrub (downslope $>0-5^\circ$): 22 m;
- Class C Shrubland (downslope $>0-5^\circ$): 15 m.

These separation distances will be achieved through a combination of perimeter road reserves (comprising managed verges, paved roads and footpaths) and front of lot setbacks consistent with the R-Codes.

Separation to the small area of Class A Forest vegetation mapped on this eastern interface will be addressed through the provision of a T-intersection between the future extension of Kiln Rd and McLennan Dr that will allow for at least 27 m of separation between this area and future dwellings.

5.4.2 Conservation Area

Consideration has also been given to hazard separation between the central conservation area and future dwellings within the subject site as illustrated in Appendix F. These sketches are indicative only and are intended to demonstrate that appropriate hazard separation is possible. Refinements to the extent and nature of the hazard separation will be made and documented in Bushfire Management Plans supporting future stages of planning.

The width of the hazard separation reflects a Bushfire Attack Level (BAL) rating of BAL-19 for future dwellings adjacent to the conservation area. This separation of 27 m assumes the urban interface of the conservation area will be comprised of Class A Forest vegetation (downslope >0-5°). This separation distance will be achieved through a combination of managed public open space and perimeter road reserves (comprising managed verges, paved roads and footpaths). Front of lot setbacks consistent with the R-Codes will provide further separation.

5.4.3 Conservation Area Management

A Conservation Management Fund (CMF) will be established to provide ongoing funding for the maintenance and management of the conservation areas. Management works are likely to include weed control, feral pest management, fuel load management, public access and maintenance, signage and associated controls. This CMF includes a seed funding mechanism for the ongoing management of the conservation areas in perpetuity, through the contribution of \$1,000 per lot into a CMF to be managed by the City of Wanneroo or an identified authority or agency. This will establish a CMF of \$8,500,000 over the development of the Carabooda DSP. It is envisaged that a Specific Area Rating system (SAR) would be established for Carabooda DSP area that provides an ongoing annual contribution to the CMF through the annual collection of SAR from every residential lot created in the DSP. This will ensure the management of the significant conservation areas are permanently funded and protected in the future. A SAR established with an annual contribution of \$300 per household, will contribute \$2.76M annually into the CMF for management works. The annual contribution to the Conservation Management Fund will ensure the conservation areas and public open space are managed in perpetuity.

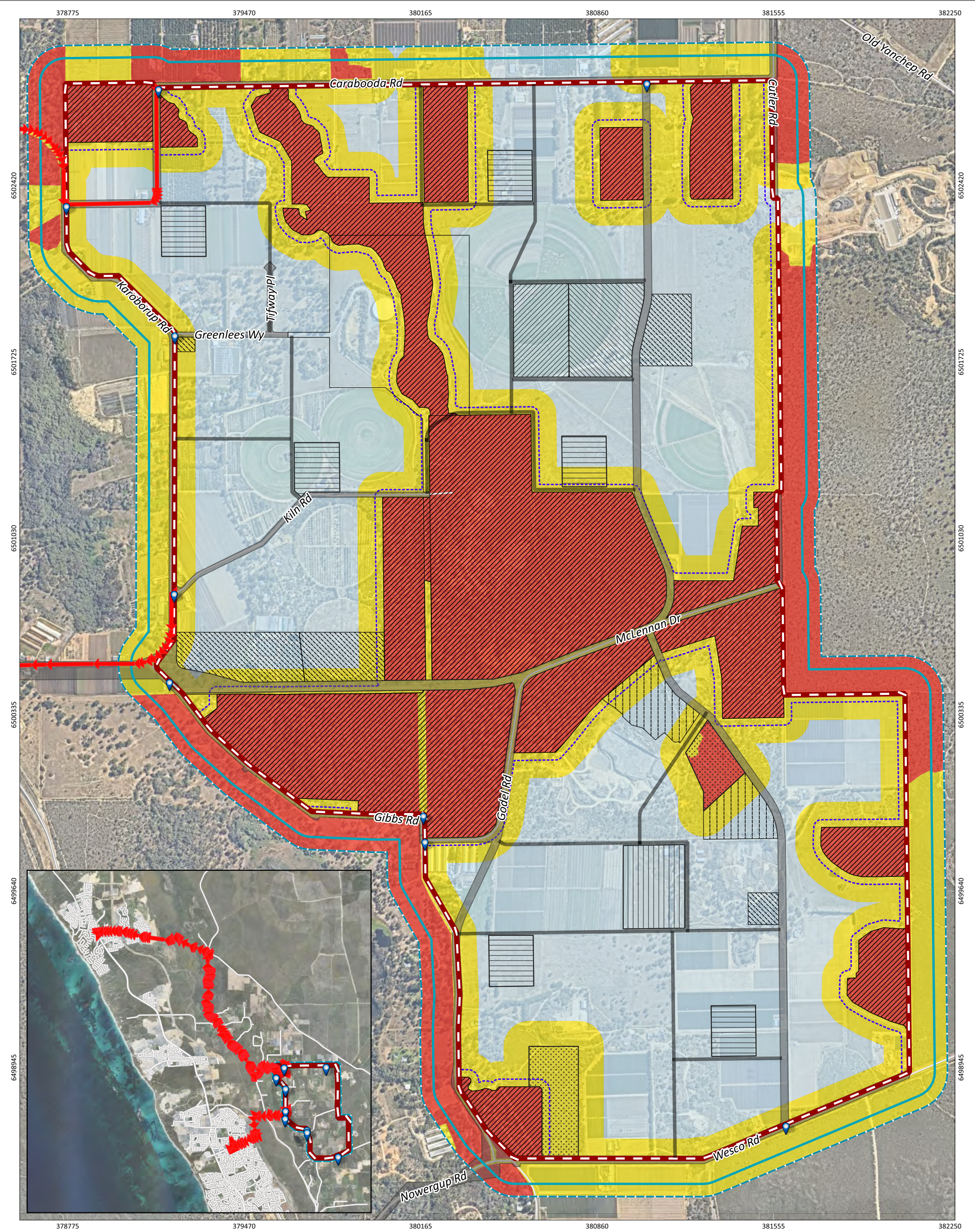


Figure 11: Spatial representation of the bushfire management strategies

0

100

200

300

400 m

N

SCALE

1:13,900

SHEET SIZE

A3 COLOUR

COORDINATE REFERENCE SYSTEM

GDA2020 / MGA zone 50

DATA SOURCE

Nearmap Imagery (3rd April 2026)

PROJECT/REPORT NAME

Bushfire Management Plan: Carabooda District Structure Plan Carabooda

CLIENT

Acumen Development Solutions

PROJECT NUMBER

A24.019

VERSION

0

DRAWN BY / REVIEWED BY

JP/BF

DATE

16/7/2026

Subject Site

Buffer 100m

Buffer 150m

Access / egress route

Other

Neighbourhood Connector

Access point

Water Hydrant (WCORP-070)

Centre

Conservation

Primary School

High School

Private College

District Open Space

Local Open Space

For Conservation

Water Authority of WA

Potential clearing and BRM extraction

Integrator / Connector

Indicative Hazard Separation (refer to Section 5.3 in BMP)

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low

No	Description	Drawn	Approved	Date
A	Original issue	JP	BF	16/7/2026

NOTES:
Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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6. Responsibilities for Implementation and Management of Bushfire Management Measures

Implementation of the BMP applies to the developer, the WAPC, the City of Wanneroo, and future landowners to ensure bushfire management measures are adopted and implemented on an ongoing basis. This BMP has been prepared as a strategic guide to demonstrate how development compliance will be delivered at future planning stages in accordance with the Guidelines. In this respect, management measures documented in Section 5 will be incorporated into development design as early as possible and confirmed through subdivision design. This will comprise of the following requirements:

- The subdivision design shall incorporate adequate hazard separation between areas of classified vegetation and future development sites to ensure the radiant heat impact does not exceed 29kW/m^2 (BAL-29) or 19kW/m^2 (BAL-19) adjacent to the eastern interface and conservation areas.
- Staged subdivisions may require the provision of an asset protection zone to ensure retained vegetation on balance lots do not result in a radiant heat impact exceeding 29kW/m^2 (BAL-29).
- The public road network shall be designed to ensure all lots have public road access in two different directions to two different suitable destinations with an all-weather surface. No-through roads can be considered where they are less than 200m in length from a proposed lot to an intersection where two-way access is provided.
- Emergency access ways can be considered where public road access in two different directions to two different suitable destinations is not achievable due to demonstratable site constraints.
- Perimeter roads shall be provided to separate areas of permanent bushfire hazards from future development sites.
- Battle-axe lots should be avoided and only considered where there are demonstrable site constraints. Battle-axe access legs greater than 50m in length from a public road shall provide passing bays every 200m and turnaround area for a Type 3.4 fire appliance.
- Evidence that a reticulated water supply can be provided for bushfire firefighting purposes. The water supply network and hydrant connections shall be provided in accordance with Water Corporation technical specifications.

Aside from the revision of this BMP or preparation of a BMP addendum to demonstrate compliance with the above requirements, there are no further items to implement, enforce or review at this stage of the planning process.

7. Conclusion

In the professional opinion of the author, the proposed DSP satisfies the intent, aim and objectives of SPP 3.7 and the Guidelines and is recommended for approval.

Future BMPs (or addenda) to support more detailed planning applications will address setbacks required between lots/dwellings and classified vegetation in line with the requirements of SPP 3.7 and the Guidelines.

8. References

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Appendix A: Classified Vegetation Photos

Plot 1

Class A Forest



Ground (Photo ID: 1)



Typical Aerial

Description:

This plot contains trees to 30 m in height with canopy cover greater than 30% and multi-tiered understorey vegetation comprising of shrubs and grasses.

The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 1

Class A Forest



Ground (Photo ID: 2)



Typical Aerial

Description:

This plot contains trees to 30 m in height with canopy cover greater than 30% and multi-tiered understorey vegetation comprising of shrubs and grasses.

The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 1

Class A Forest



Ground (Photo ID: 3)



Typical Aerial

Description:

This plot contains trees to 30 m in height with canopy cover greater than 30% and multi-tiered understorey vegetation comprising of shrubs and grasses.

The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 2

Class B Woodland



Ground (Photo ID: 4)



Typical Aerial

Description:

This plot contains trees to 30 m in height with canopy cover less than 30% and understorey vegetation comprising of grassland.

The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 2

Class B Woodland



Ground (Photo ID: 5)



Typical Aerial

Description:

This plot contains trees to 30 m in height with canopy cover less than 30% and understorey vegetation comprising of grassland.

The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 3

Class C Shrubland



Ground (Photo ID: 6)



Typical Aerial

Description:

Dense shrubs with an average height less than 2 m and overstorey canopy greater than 30%.

The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 3	Class C Shrubland
---------------	--------------------------



Ground (Photo ID: 7)



Typical Aerial

Description:

Dense shrubs with an average height less than 2 m and overstorey canopy greater than 30%.
The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 3	Class C Shrubland
---------------	--------------------------



Ground (Photo ID: 8)



Typical Aerial

Description:

Dense shrubs with an average height less than 2 m and overstorey canopy greater than 30%.
The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 4
Class D Scrub

Ground (Photo ID: 9)

Typical Aerial
Description:

Dense shrubs and trees with an average height greater than 2 m and overstorey canopy greater than 30%. The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 4
Class A Forest

Ground (Photo ID: 10)

Typical Aerial
Description:

Dense shrubs and trees with an average height greater than 2 m and overstorey canopy greater than 30%. The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 4

Class D Scrub



Ground (Photo ID: 11)



Typical Aerial

Description:

Dense shrubs and trees with an average height greater than 2 m and overstorey canopy greater than 30%. The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 5

Class G Grassland



Ground (Photo ID: 12)



Typical Aerial

Description:

Open paddocks containing unmanaged grass greater than 100mm in height. The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 5	Class G Grassland
---------------	--------------------------



Ground (Photo ID: 13)



Typical Aerial

Description:

Open paddocks containing unmanaged grass greater than 100mm in height.
The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 5	Class G Grassland
---------------	--------------------------



Ground (Photo ID: 14)



Typical Aerial

Description:

Open paddocks containing unmanaged grass greater than 100mm in height.
The slope under this vegetation has been conservatively assessed as downslope 0 - 5 degrees.

Plot 6

Excluded - clause 2.2.3.2 (e)



Ground (Photo ID: 15)



Typical Aerial

Description:

Non-vegetated public road.

Non-vegetated areas have been excluded in accordance with Clause 2.2.3.2 (e) of AS 3959: 2018.

Plot 6

Excluded - clause 2.2.3.2 (e)



Ground (Photo ID: 16)



Typical Aerial

Description:

Non-vegetated rocky outcrops.

Non-vegetated areas have been excluded in accordance with Clause 2.2.3.2 (e) of AS 3959: 2018.

Plot 6

Excluded - clause 2.2.3.2 (e)



Ground (Photo ID: 17)



Typical Aerial

Description:

Non-vegetated sand pits.

Non-vegetated areas have been excluded in accordance with Clause 2.2.3.2 (e) of AS 3959: 2018.

Plot 6

Excluded - clause 2.2.3.2 (f)



Ground (Photo ID: 18)



Typical Aerial

Description:

Low threat reticulated lawn farm.

Low threat vegetation has been excluded in accordance with Clause 2.2.3.2 (f) of AS 3959: 2018.

Plot 6

Excluded - clause 2.2.3.2 (f)



Ground (Photo ID: 19)



Typical Aerial

Description:

Low threat reticulated strawberry farm.

Low threat vegetation has been excluded in accordance with Clause 2.2.3.2 (f) of AS 3959: 2018.

Plot 6

Excluded - clause 2.2.3.2 (e) & (f)



Ground (Photo ID: 20)



Typical Aerial

Description:

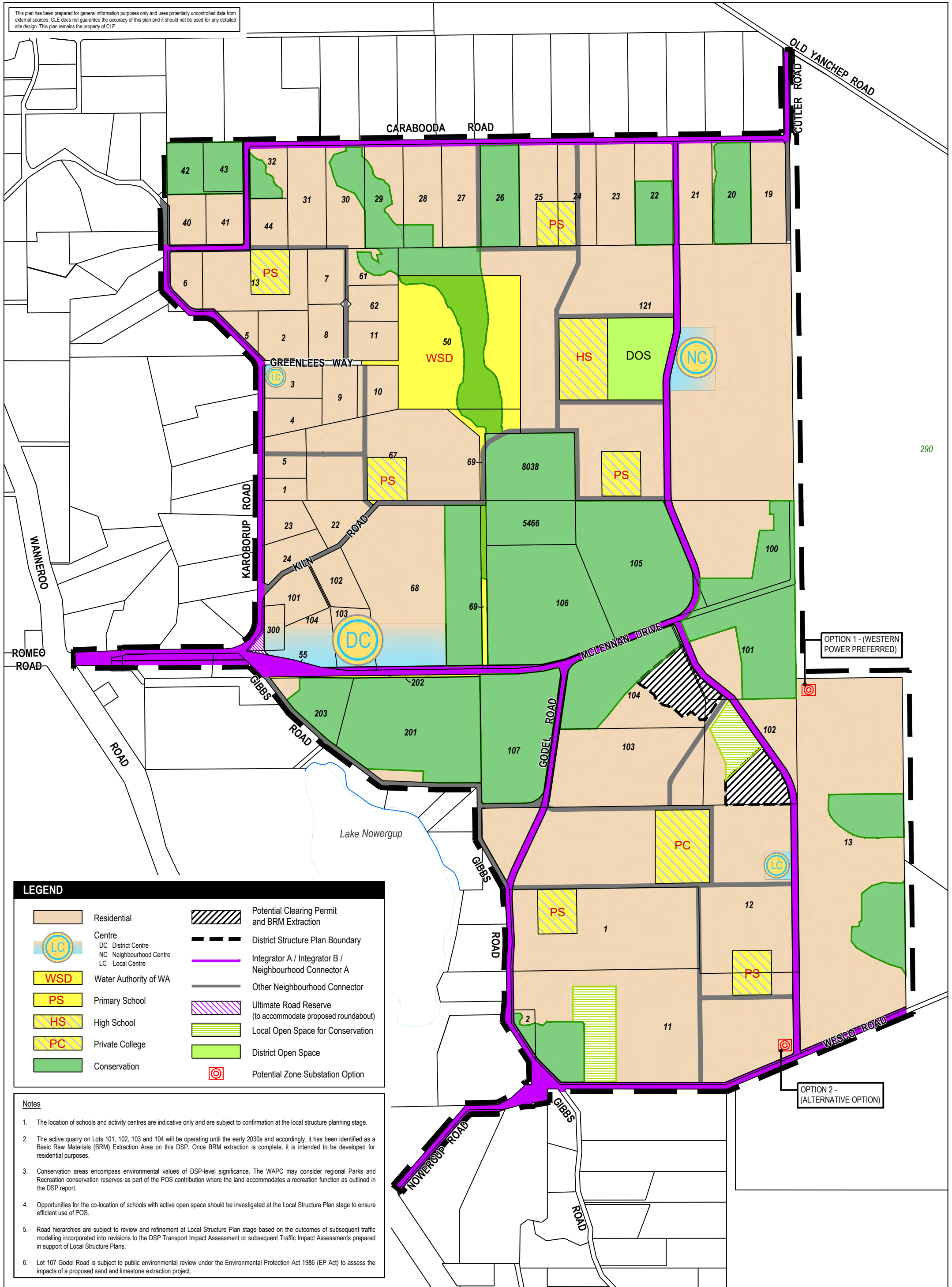
Residential properties which include non-vegetated buildings and driveways along with low threat lawns and gardens.

Non-vegetated areas and low threat vegetation have been excluded in accordance with Clause 2.2.3.2 (e) and (f) of AS 3959: 2018.

Appendix B:

District Structure Plan

This plan has been prepared for general information purposes only and uses potentially uncontrolled data from external sources. CLE does not guarantee the accuracy of this plan and it should not be used for any detailed site design. This plan remains the property of CLE.



Appendix C:

Broader Landscape Assessment

(WEPL, 2025)

Broader Landscape Assessment

Purpose

Strategic planning proposals identified within Area 2 of the Map of Bush Fire Prone Areas (DFES, 2021) require an assessment of the broader landscape, in accordance with *State Planning Policy 3.7 Bushfire* (SPP 3.7; WAPC, 2024a). The broader landscape assessment (BLA) is required to demonstrate compliance with *Element 1: Location* in Bushfire Protection Criteria 4 in the *Planning for Bushfire Guidelines* (the Guidelines; WAPC, 2024b).

Proposal Details

Carabooda Landowners Pty Ltd. are seeking to progress a District Structure Plan (DSP) across 943 ha of land in Carabooda (hereafter referred to as the subject site). This BLA has been prepared in accordance with SPP 3.7 and the Guidelines to determine whether the DSP complies with the acceptable solution for Element 1: Location. An overview of the site is presented in Figure 1.

Assessment Details

A desktop analysis has been completed to understand the bushfire hazards, broader road network, proximity to townsites, urban areas and suitable destination to quantify the potential for a landscape scale bushfire in the broader landscape in accordance with the methodology outlined in Appendix A in the Guidelines. A site assessment has also been undertaken to classify vegetation within 150m of the subject site.

Step 1: Determine the BLA area

For the purposes of this desktop assessment, all areas within 2 km of the subject site boundary have been included in the BLA area (Figure 1).

Step 2: Assess and map the broader landscape

2.1: Assess and map vegetation

Using up to date aerial imagery, the structure of vegetation within the BLA area were assessed and categorised. The categories align with classified vegetation and exclusions under *Australia Standard (AS) 3959: Construction in Bushfire Prone Areas* (AS 3959) and comprise:

- Areas of low-threat vegetation and non-vegetated areas.
- Areas of unmanaged grassland (Class G Grassland).
- Areas of all other types of classified vegetation (i.e. Class A – Class F vegetation).

Consideration has been given to any known revegetation and areas of environmental, biodiversity or conservational value in assigning categories to vegetation within the BLA area.

Three approved structure plans occur within the BLA area and have previously been assessed against SPP 3.7 (Table 1). The approved Alkimos Eglington District Structure Plan includes future extension of the Mitchell Freeway, as well as service commercial and secondary and district centre areas which occur within the BLA area for the subject site. These areas, once developed, will likely contain largely non-vegetated areas and low-threat vegetation. For this reason, these areas have been excluded as non-vegetated/low-threat areas.

Table 1: Approved structure plans to be excluded from BLA area

Plan number	Plan title
SPN/0047	Alkimos Eglington District Structure Plan
SPN/0597	Central Alkimos Agreed LSP No. 95 – Local Structure Plan (LSP)
SPN/0596	Alkimos City Centre Activity Centre Plan

2.2: Assess and map aspects

The broader landscape area has been broken down into four quadrants depending on their aspect in relation to the subject site (Figure 2). The exposure of the proposed development to identified bushfire hazards has been assessed in relation to each of these aspects (Table 2).

In addition, the subject site will contain a suite of conservation areas which contain vegetation other than Class G vegetation. These areas are displayed in Figure 2 and Figure 3.

Table 2: Description of vegetation within each of the map aspects

Aspect	Bushfire hazard description
Northeast	The northeastern aspect is mostly covered by classified vegetation other than Class G Grassland, associated with State Forest No. 65.
Southeast	The southeastern aspect is mostly vegetated with other classified vegetation associated with State Forest No. 65, except for some non-vegetated areas associated with extraction activities and some areas of unmanaged grassland associated with agricultural land uses.
Southwest	The southwestern aspect is mostly covered in other classified vegetation associated with Neerabup National Park. This classified vegetation is furthest from the subject site in this aspect, with some areas of unmanaged grassland associated with local agriculture separating the National Park from the subject site.
Northwest	The northwest aspect contains a mixture of low threat/non-vegetated areas, unmanaged grassland and other classified vegetation. Some areas of classified vegetation within this aspect have been excluded due to their location within areas subject to approved structure plans.

2.3: Assess and map the predominant vegetation pattern

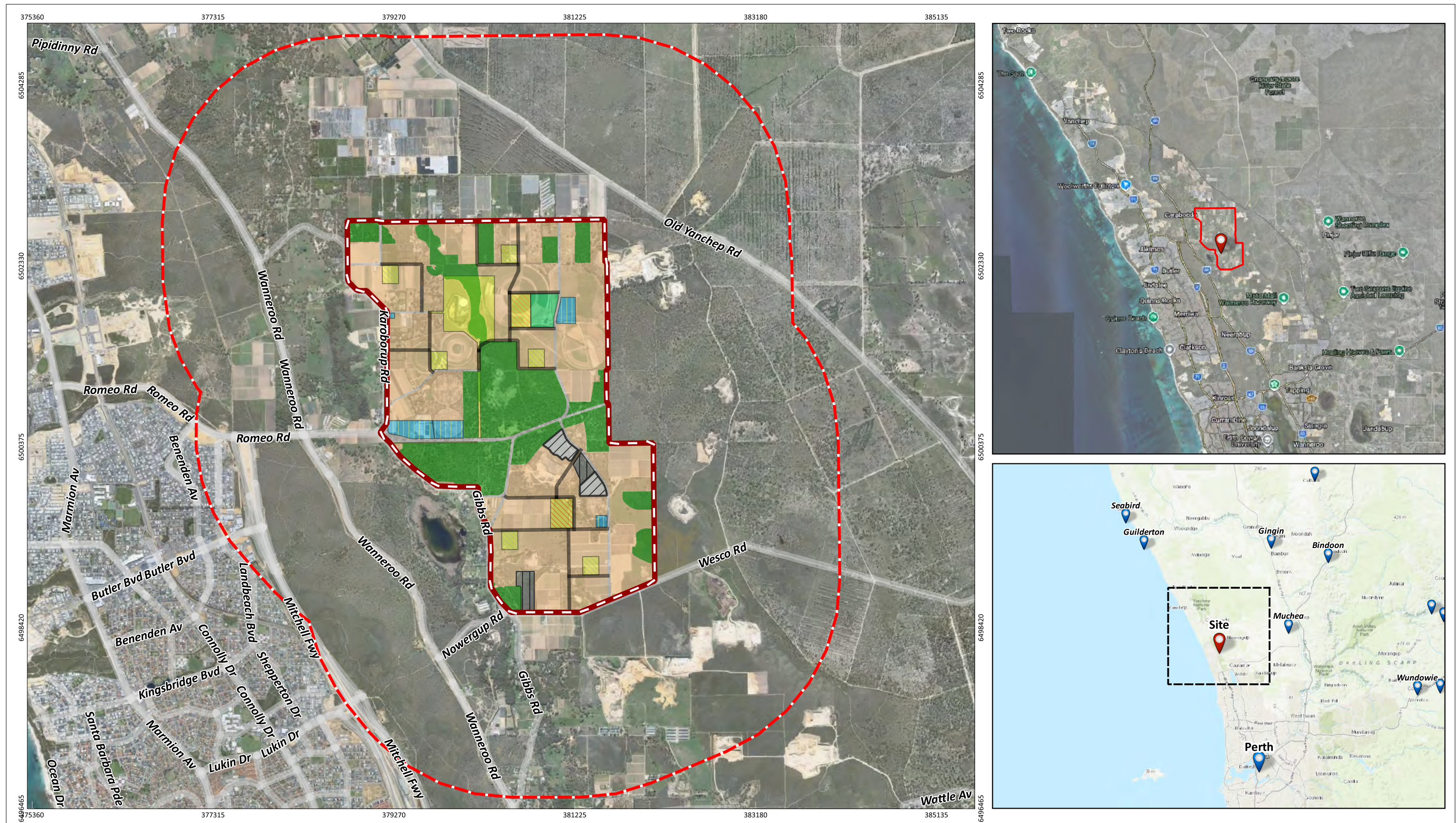
Using the vegetation assessment undertaken in Step 2.1, the predominant vegetation pattern was determined based on the following three categories (Figure 3):

- Cleared vegetation (e.g. residential or urban zoned and developed land);
- Mosaic pattern of vegetation (including Class G Grassland and vegetation within rural living precincts); or,
- Large tracts of classified vegetation (e.g. contiguous vegetation within reserves or national parks). Large tracts of vegetation were generally determined to be present if areas of classified vegetation other than Class G Grassland were continuous, with runs perpendicular to the subject site in excess of 1 km and widths parallel to the subject site of approximately 100 m or more.

The predominant vegetation pattern within the subject site constitutes large tracts of classified vegetation, with approximately 58% cover within the 2 km assessment area. See Table 3 for a percentage breakdown of the vegetation patterns within the broader landscape area.

Table 3: Percentage breakdown of vegetation patterns within the subject site and 2 km buffered area.

Pattern	Percentage of area within broader landscape
Low threat vegetation/non-vegetated	32%
Mosaic pattern	10%
Large tracts of classified vegetation	58%



0 500 1,000 1,500 2,000 m		PROJECT/REPORT NAME Broader Landscape Assessment Carabooda DSP	
SCALE 1:39,100		SHEET SIZE A3 COLOUR	
CLIENT Acumen			
COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		PROJECT NUMBER A24.019	
		VERSION 0	
DATA SOURCE LANDGATE AERIAL IMAGERY NOW		DRAWN BY / REVIEWED BY SM/BF	
		DATE 16/7/2026	

Legend

Subject Site

Buffer 2km

Urban

Centre

Conservation

High School

Primary School

Private College

District Open Space

Water Authority of WA

Potential clearing and BRM extraction

Local Open Space For Conservation

Integrator/Connector

Other Neighbourhood Connector

No

Description

Drawn

Approved

Date

A

Original issue

SM

BF

16/7/2026

NOTES:

Cadastral boundary (LGATE-002). Base map ESRI Topo. Townsites (LGATE-248).

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Level 3/25 Prowse St, West Perth WA 6005

westernv.com.au



Figure 2: Mapped Vegetation Aspect

0

200

400

600

800 m

N

SCALE

1:30,000

SHEET SIZE

A3 COLOUR

PROJECT/REPORT NAME

Broader Landscape Assessment
Carabooda DSP

CLIENT

Acumen

PROJECT NUMBER

A24.019

VERSION

0

DRAWN BY / REVIEWED BY

SM/BF

DATE

16/7/2026

Legend

Subject Site

Buffer 2km

Mapped Vegetation

Low threat/non vegetated

Unmanaged grassland

All other classified vegetation

No	Description	Drawn	Approved	Date
A	Original issue	SM	BF	16/7/2026

NOTES:
Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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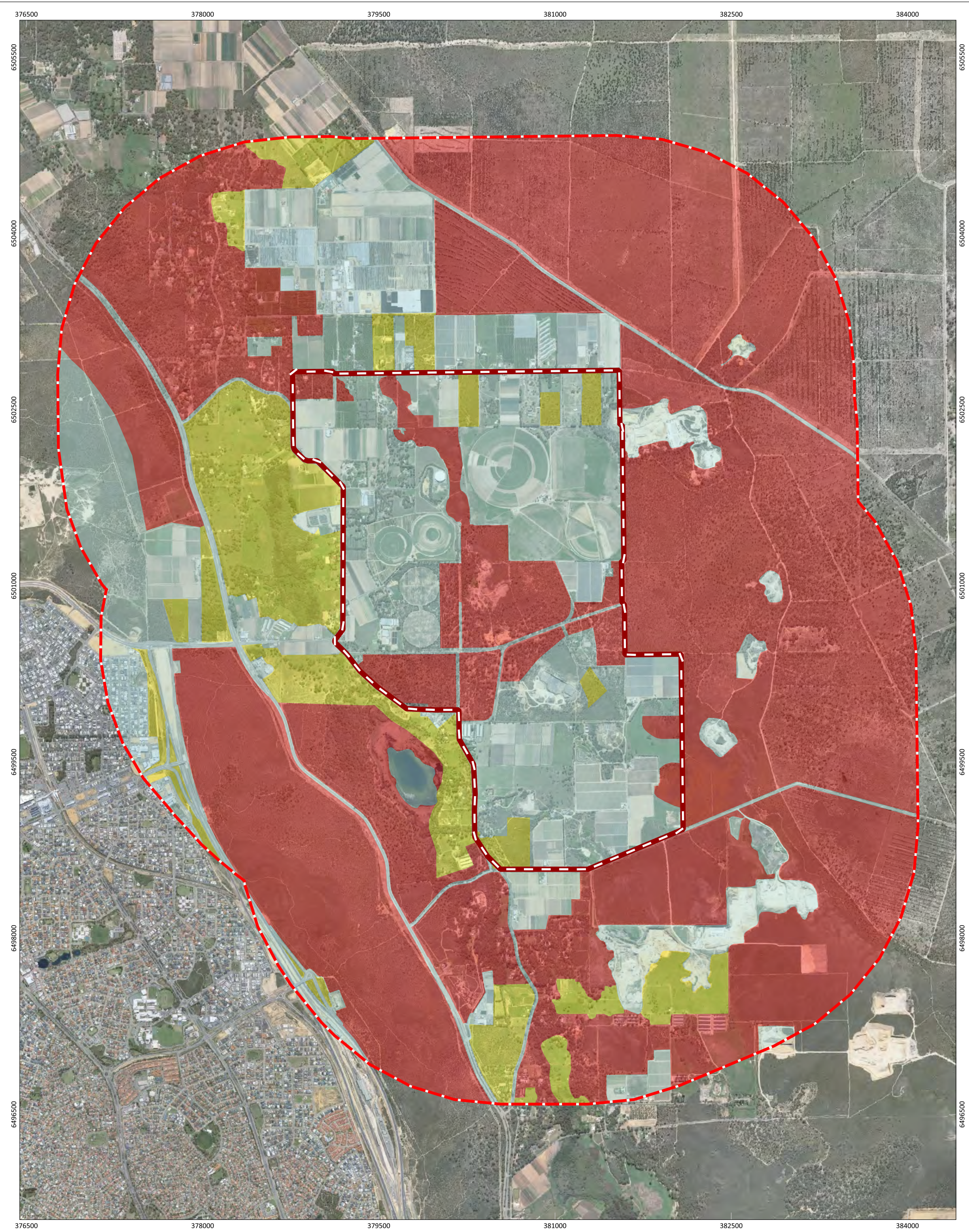


Figure 3: Predominant Vegetation Pattern

0200400600800m

N

SCALE
1:30,000

COORDINATE REFERENCE SYSTEM
GDA2020 / MGA zone 50

DATA SOURCE
LANDGATE AERIAL IMAGERY NOW

SHEET SIZE
A3 COLOUR

CLIENT
Acumen

PROJECT NUMBER
A24.019

VERSION
0

DRAWN BY / REVIEWED BY
SM/BF

DATE
16/7/2026

PROJECT/REPORT NAME
Broader Landscape Assessment
Carabooda DSP

Legend

Subject Site

Buffer 2km

Vegetation Pattern

Low threat/non vegetated

Mosaic pattern

Large tracts of classified vegetation

No	Description	Drawn	Approved	Date
A	Original issue	SM	BF	16/7/2026

NOTES:
Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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westernv.com.au

2.4: Assess and map road pattern and suitable destination(s)

The public road network surrounding the subject site was mapped and assessed to establish the level of vehicular access to the proposed DSP area. Potential escape routes to suitable destinations have been mapped and highlighted within Figure 4. In order to assess the complexity of these escape routes, the following details have been assessed and displayed:

- Main Roads WA road hierarchy.
- The location of intersections along each of the escape routes.
- Any cul-de-sacs exceeding 100m in length which are within 500 metres of the escape routes.
- The length of each of the escape routes to a suitable destination.

A short, and relatively direct route from the subject site to a suitable destination is possible, within a length of 3.8 km, containing limited intersections and traveling along the Mitchell Freeway for a portion of the route. This route is mapped through mostly urban and non-vegetated areas, passing by limited classified vegetation and unmanaged grassland at the beginning of the route.

It should also be noted that post development, a number of large areas within the subject site will have a Bushfire Hazard Level (BHL) of Low. These areas will facilitate refuge as suitable destinations in the event of a landscape scale bushfire and require shorter distances of travel avoiding the need to travel past bushfire hazards.



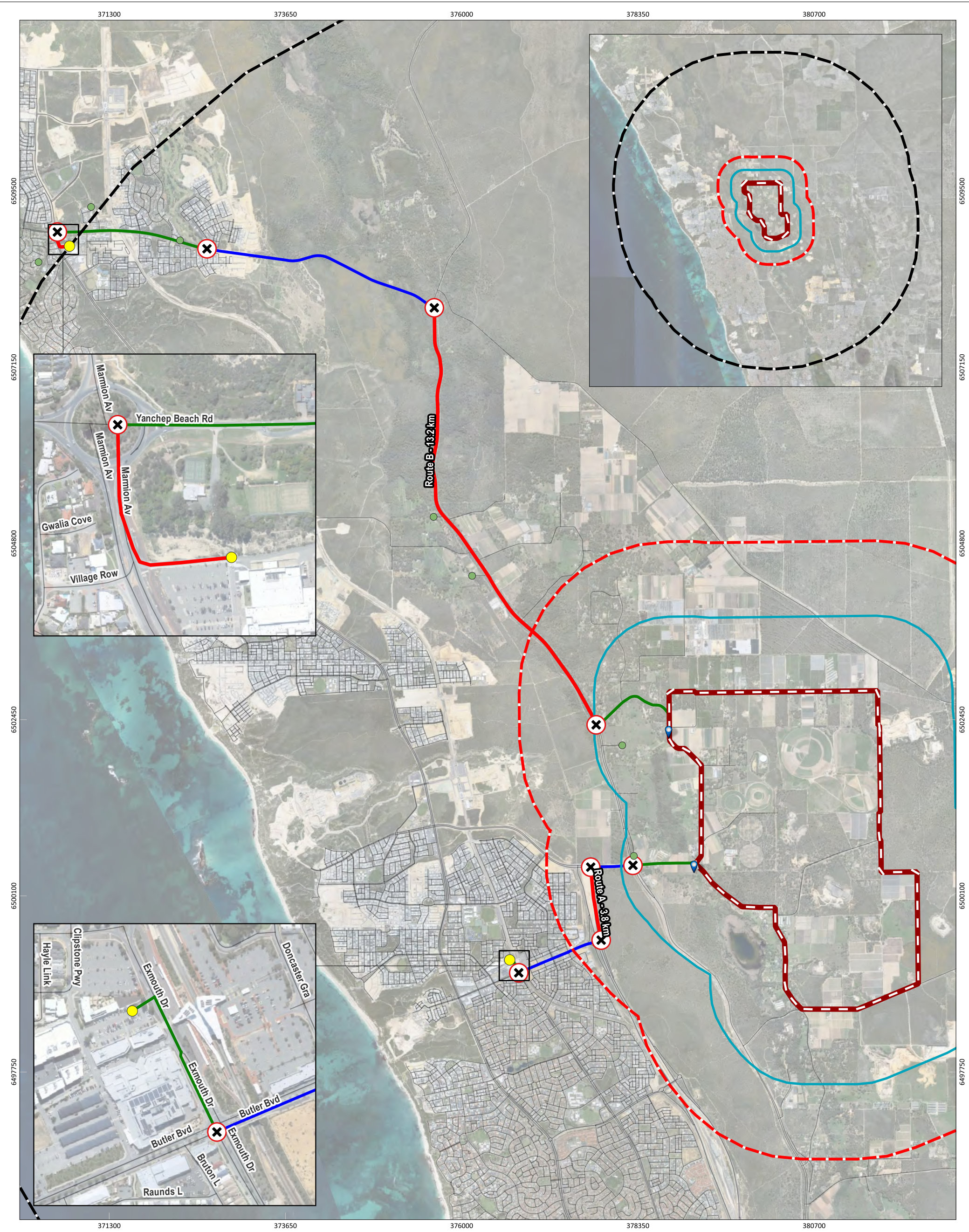


Figure 4: Road patterns and suitable destinations

0

0.8

1.6 km

N

SCALE

1:47,000

SHEET SIZE

A3 COLOUR

COORDINATE REFERENCE SYSTEM

GDA2020 / MGA zone 50

DATA SOURCE

LANDGATE AERIAL IMAGERY NOW

PROJECT/REPORT NAME

Broader Landscape Assessment
Carabooda DSP

CLIENT

Acumen

PROJECT NUMBER

A24.019

VERSION

0

DRAWN BY / REVIEWED BY

SM/BF

DATE

16/7/2026

Legend

Subject Site

Buffer 1km

Buffer 2km

Buffer 10km

Road Hierarchy (MRWA)

Intersection

Access point

Suitable Destination

Cul de Sac (Longer than 100m within 500m of the escape route)

Escape Route

Primary Distributor

District Distributor

Local Distributor

No

Description

Drawn

Approved

Date

A

Original issue

SM

BF

16/7/2026

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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\\TVSNAS01\Data\Mgmt\GIS\Project Data\2024\A24.019\A24.019_BroaderLandscape\A24.019.qgz

Step 3: Establish the Broader Landscape Type (BLT)

Using the information gathered throughout Steps 1 and 2, the BLT has been determined using a points-based system as shown in Table 4.

Table 4: Determination of the broader landscape type

Criteria	5 points	2 points	1 point	Points
Proximity of the planning proposal to a suitable destination is:	☐	✓	☐	2
	>10 km	1 – 10 km	<1 km	
The road pattern from the planning proposal to a suitable destination is:	☐	☐	✓	1
	Complex and indirect (cul-de-sacs, and/or multiple intersections)	Mixed road patterns	Simple and/or direct (limited intersections)	
The predominant vegetation pattern is:	✓	☐	☐	5
	Large tracts of vegetation (contiguous vegetation)	A mosaic pattern of vegetation (e.g. vegetation within rural living precincts)	Cleared vegetation (e.g. clearing for residential zoned urban lots)	
Exposure of the planning proposal to an identified external bushfire hazard (excluding Class G Grassland) is from:	✓	☐	☐	5
	Three or four aspects	Two aspects	From nil or one aspect only	
TOTAL POINTS:				13
Total points		Broader landscape type		
0 – 11 points		Broader landscape type A		☐
12 – 20 points		Broader landscape type B		✓

As per the above analysis, the subject site is determined to be **BLT B**.

As the DSP is proposed within BLT B, the strategic planning proposal does not meet the acceptable outcome for Element 1: Location. An outcomes-based solution has been developed (within the BMP) to demonstrate that the development is sited in an appropriate location and can achieve compliance with Element 1 of the Guidelines.



References

Department of Fire and Emergency Services (DFES). (2021). *Map of Bush Fire Prone Areas*. Retrieved on 5/11/2024 from:

<http://www.dfes.wa.gov.au/regulationandcompliance/bushfireproneareas/Pages/default.aspx>

Standards Australia (SA). (2018). *Construction of buildings in bushfire-prone areas* (AS 3959: 2018).

Western Australian Planning Commission (WAPC). (2024a). *State Planning Policy 3. Bushfire*. Government of Western Australia.

Western Australian Planning Commission (WAPC). (2024b). *Planning for Bushfire Guidelines*. Government of Western Australia.



Appendix D:

Vehicular access technical requirements (WAPC, 2024)

Technical requirements	Perimeter Roads		Public Roads		Emergency Access Way ³		Fire Service Access Route ³		Battle-Axe and Private Driveways ¹	
Map of Bush Fire Prone Areas Designation	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1
Minimum horizontal clearance (m)	12	8	See note 5		10	6	10	6	6	
Minimum vertical clearance (m)	4.5									
Minimum weight capacity (t)	15									
Maximum grade unsealed road ²	See note 5		See note 5		1:10 (10% or 6 degrees)					
1:7 (14.3% or 8 degrees)										
1:10 (10% or 6 degrees)										
8.5										

Notes:

1. Driveways and battle-axe legs to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision where not required to comply with the widths in this Appendix or the Guidelines.
2. Dips must have no more than a 1 in 8 (12.5% - 7.1 degrees) entry and exit angle.
3. To have crossfalls between 3 per cent and 6 per cent.
4. For sealed roads only the maximum grade of no more than 1 in 5 (20 per cent) (11.3 degrees) for no more than 50 metres is permissible, except for short constrictions to 3.5 metres for no more than 30 metres in length where an obstruction cannot be reasonably avoided or removed.
5. As outlined in the Institute of Public Works Engineering Australasia (IPWEA) subdivision guidelines, Liveable Neighbourhoods, Austroads Standards Main Roads standard, supplement, policy or guideline and/or any applicable or relevant local government standard or policy.

Appendix E:

Evacuation Time Analysis (PJA, 2026)

Technical Note

Project: Carabooda Fire Evacuation

Subject: Evacuation time analysis

Client:	Acumen		
Project No:	06824	Version:	B
Document Ref:	06824-0-TP-TN-Evacuation Note	Author:	Tanya Moran
Date:	25/05/2026	Approved:	Will Finlay

PURPOSE

This evacuation feasibility assessment sets out a logical, engineering-based evacuation sequence for approximately 9,200 vehicles exiting the Carabooda District Structure Plan (DSP) area via existing six road access points under a bushfire emergency scenario.

It logically demonstrates that a full-site evacuation of approximately 9,200 vehicles can be achieved within a 60 to 120 minute operational window, based on defined discharge rates at the six access points.

The assessment explicitly accounts two of the six access points that will be operating as signalised intersection via one existing four-leg signalised intersections (ie. Karoborup Road / Romeo Road / Wanneroo Road) and one future three-leg signalised intersections (ie Nowergup Road / Wanneroo Road).

It demonstrates that, even with signal control effects (assuming NO intersection control to prioritise outbound flow, including signal override manual control which would occur in an emergency via the Main Roads WA Traffic Control Centre), evacuation of approximately 9,200 vehicles can be safely achieved within 120 minutes, based on clearly defined and justified assumptions.

Demand assumption

- Total evacuation demand: 9,200 vehicles
- Even distribution assumption: 1,500 to 1,600 vehicles per exit (nominal).

This assumption represents a conservative whole-of-site evacuation, noting DFES advice that full evacuation of all 9,200 homes at the same time is unlikely and staged relocation may occur.

Western Environmental Bushfire Consultant has confirmed the following:

On the 26th of March 2025, the DFES District Officer (DO) Shaun Champ advised DPLH and the project team that only the first two rows of houses along the eastern interface would likely need to be evacuated, and that evacuation would most likely be to non-bushfire prone areas within the subject site. Western Environmental Approvals Pty Ltd agrees with the DFES DO approach, as in our view, this presents a realistic evacuation and has been informed by a highly experienced DFES Incident Controller with significant experience in managing evacuations during bushfire events. There will be approximately 458 houses in the first two rows of houses at the eastern interface of the subject site, with evacuation timings documented in the existing Bushfire Management Plan. That practical description of a real evacuation scenario makes the overall site evacuation analysis irrelevant, however the fact that complete evacuation can be achieved within 2 hours on a half exit points available scenario is a very efficient evacuation.

The exit analysis is presented graphically across three scenarios:

- *All exit points open and available*
- *Half exit points to north available*
- *Half exit points to south available*
- *These are shown on red arrow labels.*

The access for firefighting appliances to fight any potential fire is also available via access points separate to the exit evacuation routes, shown in blue arrows. These provide access to the eastern edge of the site and centrally via a 40 metre wide road reserve along McLennan Drive through the centre of the major conservation reserve. The availability of Lake Nowergup, (within a 4-minute return flight circuit) for major water bombing aircraft, is a powerful addition to the scenarios, Lake Nowergup is regularly utilised by fire fighting aircraft, that provides significant volumes of water bombing availability within minutes of a fire burning adjacent to the DSP area (as observed by the project proponents).

Key assumption 1 – Priority-controlled exit discharge rate

Based on:

- Discharge rate per exit: 1 vehicle every 2 seconds.

This is standard transport engineering practice and is equivalent to 1,800 vehicles per hour per lane per exit.

- Number of priority-controlled exits: 4

This equates to:

- 0.5 vehicles per second per exit
- 2 vehicles per second across the network.

Or put another way:

- $0.5 \text{ veh/sec} \times 4 = 2 \text{ veh/sec}$
- $2 \text{ veh/sec} \times 3600 = 7,200 \text{ vehicles per hour}$
- $9,200 / 7,200 = 1.28 \text{ hours} \approx 77 \text{ minutes (theoretical clearance time)}$

Key assumption 2 – Signal -controlled exit discharge rate

In Austroads and SIDRA-based practice, “throughput” of vehicles for a signalised intersection is typically expressed as practical capacity (veh/h) derived from:

- Saturation flow rate (s) per lane (veh/h/lane)
- Effective green time ratio (g/C) for each movement or phase
- Number of lanes serving each movement

Capacity = $s \times (g/C) \times n$

- $s \approx 1,800 \text{ to } 2,000 \text{ veh/h/lane}$ (ideal conditions, urban arterial)
- g/C typically 0.25 to 0.55 depending on signal phasing complexity
- n = number of lanes for that movement

For a 4-leg signalised intersection with 2 through lanes per approach (Karoborup Road), separate left- and right-turn pockets (1 lane each) and fully controlled protected right turns, the baseline saturation capacity per approach (under ideal conditions) is:

Movement Type	Lanes	Saturation Flow (veh/h)
Through	2	3,600 - 4,000
Left Turn	1	1,600 - 1,900
Right Turn	1	1,600 - 1,900

So theoretical total discharge per approach is **6,800 – 7,800 veh/h per approach (unconstrained)**. However, as the Left and Right turn lanes are short lanes, the theoretical total discharge would be restricted and the theoretical total discharge for the approach would be 3,600 – 4,000 veh/h, which is already ~40% of the 9,200 vehicles that could evacuate in 60 minutes if only Karoborup Road exit to Romeo Road / Wanneroo Road was available.

Notwithstanding, if we assume due to signal phasing (ie no manual override from Main Roads which would actually occur in an emergency), the intersection-level throughput is assumed constrained by green time allocation, not just lanes.

Karoborup Rd eastern leg:

- 4-leg intersection
- Karoborup Road east leg assume 2 through lanes, channelised left-turn slip lane, 1 right-turn lane
- Major road (Wanneroo Rd) dominates green time allocation, implying the eastern leg is a minor approach competing for green time
- Assuming a very low clearance for east approach, say only 30% of cycle time
- Right turn requires protected phase which adds extra phase or reduces usable green
- Through dual-lane discharge

Then the likely practical throughput (east leg out of intersection) is 700 to 1,200 veh/h (order of magnitude). **Adopted signalised exit capacity: $0.3 \times 7800 = 2,340$ vehicles per hour.**

These values align with Austroads and SIDRA-based practice for multi-phase signalised intersections.

Nowergup Rd eastern leg:

Assume as above for Karoborup Road minor leg but 40% green time, given three leg approach and 1 left turn lane and 1 right turn lane only. $0.4 * (1900 + 1900) = 1,520\text{vph}$ vehicles per hour.

SUMMARY:

- 4 uncontrolled exits 7,200 vehicles per hour.
- 2 signalised exits clears 3,860 vehicles per hour.
- TOTAL = 11,060 vehicles in one hour. This exceeds the 9,200 vehicles assumed to all leave the 920Ha area at the same time.

CONCLUSIONS

1. With four non-signalised exits and two signalised intersections, total effective capacity is approximately 11,060 vehicles per hour.
2. This results in a theoretical clearance time of approximately 50 minutes for 9,200 vehicles.
3. A 120-minute evacuation timeframe suggested by DFES is therefore robust, conservative, and defensible, even with signalised intersection constraints.
4. A staged, prioritised evacuation sequence is more realistic and would reduce congestion and improve safety outcomes.
5. Full-site clearance is achievable within approximately 60 minutes under uncontrolled conditions with 6 exits, or 85 minutes with only 4 western exits.
6. If under controlled evacuation conditions with priority given to outbound flow via Main Roads WA Traffic Control Centre, the time could be much less, OR, cater for more vehicles exiting in the hour.
7. The six access point network provides sufficient redundancy and capacity to evacuate 9,200 vehicles under a bushfire scenario.
8. From a transport engineering perspective, the network has sufficient capacity, redundancy and operational flexibility to safely support evacuation within the nominated timeframe.

Main Roads WA Traffic Control Centre

The Road Network Operations Centre (RNOC) is the state-of-the-art facility operated by Main Roads Western Australia, located in the Perth CBD. It operates 24/7 to monitor and manage traffic flow, respond to incidents, across the metropolitan and regional road networks.

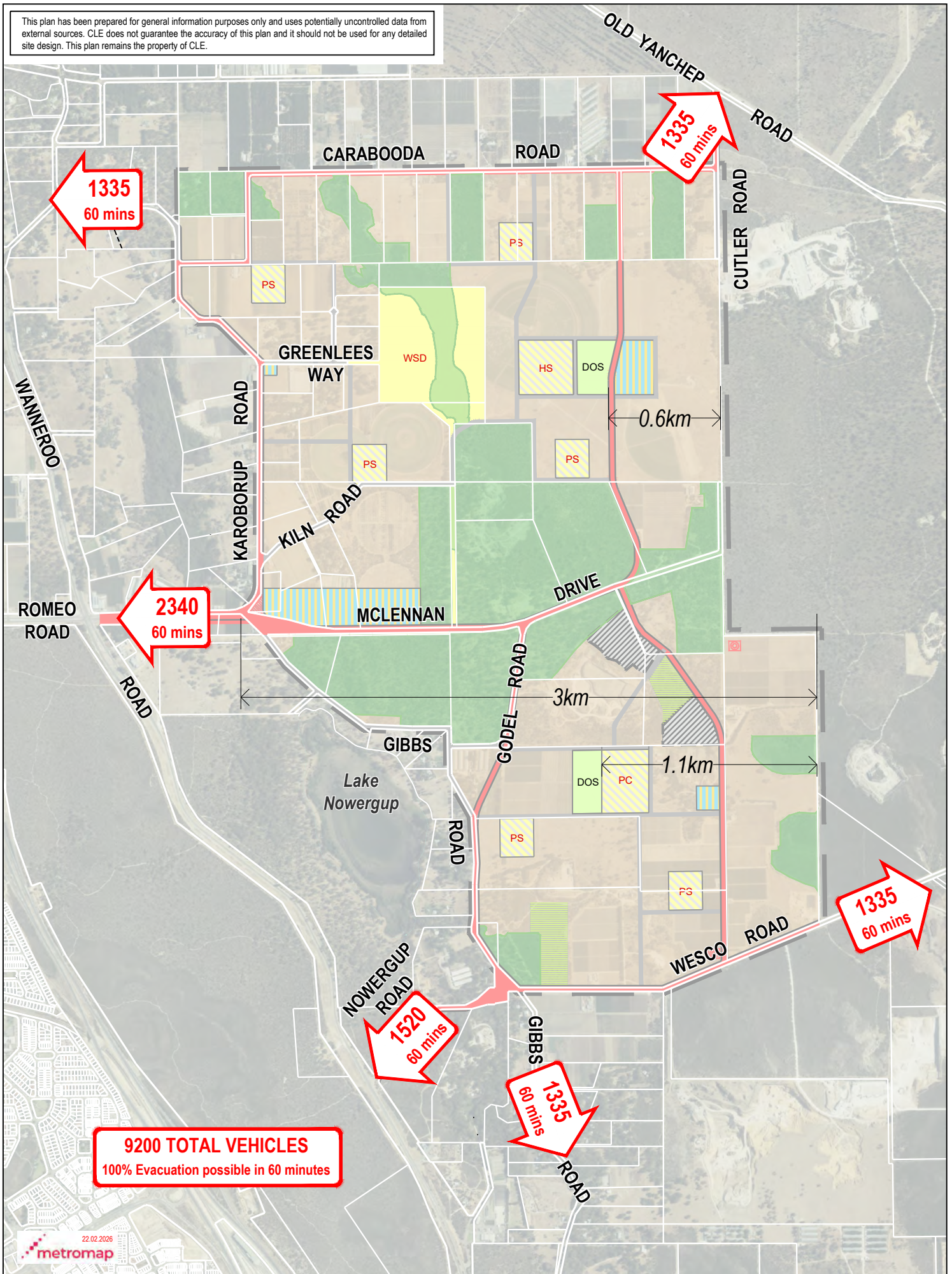
The Operations Centre uses a range of advanced technologies to gather real-time traffic data. It uses that information to detect and respond to incidents, change speed limits and activate ramp signs, which in turn keeps traffic flowing.

Information about the live state of the road network comes from a range of sources, with signals from more than 3000 sensors, 400 CCTV cameras and more than 500 Bluetooth beacons across Perth and WA feeding into the Operations Centre computers every second of the day. The sensors at the stop line of traffic signals send data about how busy each lane is which allows RNOC to adjust the signal timings depending on how busy each movement through an intersection is, such as an emergency evacuation.



Appendix A Evacuation Plans

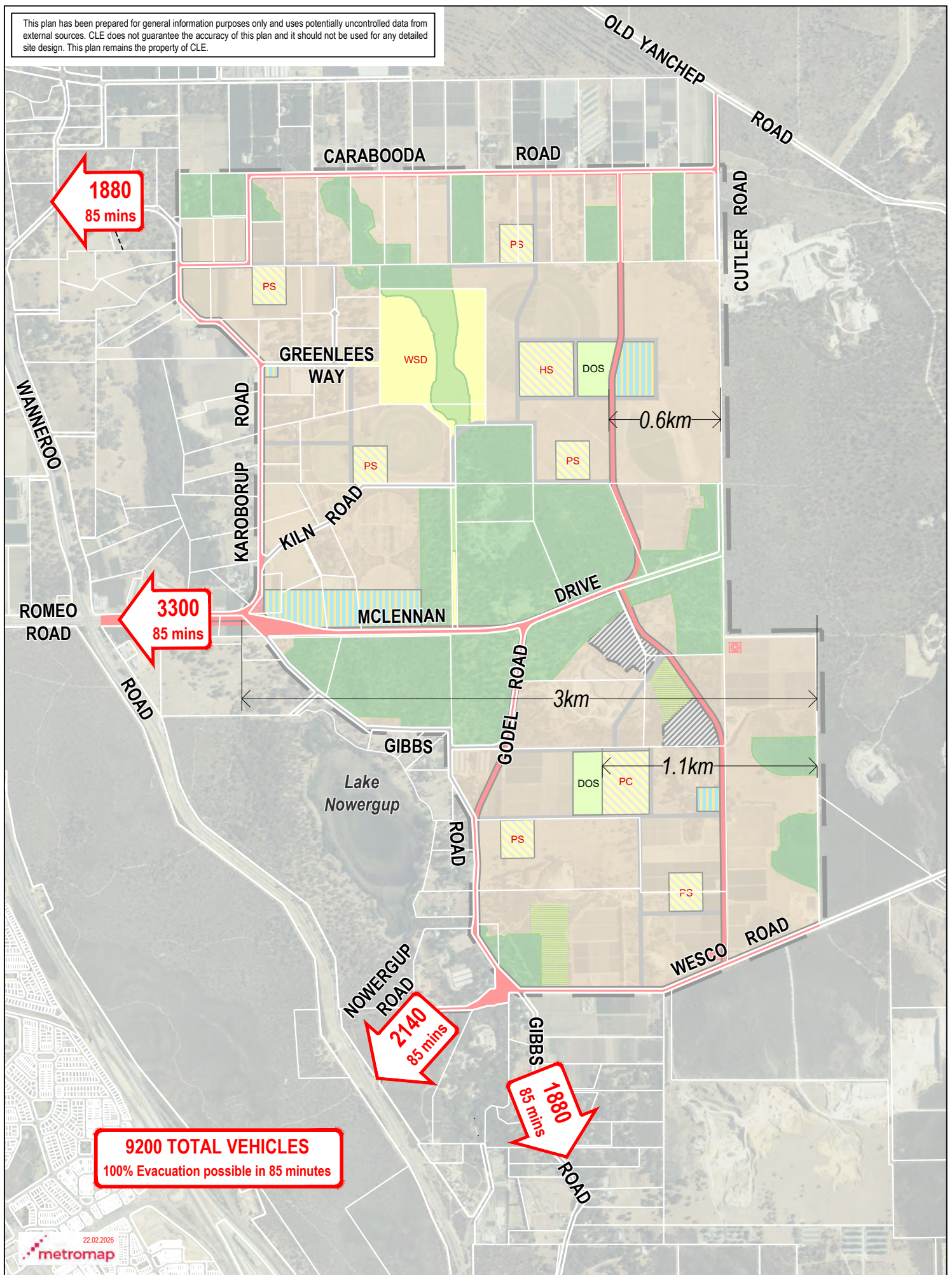
This plan has been prepared for general information purposes only and uses potentially uncontrolled data from external sources. CLE does not guarantee the accuracy of this plan and it should not be used for any detailed site design. This plan remains the property of CLE.



22.02.2026
metromap

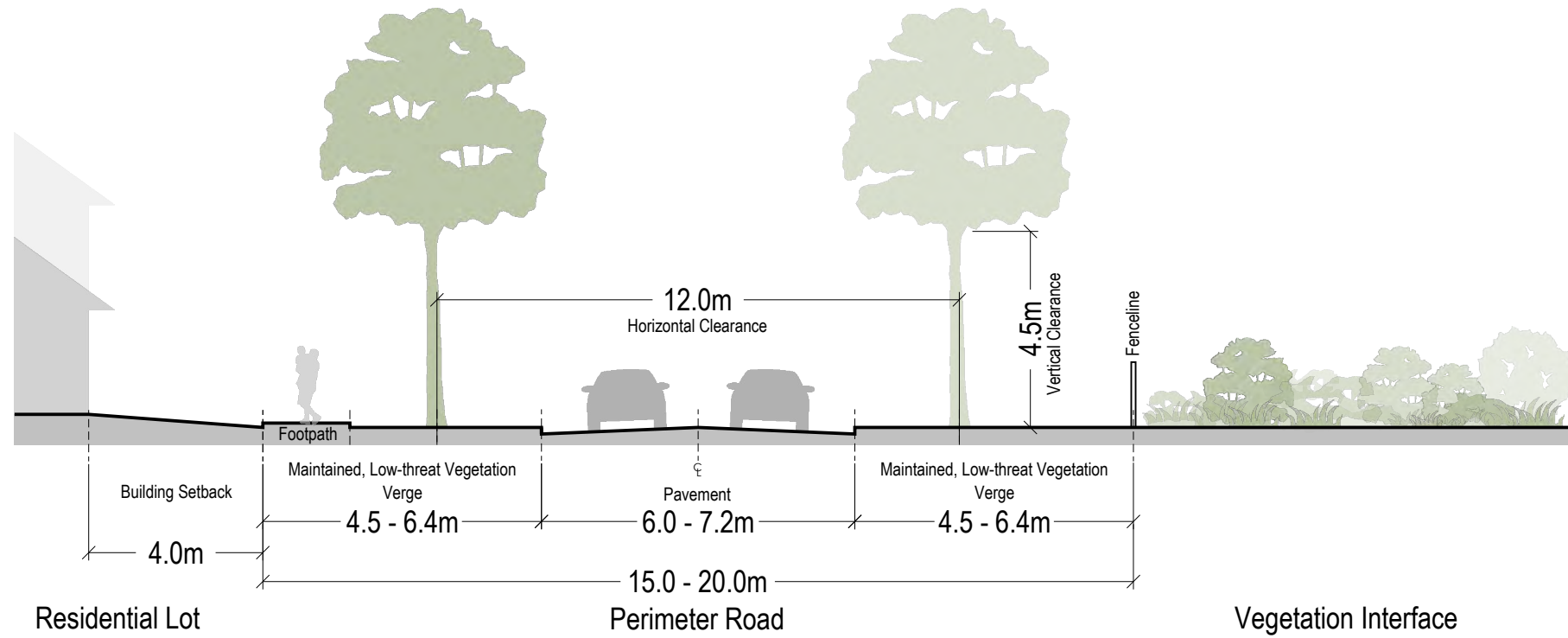


This plan has been prepared for general information purposes only and uses potentially uncontrolled data from external sources. CLE does not guarantee the accuracy of this plan and it should not be used for any detailed site design. This plan remains the property of CLE.

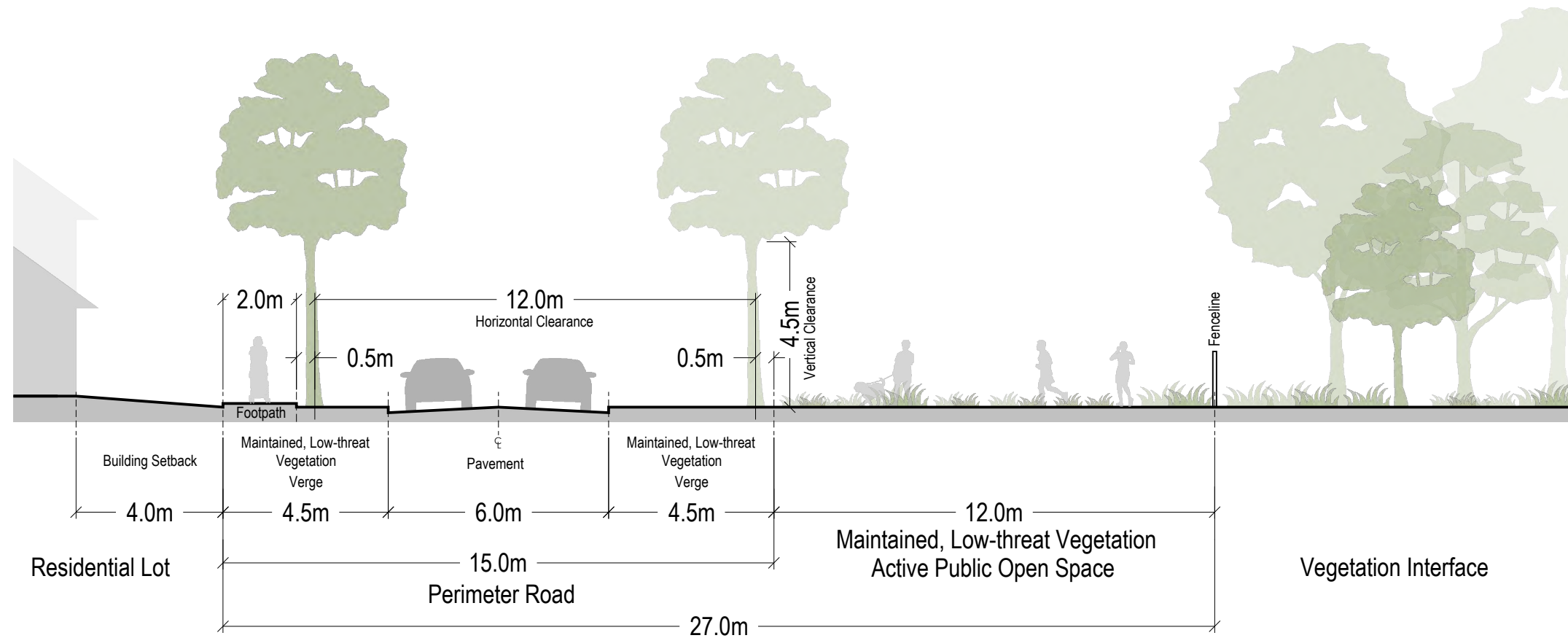


Appendix F:

Indicative Hazard Separation



Eastern Interface



Conservation POS

