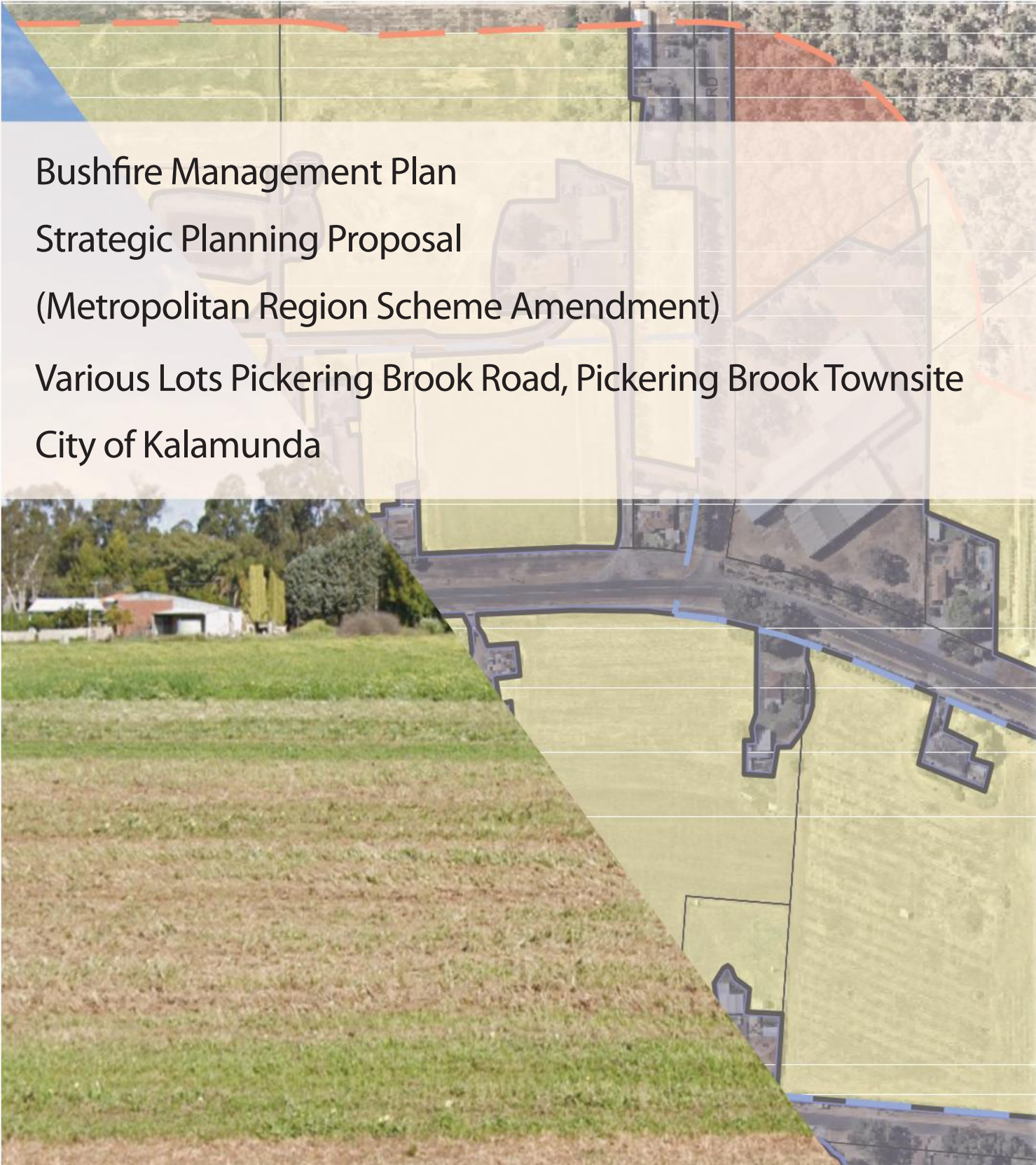




Bushfire Management Plan

Strategic Planning Proposal

(Metropolitan Region Scheme Amendment)

Various Lots Pickering Brook Road, Pickering Brook Townsite

City of Kalamunda

Prepared for: City of Kalamunda

Prepared by: Allering and Associates

JUNE 2026



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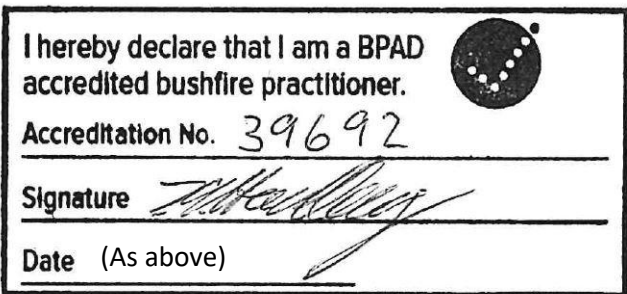
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1.0 EXECUTIVE SUMMARY

This Bushfire Management Plan (BMP) has been prepared to support the City of Kalamunda's request to initiate an amendment to the Metropolitan Region Scheme (MRS) to rezone thirteen lots (approximately 14 hectares) in the Pickering Brook townsite from Rural to Urban. The proposal would facilitate future residential subdivision of approximately 44 unsewered lots of around 2,000m² each, adjoining the existing townsite. The subject land is within a Priority 2 Public Drinking Water Source Area (Middle Helena Catchment) and is mapped as Bushfire Prone Area (Area 2) under State Planning Policy 3.7: Bushfire (SPP 3.7).

The proposal sits within an area previously considered for townsite expansion, which was refused in 2017 largely due to extreme bushfire risk, strategic planning considerations and water management constraints. Following subsequent State Government work (including the Pickering Brook and Surrounds Sustainability and Tourism Strategy and identification of the area as "Urban Investigation" in the Perth and Peel@3.5 Million/North-East Sub-regional Planning Framework), the Western Australian Planning Commission (WAPC) considered a request to initiate the amendment on 28 January 2026 and deferred its determination for six months pending additional information. In particular, the Department of Fire and Emergency Services (DFES) objected on the basis that the townsite is isolated, that evacuation options have not been demonstrated, and that risk to life and property is unacceptably high and cannot be adequately managed or mitigated.

This BMP responds directly to the WAPC's deferral requirements and addresses matters raised by DFES and the independent peer review (Meridian Urban).

The Broader Landscape Assessment determines the surrounding area to be Broader Landscape Type B, reflecting extreme landscape-scale bushfire potential. While this outcome triggers a presumption against further intensification unless an outcomes-based case can be demonstrated, it is not an automatic refusal under SPP 3.7. Accordingly, this BMP provides an outcomes-based approach to demonstrate how bushfire risk can be reduced to the lowest practicable level, including through coordinated townsite-scale mitigation measures, demonstrated efficient and effective access and egress, targeted vegetation management to achieve BAL outcomes at the lot and interface scale, and enhanced water supply arrangements for firefighting (including consideration of strategic water storage). The intent is to show that the expansion of the townsite will deliver improved bushfire resilience for the existing Pickering Brook community.

2.0 PROPOSAL DETAILS

2.1 Background

In 2017, the Western Australian Planning Commission (WAPC) refused a larger proposal to rezone approximately 90 hectares of land to expand the Pickering Brook townsite. The current proposal is located within part of this previously refused area.

Reasons for refusal included:

- The area not being supported for urban expansion.
- Extreme bushfire risk.
- Non-compliance with State Planning Policy 3.7: Bushfire (SPP 3.7).
- Lack of an approved District Water Management Strategy.

Following this refusal, a State Government Taskforce was established to consider six scenarios for expansion of the Pickering brook townsite and options for economic diversification of the Pickering Brook precinct. As a result of this work, the WAPC produced the Pickering Brook and Surrounds Sustainability and Tourism Strategy.

As part of this Strategy, a bushfire management plan (BMP) was prepared by Emerge Associates for the Department of Planning, Lands and Heritage, in 2020. This BMP was prepared under SPP 3.7 (2015).

The Government supported the Taskforce's recommendation that the site be considered for urbanisation, and the Perth and Peel@3.5Million/North-East Sub regional Planning Framework identified the site as "Urban Investigation", with bushfire risk and protection of the Middle Helena Catchment Drinking Water Resource to be addressed.

Following the adoption of the Strategy, the City of Kalamunda prepared an amendment to the Metropolitan Region Scheme (MRS) to rezone thirteen lots (approximately 14 hectares of land) in the Pickering Brook townsite from Rural to Urban to enable future residential development, consisting of about 44 unsewered residential lots of approximately 2,000 m² each. A request to initiate the amendment was considered by the WAPC on the 28 January 2026.

The Department of Fire and Emergency Services (DFES) objected to the proposal on the basis that the area is subject to an extreme bushfire hazard, that the Pickering Brook townsite is isolated, surrounded by unmanaged forest vegetation and steep terrain, and has limited evacuation options. DFES concluded that the proposal does not comply with SPP 3.7, and that the risk to life and property is unacceptably high and cannot be adequately mitigated.

The report recommended that the MRS amendment, not be initiated on the grounds that:

1. It does not satisfactorily address the "Urban Investigation" criteria in the Perth and Peel@3.5Million/North-East Sub Regional Planning Framework;
2. It does not comply with the requirements of SPP 3.7, as an extreme bushfire hazard exists making the location unsuitable and inappropriate for urban intensification; and
3. It does not comply with the requirements of State Planning Policy 2.9 – Water as unsewered residential development is proposed over a Priority 2 Public Drinking Water Source Area.

However, members outlined the following reasons for deferring consideration of the MRS Amendment:

- The City of Kalamunda indicated a willingness to undertake further investigations and provide additional reporting, particularly in response to concerns raised by DFES and the revised planning framework.
- The BMP needs to be updated by the City to address the findings of the independent peer review and the latest advice from DFES.
- The zoning requirements and permissible land uses relating to the BMP need to be reassessed. This includes ensuring that any proposed changes are consistent with the revised planning framework and address the bushfire issues raised by DFES and the requirements of SPP 3.7, including location and the need for a Broader Landscape Assessment, vehicle access and evacuation and water supply matters.
- There is also a need for the City to address the on-site effluent disposal concerns raised by the Department of Water and Environmental Regulation (DWER), DPLH, and the Department of Health, particularly regarding development within a Priority 2 Public Drinking Water Source Area and the ground water table levels.

- The City is required to address the broader landscape aspects of the proposal, ensuring that location within the broader landscape and environmental factors are adequately considered.
- DFES has raised the extreme risk represented by the proposal, with their current advice outlining that the risk cannot be mitigated, presenting a significant challenge for the City to address in their further investigations.

Subsequently, the WAPC resolved to defer the item, as detailed in the report dated 28 January 2026 for 6 months, pending:

1. Additional information being submitted by the City of Kalamunda in response to bushfire concerns which have been raised by DFES and the updated SPP 3.7.
2. Additional information being submitted by the City of Kalamunda in response to on-site effluent disposal concerns raised by the DWER, Department of Health and Water Corporation.

2.2 Purpose of the BMP

This BMP has been prepared in response to the WAPC determination.

The BMP has been prepared in accordance with SPP 3.7 and the Planning for Bushfire Guidelines (Guidelines), which require assessment against Section 4 (Strategic Planning) of the Guidelines, including consideration of Element 1: Location through an assessment of the broader landscape.

In accordance with SPP 3.7, the BMP also considers opportunities to minimise unnecessary clearing of native vegetation within the site. The BMP identifies bushfire hazard issues arising from the Bushfire Hazard Level (BHL) assessment and the surrounding broader landscape and assesses the proposal against the bushfire protection criteria requirements contained within the Guidelines, demonstrating compliance.

The BMP builds on the BMP and Risk Assessment that were prepared by Emerge Associates to support the MRS Amendment. The BMP addresses the comments that were made against the Emerge BMP by DFES and in the peer review provided by Meridian Urban. These concerns are detailed below and addressed within the BMP.

2.2.1 DEFS Comments

DFES comments dated 30 June 2025, in response to the MRS amendment included:

Bushfire Risk and Landscape Context

- Extreme Risk Landscape: The area is surrounded by unmanaged forest vegetation on steep slopes, creating a high bushfire risk that cannot be adequately mitigated.
- Broader Landscape Type: DFES categorizes the area as Broader Landscape Type 'B' or 'C', which represents an extreme bushfire risk. This classification presumes against development or intensification of land use.
- Catastrophic Potential: The topography and vegetation present a risk of catastrophic-scale destruction from bushfires, making the location unsuitable for urban intensification.

Bushfire Management Plan Concerns

- Risk Assessment: DFES disagrees with the BMP's conclusion that the overall bushfire risk is 'medium.' The reduction of the consequence level from 'catastrophic' to 'minor' is deemed unsupported by evidence.

- **Evacuation Challenges:** The BMP does not adequately address evacuation planning, including simultaneous evacuation of residents and visitors alongside emergency service access.
- **Traffic Studies:** The traffic impact assessment used in the BMP is a general study and not fit-for-purpose for emergency evacuation scenarios.
- **Place of Last Resort:** The use of the Pickering Brook Primary School as a community safer place is not supported due to its small size, hazardous surroundings, and lack of compliance with bushfire standards.

Compliance with SPP 3.7 Bushfire

- DFES states that the proposal does not comply with SPP 3.7, which requires strategic planning proposals to avoid increasing bushfire threats to people, property, and infrastructure.
- **Bushfire Protection Criteria:** Compliance with the bushfire protection criteria, including location, siting and design, vehicular access, and water supply, has not been demonstrated.

Element 1: Location

- The area is isolated, with indirect road networks and continuous tracts of vegetation, making it unsuitable for intensification.
- Clearing vegetation to achieve a BAL-29 rating is insufficient to mitigate the broader landscape risks.

Element 2: Siting and Design

- Proposed lot layouts do not ensure that all lots achieve a BAL-29 rating or lower.
- Vegetation exclusions (e.g. orchards) is not supported unless evidence confirms they are managed to low threat levels.

Element 3: Vehicular Access

- Existing road networks do not meet standards for safe evacuation and emergency service access.
- Reliance on indirect routes and vegetation along evacuation paths exacerbates risks.
- The BMP's reliance on a shelter-in-place strategy (e.g., the school) is not supported as a substitute for compliant access and egress.

Element 4: Water Supply

- Concerns about the adequacy of water supply for firefighting during emergencies.
- Risks associated with the townsite's primary water source being located in a high-risk area.

Vulnerable Land Uses

- DFES opposes the inclusion of vulnerable land uses (e.g., aged care, short-stay accommodation) in the area due to increased risks and reliance on emergency services.

DFES Recommendations for Additional Work

- **Outcomes-Based Approach:** DFES recommends an Outcome-Based Approach to justify the proposal and demonstrate mitigation measures.
- **Evacuation Traffic Modelling:** A fit-for-purpose traffic study is required to assess evacuation scenarios and road network performance during emergencies.

- Policy Alignment: Future planning must align with updated SPP 3.7 (2024) and address all bushfire protection criteria.

2.2.2 Meridian Urban Comments

Meridian Urban provided the following comments in the peer review of the Emerge BMP:

- Without further evidence or traffic modelling from an emergency evacuation perspective, the evacuation context of the existing community of Pickering Brook Townsite (and surrounds) against an expanded townsite cannot be determined.
- Bushfire behaviour, smoke and ember density modelling has not been undertaken and thus, has not informed consideration of potential bushfire attack on the townsite, or the ability to evacuate.
- With regard to the nomination of a place of last resort within the townsite, further investigation at a policy level may be required. Whilst these options can be beneficial, they are routinely misunderstood by the community. Survival at a place of last resort cannot be guaranteed.
- It is the view of this peer review that the identification of a place of last resort is not of a sufficient magnitude to warrant a residual risk level of 'minor' for evacuation risks.
- the potential for vulnerable activities including aged care, child care centres and some forms of community facilities may also need to be contemplated for avoidance in Pickering Brook.

Roads and evacuation

Several matters are unclear in relation to the road access and evacuation considerations of the report. These include:

- the speed of vehicles in an emergency is reduced;
- assumptions of how many persons may be present (both in town and in the surrounding area), and how many may have left early, and how many vehicles may be evacuating in emergency conditions. Research suggests families evacuating will take all or as many vehicles as they can to evacuate, rather than travel together;
- intersection flows can change in an emergency (i.e. a higher percentage of vehicles turning left instead of right, etc.) at key locations, either as a result of decision making to evacuate or upon direction by emergency services;
- the traffic of the broader catchment and how it has been specifically considered, particularly whether increased traffic from the townsite could prevent left turns from Canning Road from the south and the potential for bottlenecking in this location as well as others throughout the area;
- the potential for bottlenecks to remain, with vehicles queued on the road network as radiant heat increases due to spot fires and/or as the fire front arrives;
- the potential for spot fires and smoke in the area to confuse drivers as to the location or direction of the fire front;
- the points at which, under modelled events, certain evacuation routes would be closed by emergency services, or become un-trafficable; and
- the potential for evacuating traffic from Pickering Brook to inadvertently impact the ability for evacuation from other nearby locations.

Overall, the peer review found that the evacuation considerations of the BMP should be continued to be built upon. Evacuation is a growing consideration for strategic land use planning, as it is directly associated with the analysis of potential risk to life.

In research undertaken in 2017, the New South Wales Rural Fire Service found:

- most people do not intend to leave before there is a fire on days of Catastrophic fire danger. Those who intend to leave will wait until there is a fire, and others intend to stay and defend, notwithstanding emergency services advice to leave early;
- 12 per cent of those interviewed left for a place of safety when they received a catastrophic fire danger warning (this almost matches the proportion of evacuees who left more than 8 hours in advance of fire arrival during the 2009 Victoria bushfires;
- only 12 per cent of interviewees stated they would leave early upon receiving a catastrophic fire danger warning next season. 24 per cent said they would wait and see if a fire started before leaving, 27 per cent said they would prepare to stay and defend and the final 24 per cent said they would wait for a fire to decide what action to take; and
- the analysis of interviewees determined that some people underestimate the risks to life and property if fire danger is not catastrophic.

Data such as this presents a conundrum of sorts from a planning perspective, on whether strategic planning decisions should be made based on emergency management policy, or the reality of human behaviour derived from research.

The peer review could not verify the accuracy of the assessment made in relation to evacuation without a fit-for-purpose bushfire evacuation traffic study. Such a study will need to be informed by technical bushfire planning input to guide the nature of inputs and assumptions used to perform evacuation traffic modelling.

Water and electricity

Water supply infrastructure and distribution are located west of the townsite (408 metres west of Weston Road at 310 m AHD). Two 225 KL cement tanks are located within a 1,800 sqm fenced compound set within forest vegetation.

In addition to risk of ignition, loss of electricity can create cascading risks for the community with the loss of reticulated water supplies if pump stations (which may not be relevant here as the system is gravity fed) also lose power, and impacts on the ability to receive emergency warnings. Depending upon the duration of power loss, battery back ups for mobile phone towers can expire.

The NBN, which relies on power at both ends of the network, will cease to operate upon battery back-up expiration. Battery back-up at the building end of the network is designed to last for a period of approximately four (4) hours. The risks and resilience of the electricity network should be contemplated as part of continued studies relating to Pickering Brook Townsite.

2.3 Location

The subject site is situated in the Pickering Brook townsite, approximately 19km east of the townsite of Kalamunda, 5.6 km and approximately 30 km east of the Perth central business district.

The site is located within the City of Kalamunda, approximately 26 kilometres east of the Perth CBD, and directly adjacent to the existing Pickering Brook townsite. Surrounding land uses include:

- The existing townsite to the east;
- Pickering Brook Golf Course to the south-west;
- Rural agricultural land to the north; and
- A-Class Crown reserves and Korung National Park, designated as Regional Open Space.

The land comprises approximately 14 mostly cleared rural lots and is located within a Priority 2 Public Drinking Water Source Area (Middle Helena Catchment).

A location plan is included at **Figure 1**.

2.4 Zoning and Land Use

The subject site is zoned 'Rural' under the MRS and 'Rural Residential' under the City of Kalamunda Local Planning Scheme No. 4 (LPS4).

As outlined on the DFES Western Australian Map of Bush Fire Prone Areas, the subject site is designated as Bushfire Prone Area 2 (refer **Figure 2**).

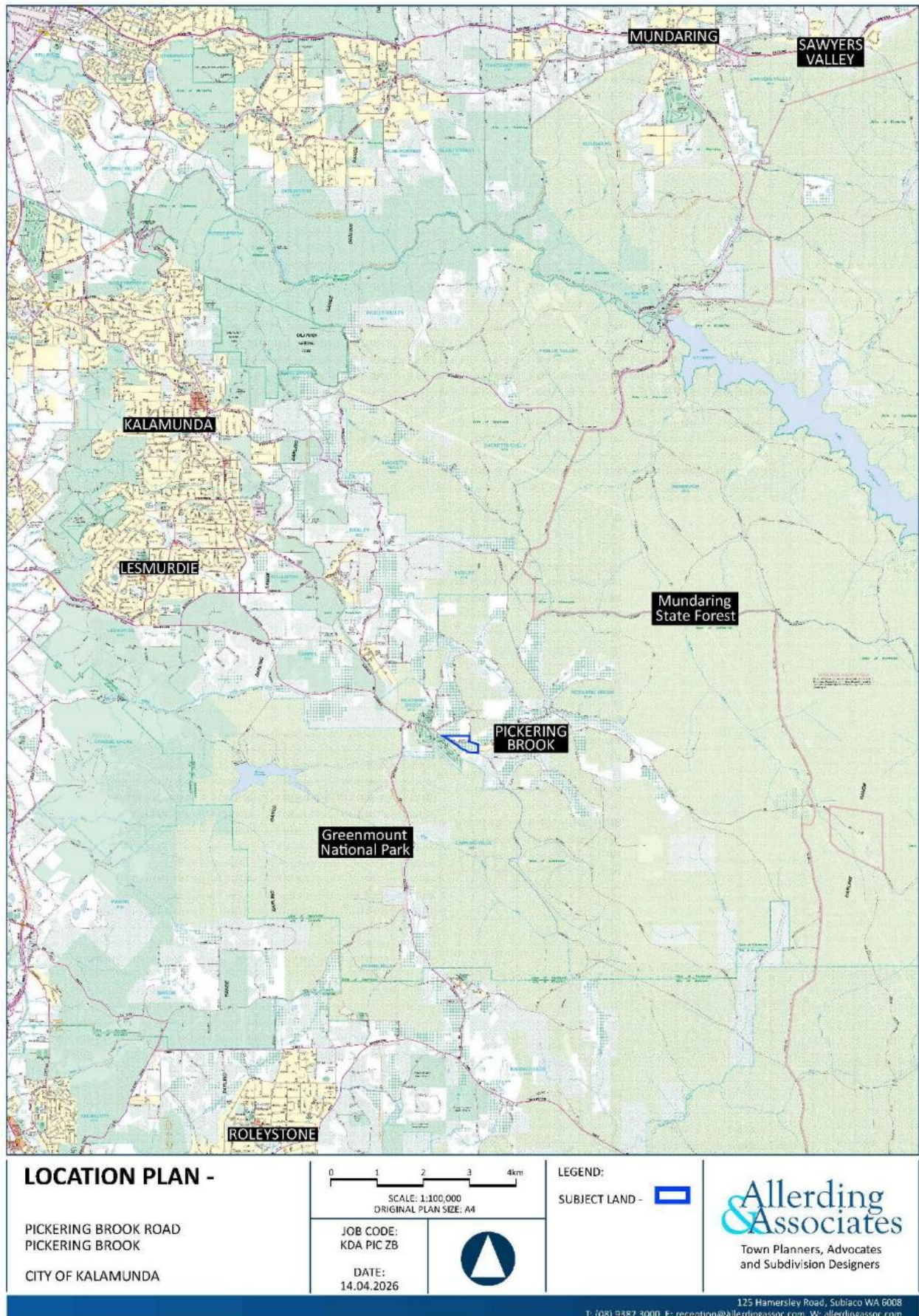


Figure 1 – Location Plan

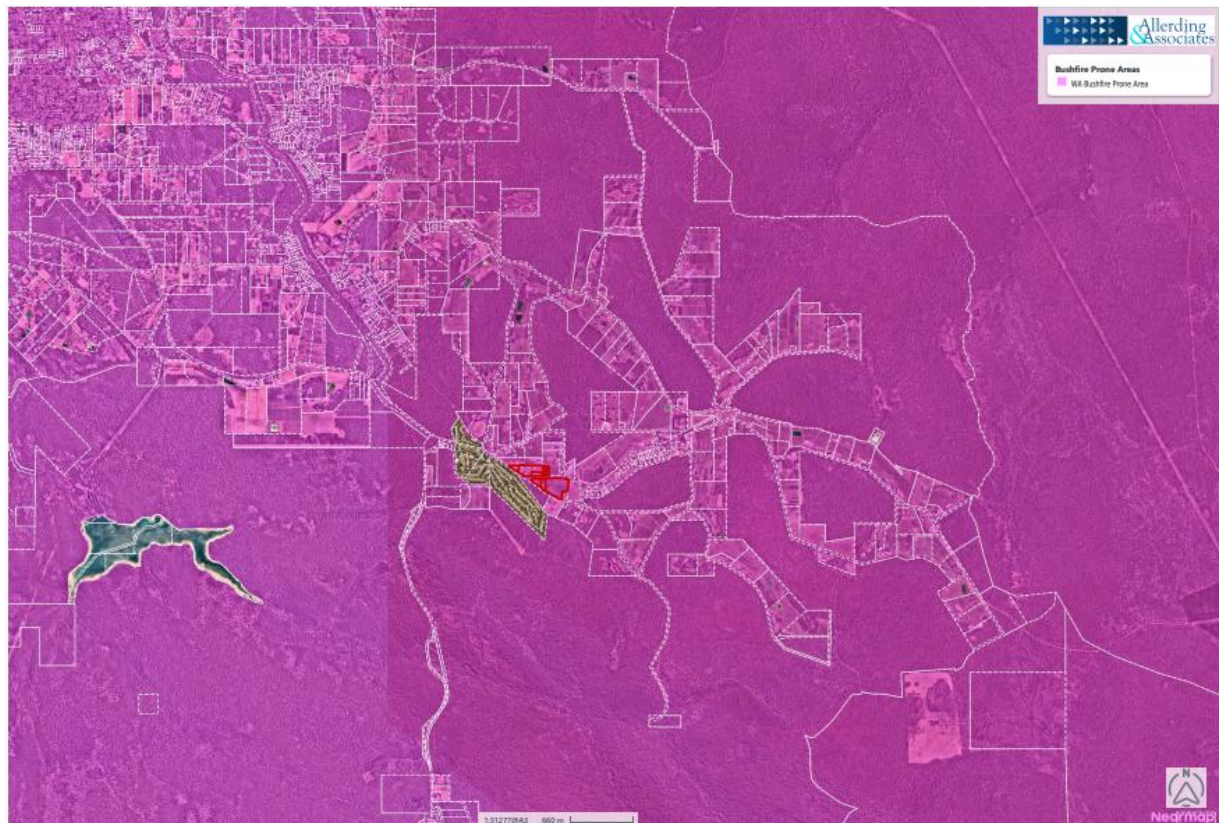


Figure 2 – Map of Bushfire Prone Areas (Source: MNG Maps 2025)

2.5 Overview of Proposal

The proposed MRS amendment seeks to rezone approximately 14ha in Pickering Brook from the Rural zone to the Urban zone. The amendment will facilitate the development of approximately 44 unsewered residential lots of approximately 2,000 m² each.

The Pickering Brook locality has a population of 570 people (2016 Census) and is comprised of primary production lots and rural lifestyle lots. The townsite comprises a cluster of 53 residential lots, mostly 2000m² each ('R5') in a double block located along Pickering Brook Road. The townsite includes the Pickering Brook Primary School.

2.6 Access

Vehicular access is via Canning Road from the south (via Stoneville) and Canning Road from the west (via Kalamunda), and also via Kalamunda to the west via Walnut Road, and then south on Patterson Road (refer **Figure 3**).

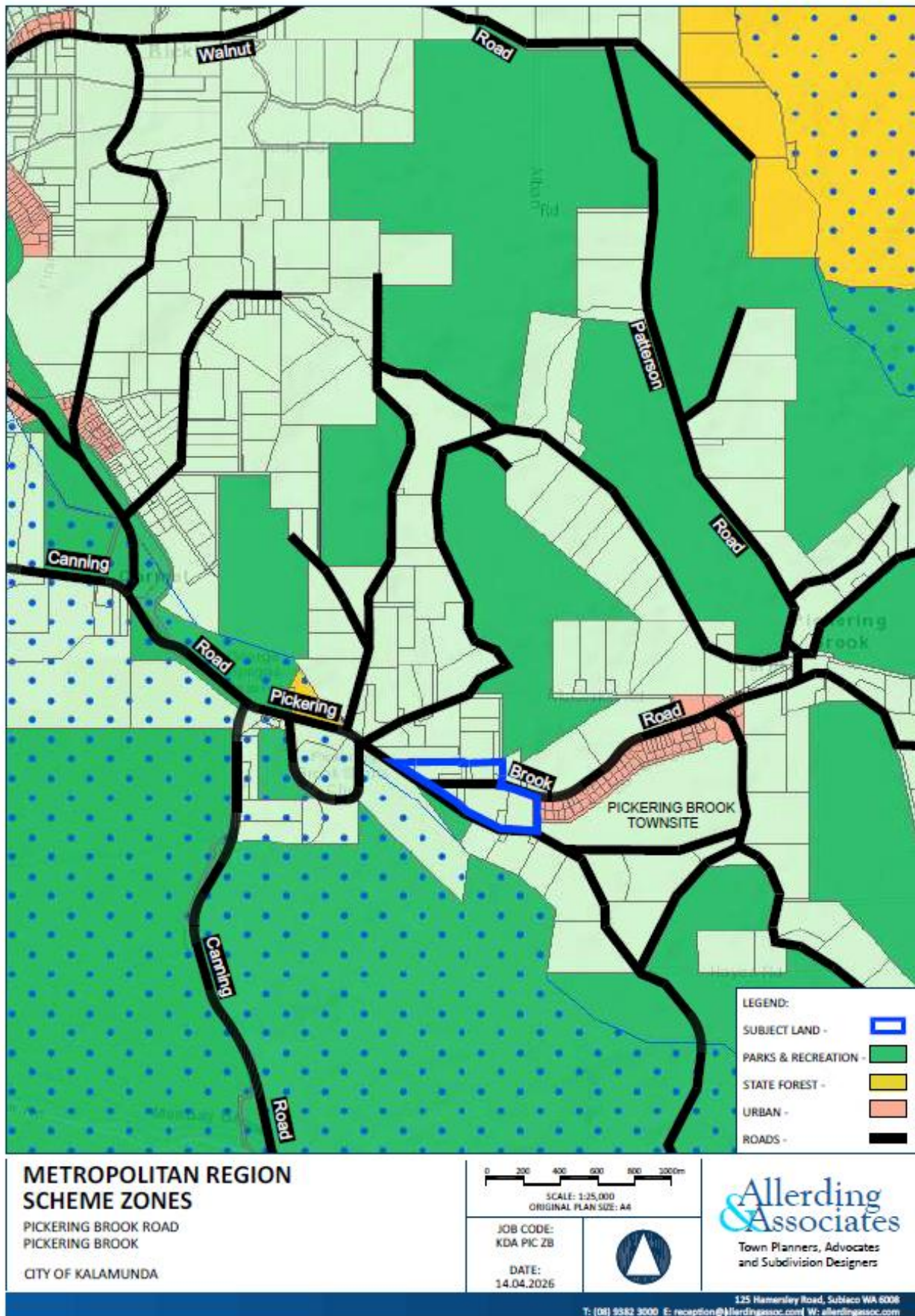


Figure 3: MRS and Road network

2.7 Water and Power Supply

The water supply infrastructure and distribution are located west of the townsite (408m west of Weston Road). Fire hydrants exist within road reserves of the Pickering Brook townsite and the City's Emergency Services team advise that there is sufficient capacity and pressure for firefighting purposes (refer to **Figure 4**).

The Water Corporation advised that the future subdivision of land can be provided with water services by the subdivider's undertaking extensions of water mains at their cost; and that depending on the proposed lots sizes and ultimate lot yield, the Water Corporation will need to revisit its water planning for Pickering Brook to determine what headwork upgrades will be required to the water storage tank, water transfer pumping, and the tank outlet mains serving the local Pickering Brook network.

The townsite is supplied by overhead power lines, 33 KV, that connect the town from Canning Road through to Pickering Brook Road or by Patterson Road.

Meridan Urban note the specific risk of ignition posed by above ground power lines, and in addition to the risk of ignition, loss of electricity can create cascading risks for the community with the loss of reticulated water supplies if pump stations also lose power, and impacts on the ability to receive emergency warnings. Meridan Urban also note that this may not be relevant as the system is gravity fed.

Depending upon the duration of power loss, battery backups for mobile phone towers can expire. The NBN, which relies on power at both ends of the network, will cease to operate upon battery back-up expiration. Battery back-up at the building end of the network is designed to last for a period of approximately four (4) hours (Meridian Urban: 2021).

The Emerge Associates BMP states that the main threat to the function of the road network is from trees and powerlines falling into the roadway and recommends that the power poles and overhead wires be reviewed for clearance from falling trees and branches to minimise the disruption of power to the townsite (Emerge Associates: 2020). This recommendation is supported.

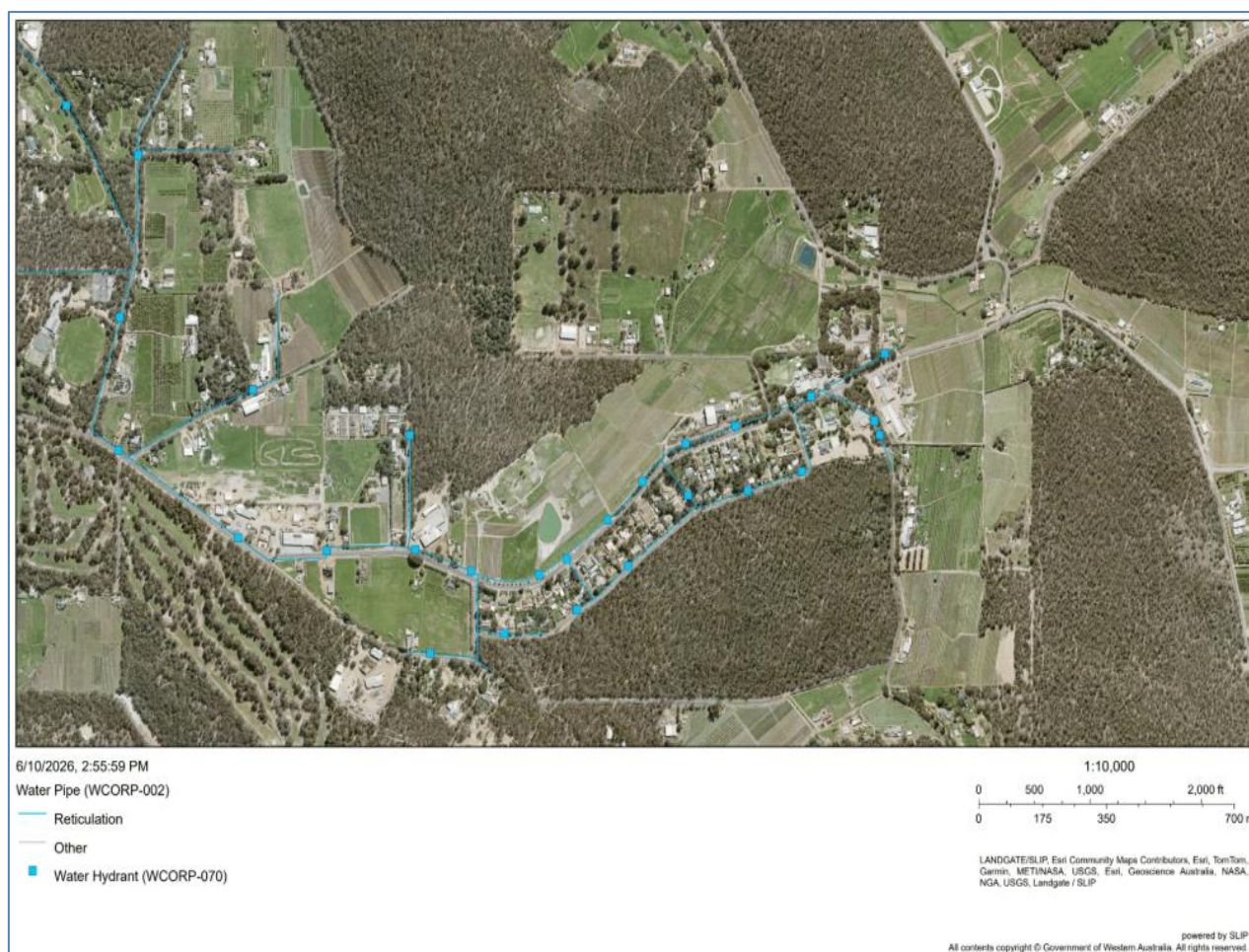


Figure 4: Water Hydrant Location

3.0 ENVIRONMENTAL CONSIDERATIONS

The subject site is mostly cleared, with only a limited number of mature trees remaining.

3.1 Native Vegetation – Modification and Clearing

A review of the publicly available databases has been undertaken. The review below does not include a detailed environmental assessment of any vegetation clearing and/or modification which may be required in road reservations for the purposes of upgrades to access routes to achieve compliance with the Guidelines.

Environmental feature	Occurrence within or in proximity to the subject site
BUSHFOREVER – DPLH-019	No Bush Forever sites are located within or adjacent to the site.
Conservation category wetland - Geomorphic Wetlands Swan Coastal Plain – DBCA -019	No wetlands have been identified within the site.
DBCA controlled lands or	No DBCA managed lands occur within the site.

waters - DBCA-011	
Environmentally Sensitive Areas (ESAs) – DWER-046	There are no ESAs identified within the site.
RASAR wetlands – DBCA- 010	No wetlands have been identified within the site.
Threatened and priority flora – DBCA-036	Potentially (subject to site specific assessment).
Swan Bioplan Regionally Significant Natural Areas 2010 - DWER-070	No Swan Bioplan Regionally Significant Natural Areas have been identified within the site.
Threatened and priority flora – DBCA-037	Potentially (subject to site specific assessment).
Threatened Ecological Communities (TECs) – DBCA-038	There are no threatened ecological communities identified within or adjacent to the site.
Waterways – DWER-031	There are no natural watercourses identified within the site. Piesse Gully is located to the north-east of the site.

3.2 Revegetation and Landscape Plans

No revegetation or landscaping is currently contemplated as part of the future redevelopment of the site.

4.0 BUSHFIRE ASSESSMENT RESULTS

4.1 Broader Landscape Assessment

As the subject site is designated as Bushfire Prone Area 2, an assessment of the broader landscape has been undertaken in accordance with Element 1: Location of the Guidelines to determine the broader landscape type. The broader landscape assessment has been undertaken in accordance with Appendix A.1 of the Guidelines with the results mapped in **Figures 5, 6 and 7** and the broader landscape type determined in **Table 1** based on the points-based system. The areas surrounding the subject site have been assessed as a Broader Landscape Type B. An outcomes-based approach is provided at **Section 8** of this BMP.

Table 1: Points Based System for Determining Broader Landscape Type

CRITERIA	5 POINTS	2 POINTS	1 POINT	POINTS
Proximity of the planning proposal to a suitable destination is:	>10km	1-10km	<1km	5
The road pattern from the planning proposal to a suitable destination is:	Complex and indirect (cul-de-sacs, and/or multiple intersections)	Mixed road patterns	Simple and/or direct (limited intersections)	1
The predominant vegetation pattern is:	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)	5
Exposure of the planning proposal to an identified external bushfire hazard (excluding Class G Grassland) is from:	Three or four aspects	Two aspects	From nil or one aspect only	5
TOTAL POINTS				
Total points	Broader landscape type			16
0 – 11 points	Broader landscape type A (BLT A)			☐
12 – 20 points	Broader landscape type B (BLT B)			☒
BROADER LANDSCAPE TYPE DETERMINED				

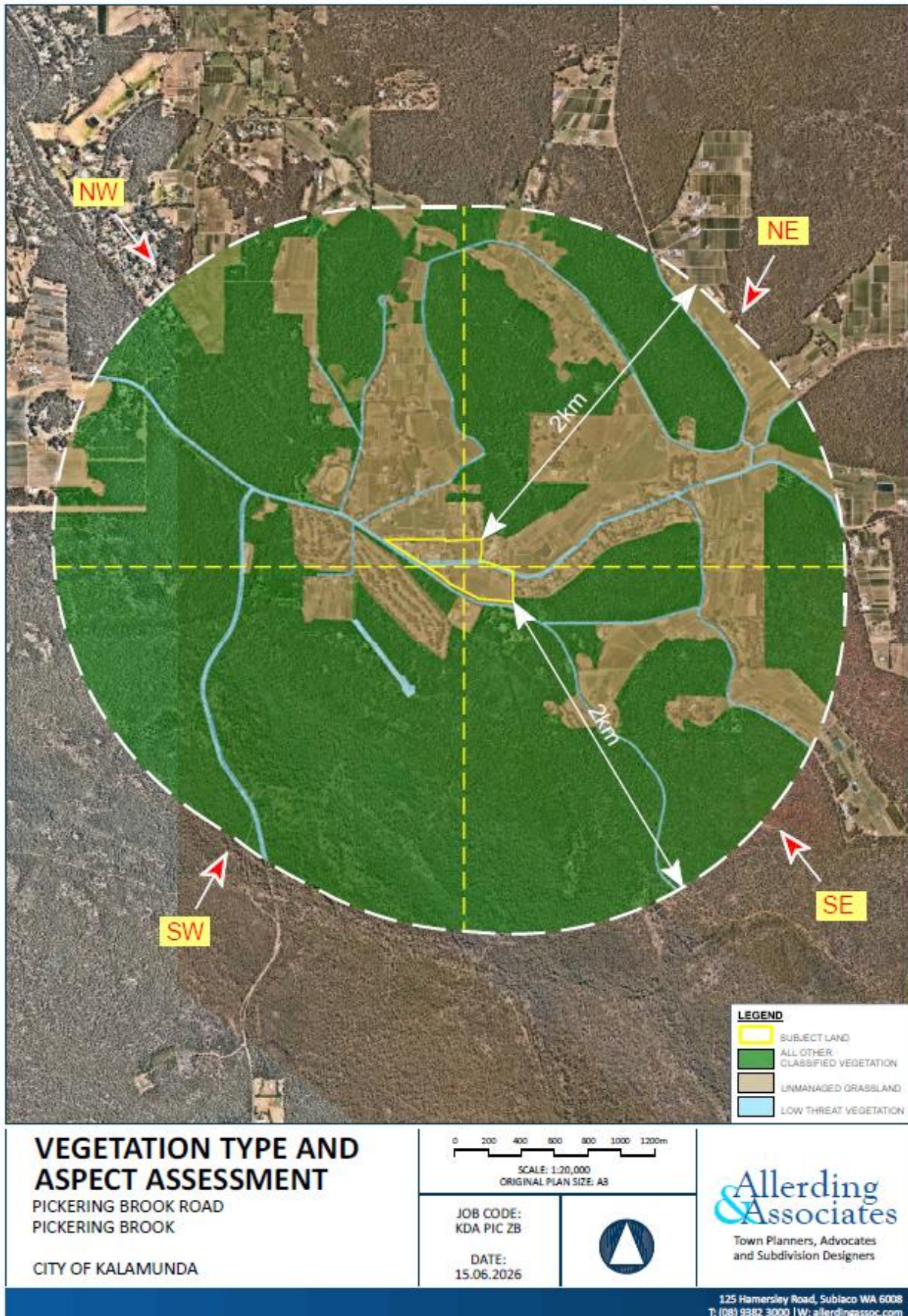


Figure 5 – Vegetation Type and Aspect

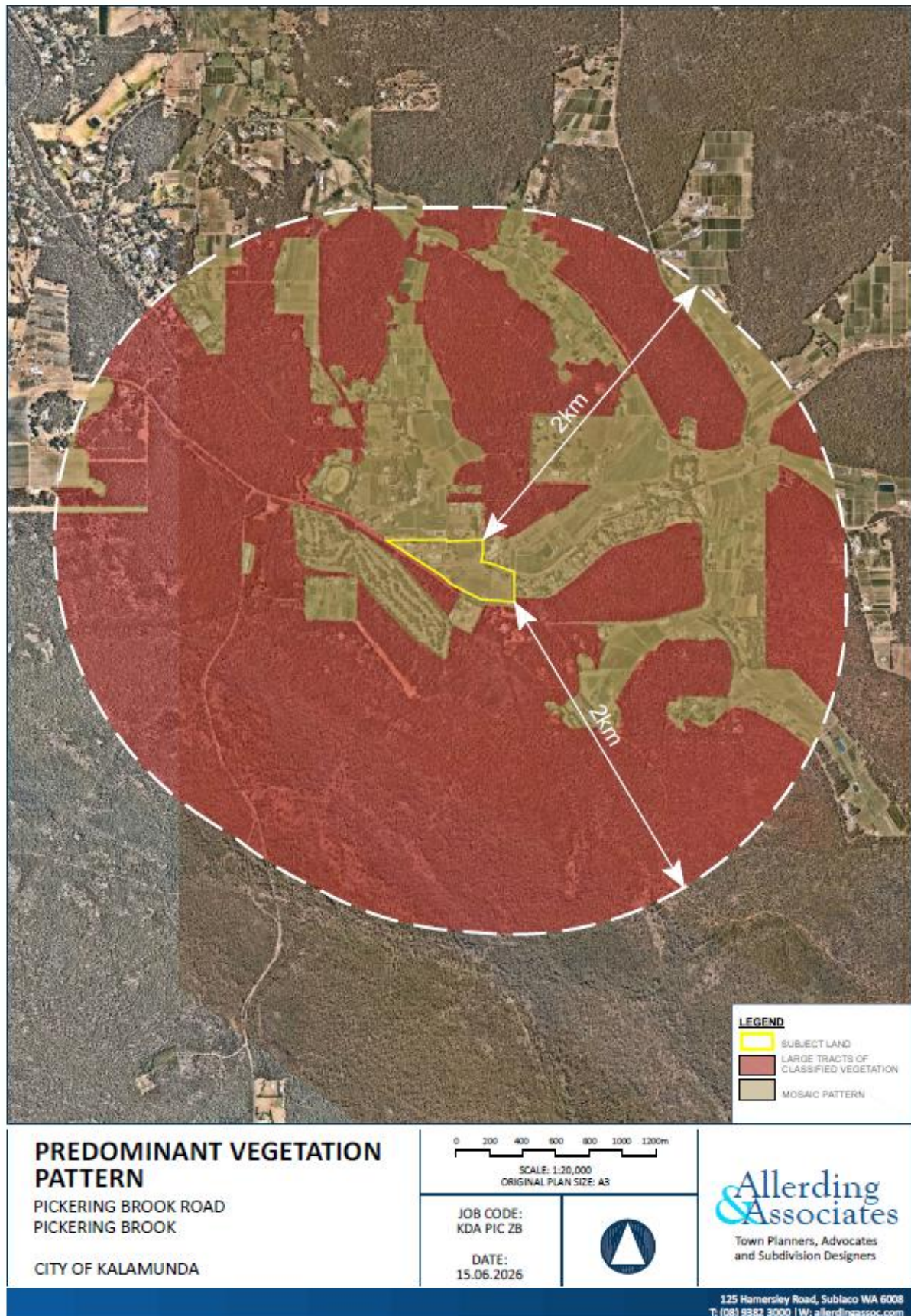


Figure 6 – Predominant Vegetation Pattern

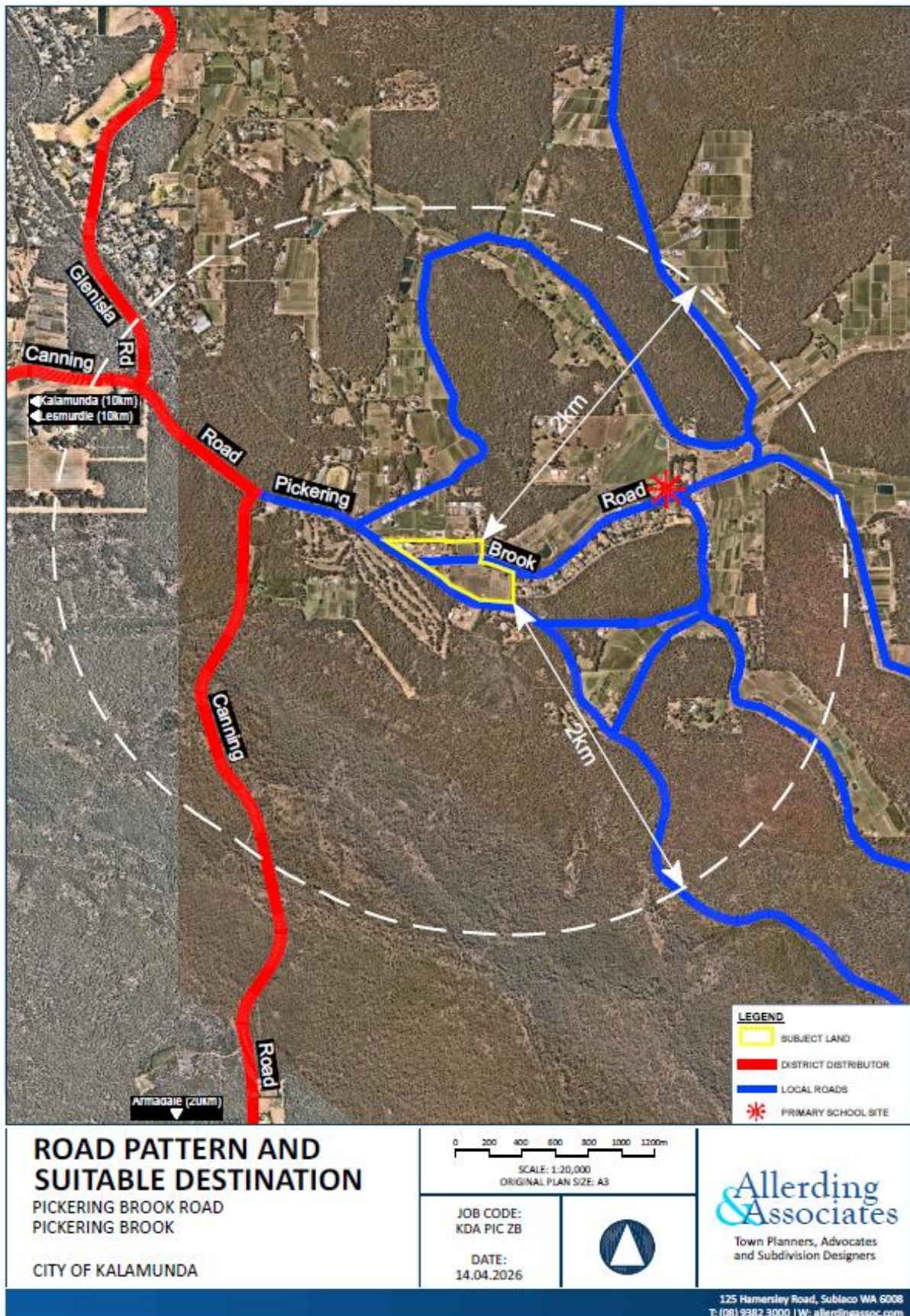


Figure 7 – Road Pattern and Suitable Destinations

4.2 Landscape Scale Bushfire Hazard Level Assessment

A Bushfire Hazard Level (BHL) assessment for the wider Pickering Brook precinct was undertaken by Emerge (**Figure 8**). The BHL has been conducted for a 5 km radius around the original townsite planning investigation area (PIA), rather than the 150m required by the Bushfire Guidelines and has sub-categorised 'extreme' values into three separate classes, using a fireline intensity assessment approach. These classes separate the 'extreme' rating into values of fireline intensity:

1. Up to 44, 000 kW/m;
2. 44, 000 kW/m – 62, 000kW/m; and
3. >62, 000 kW/m.

Emerge conclude that the townsite and the townsite expansion would likely experience a reduced fireline intensity exposure than the mapping might suggest is considered by Meridian Urban in their peer review, undertaken for the DPLH in 2021, to be possible and perhaps likely, but irrespective of this, the lower fireline intensity exposure, one of the prevailing issues for the location is increased ember attack and smoke within valley locations.

The subject site is surrounded by areas of moderate and low BHL, providing areas of hazard separation from embers and radiant heat. The Pickering Brook Golf Course to the south of the subject site is not identified as Bushfire Prone on the DFES Map of Bushfire Prone Areas and serves as hazard separation to the south. These areas fragment the vegetation and slow the impact of any bushfire travelling from the south-west.

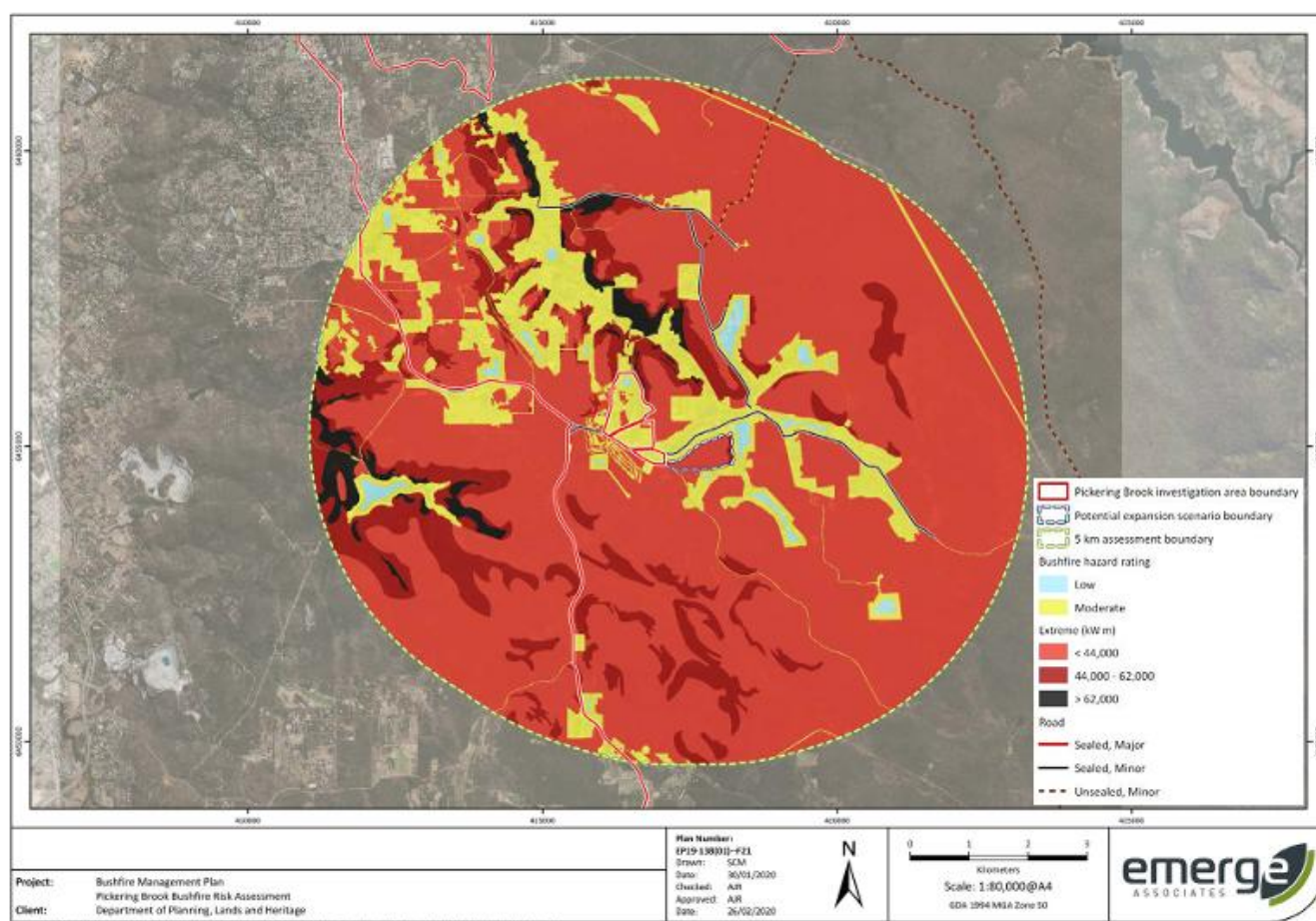


Figure 8: Landscape BHL

(Source: Pickering Brook Townsite Bushfire Risk Assessment – Bushfire Management Plan (Emerge 2020))

4.2.1 DFES and Meridian Urban comments

DFES considers the proposal non-compliant with SPP 3.7, which requires strategic planning proposals to avoid increasing bushfire threats to people, property, and infrastructure. The site is surrounded by unmanaged forest on steep slopes, with indirect road connections, creating a risk of catastrophic bushfire impacts that cannot be adequately mitigated. As a result, DFES deems the location unsuitable for urban intensification.

Concerns are also raised regarding vehicular access and evacuation, with the Emerge BMP not demonstrating that the existing road network meets standards for safe evacuation or emergency service access.

DFES recommends that, if the proposal is to proceed, it must be supported by an outcomes-based approach that clearly demonstrates how bushfire risks can be effectively mitigated. This includes undertaking a fit-for-purpose evacuation traffic study to assess evacuation scenarios and broader road network performance during emergencies. Future planning must also align with the updated SPP 3.7 and fully address all bushfire protection criteria.

Both DFES and Meridian Urban note that in the absence of detailed emergency evacuation modelling, the evacuation capacity of both the existing and expanded Pickering Brook townsite cannot be reliably determined.

The 2024 version of SPP 3.7, acknowledges the challenges of accommodating housing demand while supporting the long-term viability of established townsites, particularly where bushfire risk is present. This is reflected in the revised Policy Objective to “avoid the bushfire risk in the first instance, but where unavoidable, manage and/or mitigate the risk to people, property and infrastructure to ensure the risks are acceptable and appropriate to the land use and the location” (WAPC: 2024).

The outcomes-based approach at **Section 8** of this BMP has been developed in direct response to this objective. It seeks to demonstrate that, while the broader landscape presents an extreme bushfire risk, this risk can be appropriately managed and mitigated, and that efficient and effective evacuation routes are available to support life safety in the event of a bushfire.

A Bushfire Shelter was proposed as part of the Emerge BMP and did not receive support from DFES. In the absence of a State endorsed legislative framework for public on-site bushfire shelters, further consideration of this mitigation strategy has not been progressed.

The outcomes-based approach includes bushfire evacuation scenarios, with supporting traffic modelling undertaken by Donald Veal Consultants. A copy of the Pickering Brook Evacuation Technical Note is included at **Appendix 1**.

4.3 BHL Map Inputs

4.3.1 Vegetation Classification

The vegetation classification has been determined within and surrounding the subject site in accordance with Clause 2.2.3 of AS3959, with the current pre-development (existing) condition mapped in **Figure 9**. This information has been used to develop the BHL Map at **Figure 11**. A copy of the bushfire mapping is also included at **Appendix 2**.

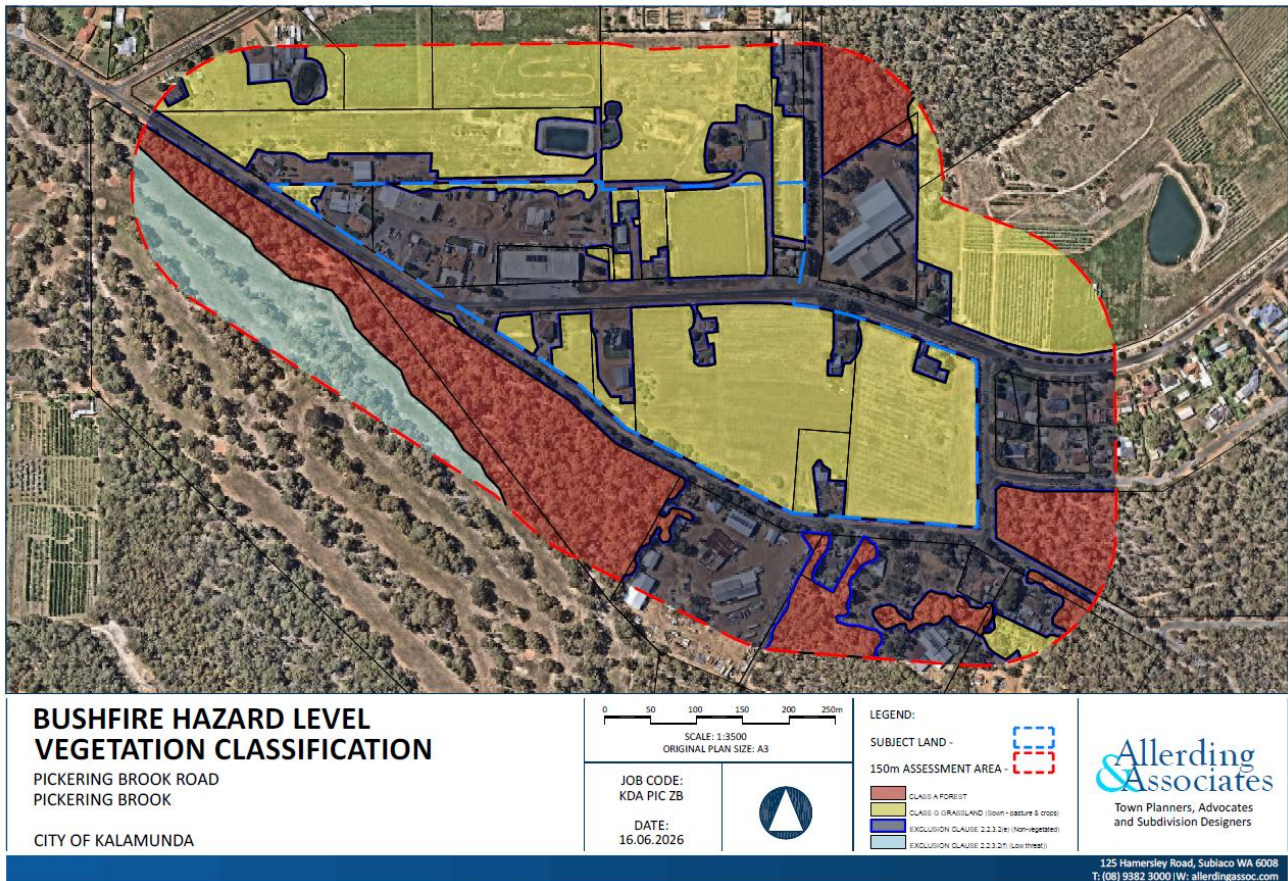


Figure 9 – Vegetation Classification (Existing Condition)

4.3.2 Site Topography and Slope

Based on available topographical mapping and previous work undertaken by Emerge, the subject land contains a slight valley in the centre (2.5 degrees). There is a 5.5 degree rise across the north of the site, from west to east. A topographical plan is included at **Figure 10**.

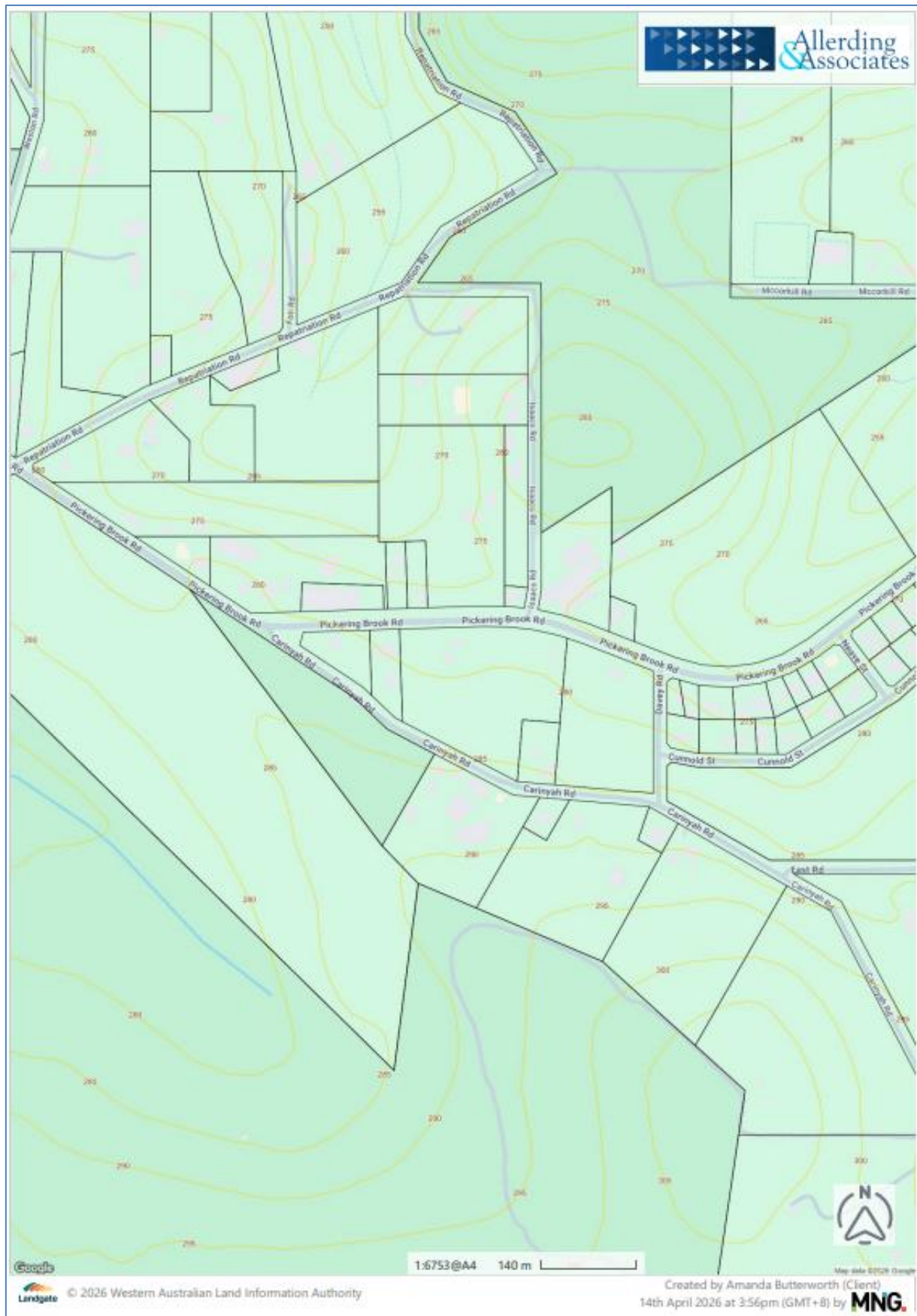


Figure 10 – Topographical Plan

4.4 BHL Map Outputs

4.4.1 BHL Mapping

The BHL Assessment was undertaken using the vegetation classification information contained within **Figure 9**, and the slope assessment shown at **Figure 10**. The BHL assessment methodology was applied based on Appendix A.2 of the Guidelines and has considered the classified vegetation and slope within 150m of the subject site. The results of the BHL are mapped in **Figure 11** in the current pre-development (existing) condition.

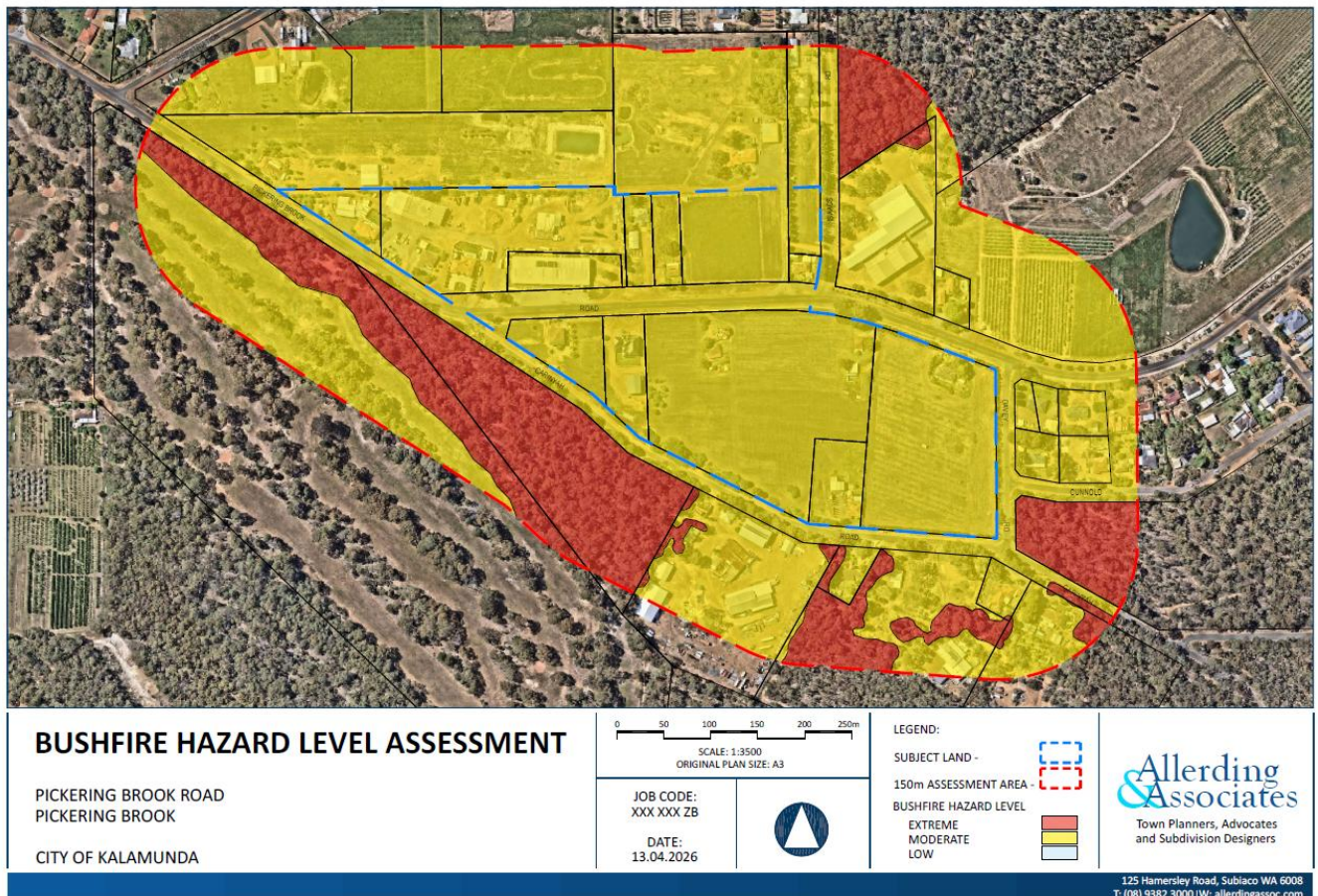


Figure 11 – BHL Map (Existing Condition)

5.0 IDENTIFICATION OF BUSHFIRE HAZARD ISSUES

The subject site is set in a valley surrounded by National Parks with slopes between 5° and 10°. The Emerge Associates BMP estimated that Pickering Brook will experience a significant bushfire within 5 km of the townsite occurring at least once every five years, however that despite the rate of occurrence of landscape-scale fires in the area, there has yet to be a penetration of a bushfire within the townsite. The Emerge Associates BMP attributes this to present bushfire mitigation measures, the fuel reduction activity taken in the adjacent National Parks, and Lot 81, and brigade suppression activity.

Pursuant to Clause 7.1ii.e. of SPP 3.7, the proposal has been assessed against the bushfire protection criteria requirements contained within the Guidelines. **Sections 6.0 and 7.0** of this report demonstrates that the proposal complies with the bushfire protection criteria of the Guidelines, for Elements 2, 3 and 4.

The townsite expansion area is within a Broader Landscape Type B, representing an extreme risk. Although the risk is extreme, the subject site is surrounded by areas of moderate and low BHL, providing areas of hazard separation from embers and radiant heat. The extent of these low and moderate BHL areas is best demonstrated in **Figure 8**, including the Pickering Brook Golf Course to the south, which is not identified as Bushfire Prone on the DFES Map of Bush Fire Prone Areas. These areas serve to fragment the vegetation and slow the impact of any bushfire impacting the subject site.

Figure 8 also spatially identifies those aspects that include large areas of contiguous vegetation, presenting opportunity for landscape scale bushfires.

An outcomes-based approach has been prepared, to provide more detail on the potential risk of a bushfire impacting the subject site, and whether this risk can be mitigated and managed to an acceptable level, and whether in the event of a bushfire, the additional 131 residents associated with the proposed townsite expansion are able to evacuate.

6.0 PROPOSAL COMPLIANCE AND JUSTIFICATION

Strategic planning proposals in bushfire prone areas are required to comply with SPP3.7 and **Section 4** of the Guidelines, as required under the following policy measures.

6.1 SPP 3.7 Policy Measures

6.1.1 Relevant provisions

The development has been assessed against the policy measures of Clause 7.1 for information to accompany planning proposals:

Policy Measure:	Response:
a. <i>an assessment of the broader landscape (where required);</i>	A broader landscape assessment has been undertaken and is included in Section 4.0 of this report, noting the area surrounding the subject site has been assessed as Broader Landscape Type B. An outcomes-based assessment is included at Section 8.0 .
b. <i>the identification of any environmental, biodiversity or conservation values on the subject site, including vegetation that may be impacted by any proposed clearing or modification, necessary to mitigate bushfire risk;</i>	Consideration has been given to environmental, biodiversity and conservation values on the subject site in Section 3.0 of this report.
c. <i>a Bushfire Hazard Level, Bushfire Attack Level (BAL), Contour Map or BAL assessment;</i>	A BHL Map has been prepared as part of this BMP as provided in Figure 11 .
d. <i>the identification of any bushfire hazard issues arising from the assessment; and</i>	The identification and assessment of bushfire hazards relevant to the proposal are contained in Section 5.0 of this report.
e. <i>assessment against the bushfire protection criteria contained within the Guidelines, demonstrating compliance via either the acceptable solutions, or through an outcomes based approach.</i>	An assessment of the proposal against the bushfire protection criteria of the Guidelines is provided in Section 7.0 of this report.

7.0 ASSESSMENT AGAINST THE BUSHFIRE PROTECTION CRITERIA

An assessment of the proposal against the bushfire protection criteria under Section 4 of the Guidelines is contained in **Table 2** which demonstrates how the proposal meets the outcomes and acceptable solutions. Further guidance on road and water requirements, for subsequent stages of the planning process, is provided at Appendix 3.

7.1.1 Compliance table

Table 2: Assessment Against the Bushfire Protection Criteria

Bushfire Protection Criteria	Outcomes	Method of Compliance	Proposed Bushfire Management Strategies	Response
		Acceptable Solutions		
Element 1: Location	Avoid broader landscapes that present an unacceptable bushfire risk to life, property and infrastructure.	Area 1 (Urban): Does not require assessment of Element 1: Location. Area 2: Determine the Broader Landscape Type in accordance with Appendix A.1 and proceed with the following acceptable solutions.	The subject site is located in a Bushfire Prone Area 2.	
		A1.1 Location		
		A1.1a Broader Landscape Type A The subject site is located in an area that is a Broader Landscape Type A. This location satisfies the policy outcome for Element 1: Location and no additional consideration is required.	NA	NA
		A1.1b Broader Landscape Type B The subject site is located in an area that is a Broader Landscape Type B which presents an unacceptable bushfire risk of a landscape-scale bushfire resulting in impacts to people, property and infrastructure. This location does not satisfy the acceptable solution for Element 1: Location.	As outlined in Section 4.1 of this report, the subject site is located in an area that is Broader Landscape Type B.	The proposal does NOT achieve acceptable solution A1.1a. An outcomes-based approach is provided at Section 8.0

Bushfire Protection Criteria	Outcomes	Method of Compliance	Proposed Bushfire Management Strategies	Response
		Acceptable Solutions		
Element 2: Siting and Design	Ensure siting and design solutions: - manage or mitigate the bushfire risk to people, property and infrastructure; and - Avoid, or where unavoidable, minimises the clearing of native vegetation.	Area 1 (Urban): Does not require assessment of Element 2: Siting and design.	The subject site is located in a Bushfire Prone Area 2.	NA
		Area 2: Proceed with the following acceptable solutions.		
		A2.1 Siting and design The areas of the subject site(s) identified for intensification and/or the future development site(s) achieve a pre- or post-development bushfire hazard level of moderate or low.	The proposed development site is within a BHL of moderate and low. Future development will be capable of being appropriately sited in a BAL-29 or below through targeted vegetation management and clearing, predominantly focussed to the south-western portions of the subject site. As outlined in Section 3.0 of this BMP, the degraded environmental condition and ecological values of existing vegetation within the subject site do not constrain future development and should therefore not prevent clearing to facilitate those works.	The proposal achieves acceptable solution A2.1.
		A2.2 Clearing of native vegetation The strategic planning proposal avoids, or where unavoidable, minimises the clearing of native vegetation.		

Bushfire Protection Criteria	Outcomes	Method of Compliance	Proposed Bushfire Management Strategies	Response
		Acceptable Solutions		
Element 3: Vehicular Access	Ensure the design and capacity of vehicular access and egress provide: - for efficient and effective evacuation to a suitable destination(s) and/or - as a contingency measure for vulnerable land uses, an on-site shelter, where demonstrated appropriate, as a last resort option.	Area 1 (Urban): Does not require assessment of Element 3: Vehicular access. Area 2: Proceed with the following acceptable solutions.	The subject site is located in a Bushfire Prone Area 2.	NA
		A3.1 Public roads Public roads, including perimeter roads should meet the technical requirements in Appendix B.3, Table 10.	The future internal public road network will address the applicable design standards and/or local government requirements. The public road network beyond the subject site is considered as part of the outcomes-based approach in Section 8.0	
		A3.2 Access routes Public road access should be provided in two different directions, to two different suitable destinations, with an all-weather surface.	The public road network provides access to the west via Canning Road to Lesmurdie, Kalamunda and High Wycombe Evacuation Centre (suitable destination), and to the south via Canning Road to Roleystone and Armadale (suitable destination)*¹. Further detail is included as part of the outcomes-based approach in Section 8 and in the Pickering Brook Bushfire Evacuation Technical Note included in Appendix 1.	The proposal achieves acceptable solution A3.1. The proposal achieves acceptable solution A3.2.

Bushfire Protection Criteria	Outcomes	Method of Compliance	Proposed Bushfire Management Strategies	Response
		Acceptable Solutions		
		A3.3a No-through roads If the public road access to the subject site is via a no-through road which cannot be avoided due to demonstrated site constraints, the public road access is to be a maximum of 200 metres from the subject site boundary to an intersection where two-way access is provided.	Whilst a number of no-through roads have been identified in the locality, the proposal will not rely on no-through roads.	NA
		A3.3b No-through road requirements A no-through road is to meet all the following requirements: • requirements of a public road (Appendix B.3, Table 10, Column 2); and • turn-around area/head (Figure 30).	NA	NA
Element 4: Water Supply		Area 1 (Urban): Does not require assessment of Element 4: Water supply. Area 2: Proceed with the following acceptable solutions.	The subject site is located in a Bushfire Prone Area 2.	NA

Bushfire Protection Criteria	Outcomes	Method of Compliance	Proposed Bushfire Management Strategies	Response
		Acceptable Solutions		
	Ensure that sufficient water is available and accessible for emergency services, to enable people, property and infrastructure to be defended from bushfire.	A4.1 Water supply Evidence that a sufficient and accessible reticulated or non-reticulated water supply for bushfire firefighting can be provided at the subdivision and/or development application stage, in accordance with the specifications of the relevant water supply authority or the requirements in Appendix B.4: Water Supply dedicated for bushfire firefighting.	The subject site is serviced by a reticulated water supply, however, it is recommended that a 50, 000 litre strategic water tank be provided to support bushfire fighting in Pickering Brook.	The proposal achieves acceptable solution A4.1.

*Note¹. A suitable destination is an area that is not designated as bushfire prone on the Map of Bush Fire Prone Areas or is greater than 100 metres from classified vegetation, or 50 metres from Class G Grassland, as per AS 3959 and can provide protection during and after a bushfire event. A suitable destination is located within an urban area, townsite or similar. This also includes any evacuation centre, dedicated by the local government, for use during a bushfire event (WAPC: 2024).

The nominated suitable destinations are south to Armadale and west to Kalamunda. Although the majority of Kalamunda is identified as bushfire prone, there is a nominated evacuation centre at 200 Newburn Road, High Wycombe, which is not designated as bushfire prone and is approximately 16km from Pickering brook townsite. The nominated evacuation centre in Armadale is the Armadale Recreation Centre at 4 Mach Court.

8.0 OUTCOMES-BASED APPROACH FOR BROADER LANDSCAPE TYPE B

The Planning for Bushfire Guidelines (2024) state that strategic planning provides the best stage of the planning process to ensure future land use and development are not located in areas where the bushfire risk is extreme and/or where the bushfire risk cannot be satisfactorily managed or mitigated through the use of the bushfire protection criteria.

The subject site is located in an area that is a Broader Landscape Type B which “presents an unacceptable bushfire risk of a landscape scale bushfire resulting in impacts to people, property and infrastructure”. However the WAPC Bushfire Explanatory Note (2025), states that a Broader Landscape Type B is not an automatic refusal. The Guidelines provide that where the practitioner considers that further analysis could demonstrate to the decision-maker that the risks can be appropriately managed and/or mitigated, an outcomes-based approach should be prepared in accordance with policy measures 7.2 and 7.5 or SPP 3.7.

Policy measure 7.2 of SPP 3.7 states: proposals located within Broader Landscape Type B will not be supported unless the proposal has demonstrated through an outcomes-based approach that the broader landscape risk to people, property and infrastructure is acceptable.

The Bushfire Guidelines state that *it has become evident that risk assessments in accordance with methodologies including ISO 3100 and the National Emergency Risk Assessment Guidelines (NERAG) are complex, difficult for decision-makers to interpret and may not be suitable for land use planning decision making.*

For an outcomes-based approach to support a Broader Landscape Type B, the Bushfire Guidelines recommend the use of bushfire scenario planning to examine the potential impact a bushfire will have around or within the planning proposal. These scenarios are included to demonstrate that the risks can be managed to an acceptable risk, through evacuation to suitable destinations on existing roads.

8.1 SPP 3.7 Policy Measures

8.1.1 Address the acceptable solutions to the greatest extent possible

An assessment against the Bushfire Protection Criteria has been undertaken in Table 4 demonstrating how the proposal addresses the acceptable solutions to the greatest extent possible.

8.1.2 Identify the non-compliance with the acceptable solutions and why these cannot be achieved

The subject site complies with Elements 2, 3 and 4. However is within an area which is Broader Landscape Type B. The Broader Landscape Type B has been triggered due to the vegetation type within the broader landscape, and to a lesser extent, proximity to a suitable destination being more than 10km.

Kalamunda and Lesmurdie are both 10km for the subject site to the west, and Armadale is approximately 20km south of the subject site. It is therefore important that the road network provides for efficient evacuation of the existing and proposed community, whilst providing for access for emergency services vehicles to utilise the road network to fight the bushfire.

Vegetation beyond the subject site, within the broader landscape is within private properties and Crown land reserves, including Mundaring State Forest and Greenmount Nature Reserve. Most of the Crown land in the area is identified as 'Priority management area' and actively managed by the Department of Biodiversity, Conservation and Attraction (DBCA). Further information is provided below.

Land under private ownership is immediately surrounding the subject site and consists of the Pickering Brook townsite and rural zoned lots, which contain operating and non-operating orchards. The orchards in Pickering Brook and surrounds have been in operation since the arrival of the European settlers. AS 3959 allows for the exclusion of orchards and vineyards, under clause 2.2.3.2, as low threat, due to factors such as flammability, moisture content and fuel load.

It is noted that DFES did not support these orchards as an exclusion without evidence they were being managed in a low threat state. As such these lots have been mapped as 'mosaic', which can include rural living lots, and 'unmanaged grassland', which could represent an orchard once the trees are removed and the ground is bare. Either way, this BMP is not disputing the extreme risk presented by the broader landscape. Improved management on private land can be achieved by community education programs, and enforcement of the fire break notice.

8.1.3 Detail how the design addresses bushfire risk and where additional bushfire risk management measures have been deemed necessary and included to minimise risk

The Pickering Brook Townsite Bushfire Risk Assessment (Emerge 2020) considered the likelihood and consequential impact of a bushfire that may threaten the townsite and drew upon historical bushfire information for the area. The assessment identified that a bushfire was likely to occur on average every five years and that the consequence could be catastrophic with fatalities and loss of buildings to be expected unless exposure is managed successfully. The Report concluded that the risk could be reduced to Medium, with the introduction of various mitigation measures. Both DFES and by Meridan Urban, stated that there was not sufficient quantitative evidence to demonstrate that the risk could be reduced to a Medium rating.

DFES also contend that the proposal should not be supported as it does not satisfy SPP3.7 and "avoid broader landscapes that present an unacceptable bushfire risk". The SPP3.7 Policy Objective provides further guidance on risk and states "Avoid the bushfire risk in the first instance, but where unavoidable, manage and/or mitigate the risk to people, property and infrastructure, to ensure the risks are acceptable and appropriate to the land use and the location".

Acceptable risk is the level of potential harm or financial loss that an individual, organisation or society is willing to tolerate. Determining this level is difficult to quantify and involves value judgement that often varies between decision-makers and affected parties. For instance, Emergency Services typically demand a low threshold for bushfire risk, aiming to avoid it entirely. However, land-use planning involves competing factors, including land release, environmental protection and economic development. Avoiding heavily vegetated bushfire prone areas is increasingly difficult.

Consequently, when evaluating acceptable risk, decision-makers should also consider benefits of the proposed townsite expansion to the existing and future residents. Consideration should also be given to the fact that the risk is not being imposed on existing or future residents - the risk is voluntary. In this instance, benefits to the existing townsite and the Pickering Brook precinct are discussed in **Section 8.1.4.**

The bushfire risk is existing and the proposed townsite expansion aims to reduce this risk to the existing community through various mitigation measures. New residents will have the additional benefit of new homes, constructed to appropriate bushfire construction standards and importantly, have a choice to accept the risk by living in the area.

The following mitigation measures, in addition to those measures required by SPP 3.7, have been identified to manage and mitigate the risk:

- Installation of a 50, 000 litre strategic bushfire water tank to supplement the reticulated fire hydrants within the road reserves;
- The following targeted road upgrades are recommended to improve evacuation efficiency and emergency vehicle access:
 - Two culverts on the bend just north of Pickering Brook Road on Bracken/Patterson Road may constrain evacuation and emergency vehicle access. These culverts should be extended and the carriageway widened to at least 7.0m, and potentially wider, having regard to the horizontal geometry of the road at this location.
 - The sealed carriageway width of the eastern section of Walnut Road, west of its intersection with Patterson Road, is approximately 5.5 m. While this may be adequate for one-way evacuation, it may limit the ease and safety of concurrent use as an emergency vehicle access route. The sealed carriageway should be widened to at least 6.0m.
 - The sealed carriageway width of the northern section of Patterson Road, south of its intersection with Walnut Road, is approximately 5.5m. While this may be adequate for one-way evacuation, it may limit the ease and safety of concurrent use as an emergency vehicle access route. The sealed carriageway should be widened to at least 6.0m.
 - Glenisla Road generally meets or exceeds the required sealed width of 6.0m. However, roadside hazards were noted towards its northern end, including trees, power poles and unrecoverable batters, with no formal protection. To improve road-user safety and emergency access, edge lines, additional signage, and vegetation management, pruning and, where necessary, removal is recommended.
- Signage plays an important role in bushfire risk mitigation. In the event of a bushfire, people can become disorientated and legible directional signage is necessary to ensure people are directed to the safest destination. The following signage improvements are recommended to improve clarity during evacuation:
 - The initial southern section of the Patterson Road evacuation route is currently signposted as Bracken Road, before Bracken Road branches east. This may cause confusion, particularly for drivers unfamiliar with the local road network or under emergency conditions. It is recommended that this section be reviewed and, where appropriate, renamed and signposted as part of the Patterson Road route.
 - Directional signage at the Patterson Road turn-off to Canning Road south is not sufficiently clear. It is recommended that signage at this location be reviewed, relocated where necessary, and upgraded to clearly identify Canning Road south as a southern evacuation route.

- A number of no-through roads occur within the Pickering Brook area. Although several are signposted, it is recommended that no-through road signage be audited and upgraded where required, including through additional signs to reduce the risk of drivers entering unsuitable routes during an emergency.
- Preparation of a Bushfire Risk Management (BRM) Plan for Pickering Brook. A BRM Plan assists a local government to identify, assess, prioritise, treat and monitor bushfire risk throughout its local government area. DFES Rural Fire Division and regional offices, offer support to local governments to identify and assess bushfire risks and treat risks through the development of BRM Plans. DFES recommend that local governments with significant bushfire risk develop and implement a BRM Plan.
- Maintaining hazard separation around the subject site and the Pickering Brook townsite. There are existing significant areas of Crown land in the area, which is identified as a Priority Management Area by DBCA. These areas are managed by DBCA and form part of the annual works programme. The existing urban and rural land forming the Pickering Brook townsite and surrounds are mapped as Low and Moderate BHL. The land parcels highlighted in red in **Figure 12** are both Crown land, but the eastern site (Lot 81 Cunnold Street), is identified as Rural under the MRS and Rural Conservation under the City's local Planning Scheme No. 3. It is understood that this parcel is not Part of the DBCA burn program. Discussions are being held with DBCA to include this parcel. The smaller parcel adjoining the subject site to the south (Reserve 47881), is managed by DFES. DFES confirm that they undertook a mosaic burn seven years ago.
- Community engagement and training. Residents within Pickering Brook are aware of the bushfire risks, however new residents to the area, should be provided with adequate information about what to do in the event of a bushfire. Work could also be undertaken to identify cost effective retrofitting measures that could be implemented for existing houses, to reduce the risk of ember attack and radiant heat.
- Construction of new homes to the assessed Bushfire Attack Level (BAL) under AS3959, but to be constructed to a minimum standard of BAL-12.5 where BAL-Low applies. BAL-12.5 construction primarily addresses ember attack so in the event that BAL-Low applies to any land within the MRS area, construction to a minimum BAL-12.5 is recommended.

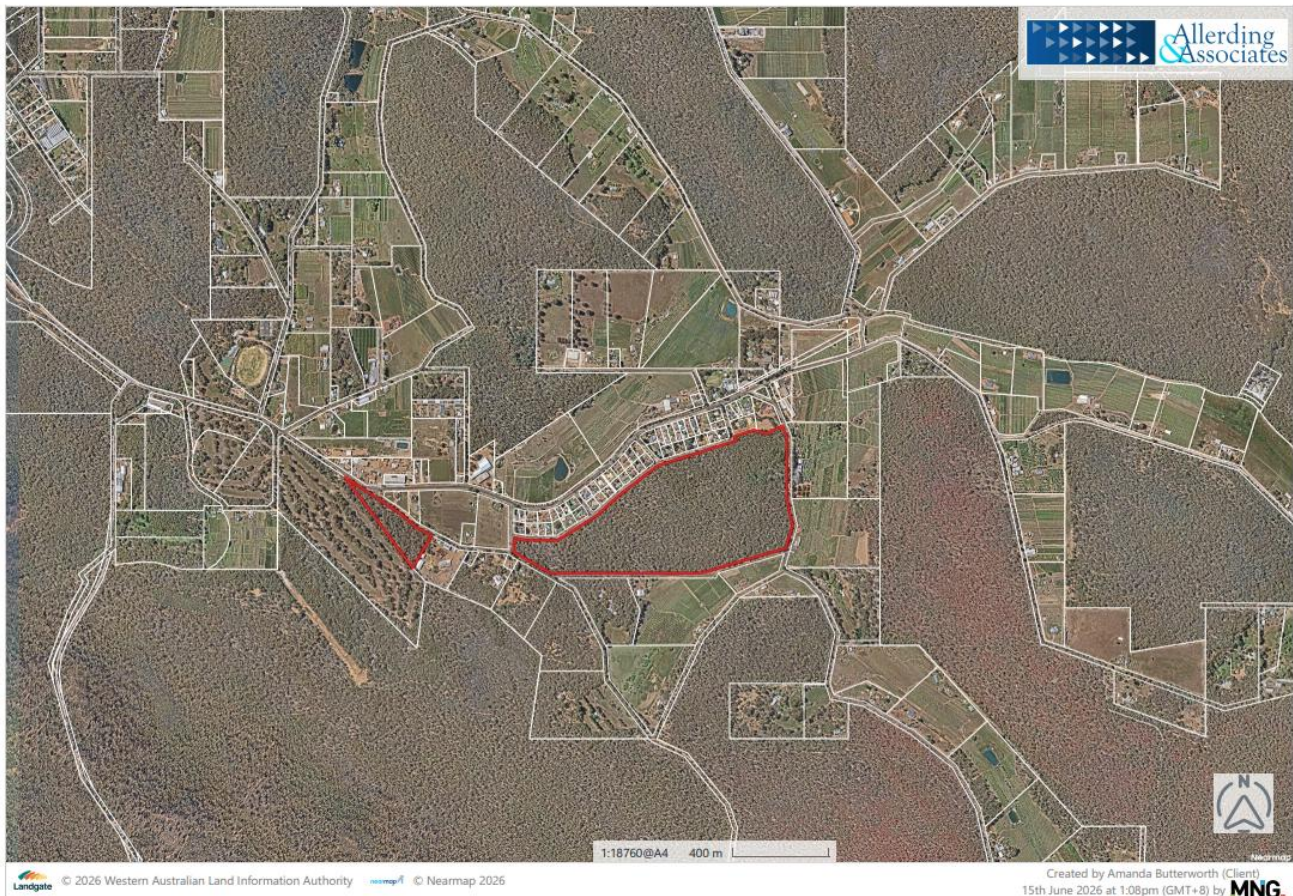


Figure 12: Hazard separation

8.1.4 Detail community net benefits such as improvements to the public road network

In recognition of the extreme bushfire risk presented by the broader landscape, any expansion of the Pickering Brook townsite will need to reduce this risk, to the lowest possible level, through the implementation of the measures identified above. The additional bushfire risk mitigation measures will not only enhance bushfire resilience for the future development area associated with the MRS amendment but will also deliver wider community benefits that provide for a more sustainable townsite and wider area, in general.

The sustainability of the townsite and the precinct as a whole has been previously considered in reports, including the Pickering Brook Townsite Sustainability Assessment (Macroplan, April 2020), prepared for the DPLH on behalf of the Pickering Brook and Surrounds Working Group. The report estimated townsite expansion within the subject site, would yield a population of 131, resulting in approximately 14 primary school aged children.

Community consultation to support the development of the Sustainability Assessment, identified that economic development and (bushfire) security were identified by residents, as the most important categories for the on-going sustainability of the town. The report identified that an additional 131 residents would have the following implications on the sustainability of the Pickering Brook townsite and wider precinct.

Economic implications:

- Increased residents in Pickering Brook should encourage local spending to increase.
- The increased availability of land for residential holdings will reduce housing availability pressures for people who want to move into the area.
- An additional local labour force may also assist businesses in the area needing employees.

Social infrastructure implications:

- Some form of development in the area should encourage the revitalisation of Pickering Brook through greater participation in local activities/facilities.
- There is potential for new development to attract families and increase enrolments at the Pickering Brook Primary School.
- With more people in the area, some income from the additional residents will then be injected into local business.

The Pickering Brook and Surrounds Sustainability and Tourism Strategy – Part 1 – Pickering Brook Townsite (November 2020) and the City of Kalamunda Local Planning Strategy identify a potential opportunity to increase the size of the existing townsite and subsequent additional population to support and grow existing services and facilities, provide a wider variety of housing options and generally revitalise the townsite that is in decline.

The Working Group's recommendation to support the townsite expansion has taken into consideration that DFES did not support any townsite expansion or intensification of land use (such as low scale tourism) in the Pickering Brook area due to concerns relating to the bushfire risk assessment and management plan.

The report concludes that the recommendations developed by the Working Group are a balanced consideration of the strategic local need for a relatively small but worthwhile townsite expansion. This BMP supports this recommendation.

Bushfire security was identified in the Report as one of the key factors to the on-going sustainability of the townsite. The development of the proposed townsite expansion will result in a substantial increased bushfire resilience through the various mitigation measures, mentioned above. Of particular note will be the improvements to the broader road network, which will benefit the precinct as a whole and could result in increase in tourism activities in the area.

8.1.5 *Include fire engineering solutions or written evidence such as publications and State Administrative Tribunal decisions to support the proposal (where appropriate)*

In their Peer Review, Meridian Urban stated that bushfire scenario modelling is an emerging field. Methodologies including the SPARK modelling utilised for North Stoneville Structure Plan, were not supported by DFES or the WAPC. In the absence of any other agreed or established methodology, it is recommended that the approach undertaken by Western Environmental, dated 2 October 2025, for the Carabooda District Structure Plan, be undertaken. The WAPC resolves to advertise the draft Carabooda District Structure Plan and the associated BMP.

The BMP prepared by Western Environmental, includes a methodology for an outcomes-based approach for a Broader Landscape Type B. The analysis was undertaken based on the bushfire scenario methodology recommended within the Bushfire Guidelines. The purpose of the analysis is to model the evacuation of residents to a suitable destination, if a bushfire were to arrive from different directions and block off road access. The Carabooda BMP modelled 6 bushfire scenarios, and was able to demonstrate that in all scenarios, evacuation would be possible.

This type of bushfire scenario modelling is relevant to the current MRS proposal, the subject of this BMP, as it provides a clear representation of the different bushfire scenarios, whether deemed likely (from the South) or unlikely (from the North); and the available evacuation route. A review of the current road construction standards will be undertaken and determination of road carrying capacity. Through this modelling the BMP will be able to determine whether the existing road network can provide for efficient and effective evacuation, while providing for access by Emergency Services vehicles. If road and/or verge upgrades or modifications are necessary, these will form part of the recommended mitigation measures.

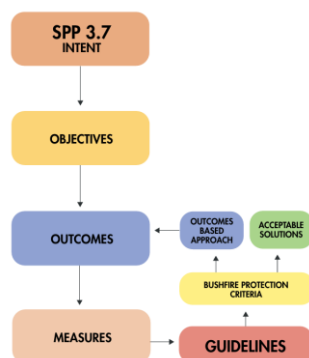
8.1.6 Outline how the policy outcomes have been achieved

The Planning for Bushfire Guidelines (2025), state that the bushfire protection criteria are an outcomes-based system of assessing bushfire risk management, divided across four Elements – location, siting and design, vehicular access and water supply. Each Element is achieved by demonstrating compliance with one of the following:

- a) Acceptable solution(s)
- b) Outcomes-based approach
- c) A combination of (a) and (b).

The Guidelines state that an outcomes-based approach can be used where compliance with the acceptable solutions cannot be achieved due to demonstrated site constraints or environmental values (including where existing native vegetation cannot be cleared), and where the bushfire planning practitioner is of the expert opinion that the SPP 3.7 outcomes can still be demonstrated.

The diagram below is from the Guidelines and shows the inter-relationship between the intent, objectives, outcomes and measures.



The overarching intent of SPP3.7 is to implement effective, risk-based land use planning and development which in the first instance avoids the bushfire risk, but where unavoidable, manages and/or mitigates the risk to people, property and infrastructure to an acceptable level. The preservation of life and the management of bushfire impact are paramount.

In relation to this strategic planning proposal, the relevant objectives of SPP3.7 include:

- 5.1 *Avoid the bushfire risk in the first instance, but where unavoidable, manage and/or mitigate the risk to people, property and infrastructure, to ensure the risks are acceptable and appropriate to the land use and the location.*

The relevant policy outcome which contributes to the above policy objective includes:

- 6.1 *Avoid broader landscapes that present an unacceptable bushfire risk to people, property and infrastructure.*

In relation to the broader landscape considerations, the following policy measure addresses the above policy objective and outcome:

- 7.2 i *Proposals located within a Broader Landscape Type B in accordance with the methodology within the Guidelines, will not be supported unless the proposal has demonstrated through an outcomes-based approach that the broader landscape risk to people, property and infrastructure is acceptable.*

The policy outcome and objective require demonstration that the bushfire risk is acceptable. The concept of acceptable risk has been explored in the previous sections of this BMP. In summary, the bushfire risk will be reduced to the lowest practicable level, which is acceptable to the current and future residents of the townsite and the broader precinct. This is due to the improved bushfire resilience, through additional management and mitigation measures; and sustainability benefits for the existing Pickering Brook townsite and wider precinct.

8.1.7 Outline why approval is warranted by the decision-maker in this instance

In this instance, the outcomes-based approach is founded on the specific physical, environmental and settlement characteristics of the Pickering Brook townsite and the proposed expansion area, and the demonstrated opportunity to reduce bushfire risk through coordinated land-use planning and infrastructure provision. Importantly, the proposal does not represent isolated greenfield development within an unmanaged landscape. Rather, it constitutes the logical expansion of an established townsite, where existing and proposed development, supporting infrastructure, and management regimes can be integrated to improve bushfire resilience at both the site and townsite scale.

The proposed townsite expansion allows for the coordinated implementation of bushfire mitigation measures that are not achievable under the existing fragmented rural land use pattern. These measures include improved road networks, the establishment of defendable edges to the townsite, enhanced access and egress arrangements, managed Asset Protection Zones, and upgraded water supply infrastructure for firefighting purposes. Collectively, these measures are intended to reduce exposure to bushfire attack, improve emergency access and evacuation capacity, and strengthen the ability of emergency services to defend the townsite during bushfire events.

The proposal also delivers broader community-wide benefits by enabling infrastructure upgrades that improve resilience not only for the proposed development area, but for the existing Pickering Brook townsite, which is currently exposed to extreme bushfire risk with limited mitigation options. In this respect, the expansion provides a mechanism to actively reduce existing risk rather than perpetuate the current vulnerable settlement pattern.

Accordingly, while the site is located within a Broader Landscape Type B, it is considered that the proposed development, when assessed holistically and supported by the bushfire management strategies outlined in this BMP, achieves the policy outcome of Element 1: Location. The outcomes-based approach demonstrates that bushfire risk can be reduced to the lowest practicable level, consistent with the intent of SPP 3.7, and that the proposal represents a net improvement in bushfire resilience for the Pickering Brook community.

8.2 Bushfire scenarios

8.2.1 DFES and Meridian Urban comments

DFES and Meridian Urban recommended that any intensification of the townsite area should ensure that the capacity of the broader road network is sufficient to enable effective evacuation and access by emergency services in the event of a bushfire. Meridian Urban commented that evacuation considerations of the Emerge BMP should be continued to be built upon. Evacuation is a growing consideration for strategic land use planning, as it is directly associated with the analysis of potential risk to life.

Meridian Urban also noted that the accuracy of the assessment made in relation to evacuation will be dependent on a fit-for-purpose bushfire evacuation traffic study. Such a study will need to be informed by technical bushfire planning input to guide the nature of inputs and assumptions used to perform evacuation traffic modelling.

8.2.2 Bushfire scenario modelling

Bushfire scenario modelling has been undertaken to demonstrate that in the event of a bushfire, the road network has sufficient capacity to provide for the evacuation of the 131 residents anticipated as part of the proposed townsite expansion area, the residents of the existing townsite and the precinct.

Previous studies, including the Emerge BMP found that bushfires predominantly arrive from the south, west and east, and are rare from the north and north-east. Irrespective of likelihood, four scenarios have been undertaken that consider bushfire behaviour, and likely impact on the road network and options for evacuation.

Anticipated bushfire behaviour considers vegetation type, contiguity, potential for ember attack and the BHL mapping undertaken by Emerge, which considers slope under vegetation. These are presented diagrammatically at **Figures 13, 14, 15 and 16** and **Appendix 4** and discussed below.

The Pickering Brook Bushfire Evacuation Technical Note prepared by Donald Veal Consultants (2026) provides detailed analysis of the road capacity and evacuation potential (refer **Appendix 1**). The Technical Note has used the figures provided by Meridian Urban in their Peer Review as follows:

- 12% stated that they would leave early;
- 24% intended to wait to see whether a fire started, and then leave if it did;
- 27% stated they would prepare to stay and defend their properties; and
- 24% were uncertain as to their likely course of action.

It is noted that this does not add up to 100%.

The Technical Note assumes, as a worst-case scenario, that the vast majority of the residents, the visitors, the workers and the tourists, will all leave together, within a short window of time.

The total number of vehicles estimated to require evacuation is 1,020 and comprises of:

Residents = 570

External workers = 250

Tourists and other visitors = 200

Whilst it is expected that the majority of vehicles being used to evacuate will be standard sedans, 4WDs and SUVs, the Technical Note has provided for a proportion of vehicles towing trailers, caravans and horseboxes.

The majority of the vehicles leaving the area will need to use Pickering Brook Road in order to access evacuation routes. The road is designated as a Local Distributor that is constructed as a two-lane undivided highway, partly kerbed, with one lane in each direction. The sealed road pavement width is generally 7.0m and complies with the 6.0m horizontal clearance requirements of the Guidelines.

The Technical Note has also considered the possibility that residents (and others) will be evacuating the area whilst emergency services vehicles are heading into the area. Given the road network around Pickering Brook, and the lack of access from the east, the nearest fire stations to the area are generally to the north and west, noting that in a significant bushfire event, DFES resources may come from further afield.

Generally, however, the most likely access route into the area would be via Canning Road, either from the west or the south. Both roads are of a suitable width and geometry to allow simultaneous access and egress by emergency vehicles and those evacuating the area.

Should a section of Canning Road become inaccessible, alternative routes would include Carmel Road, Lawnbrook Road, Glenisla Road, Walnut Road and Patterson Road.

As detailed below, some of these roads have limited width and other issues that may make simultaneous use more difficult, and certain upgrades are recommended.

Bushfire scenario 1 (Fire activity advance from north-east):

A bushfire advancing from the north or north-east (refer **Figure 13**) is considered less likely than scenarios associated with prevailing summer conditions. However, under severe fire weather, including trough-driven conditions that may generate hot, dry and gusty winds from the north or north-east, a fire in this sector could develop into a landscape-scale event within Mundaring State Forest. This risk is influenced by the extent of contiguous Class A Forest vegetation and the extreme BHL values identified within the broader landscape.

As a fire front advances towards the Pickering Brook townsite and the proposed expansion area, areas of low and moderate BHL associated with existing development, orchards and managed land along parts of the road network may assist in moderating fire behaviour. These areas may provide opportunities for suppression activities and may reduce the continuity of fuel between the broader forested landscape and the townsite interface.

Ember attack remains likely under this scenario. Future dwellings within the expansion area will therefore need to be constructed in accordance with AS 3959 bushfire construction requirements applicable to their assessed BAL rating. The presence of lower and moderate BHL corridors along parts of the road network also provides a degree of hazard separation between the broader bushfire hazard and the townsite.

In the event of a landscape-scale bushfire approaching from the north or north-west, the principal evacuation options from the existing and proposed townsite expansion would be to the west via Canning Road towards Lesmurdie and Kalamunda, and to the south via Canning Road towards Roleystone and Armadale, subject to prevailing fire behaviour, road conditions and emergency services direction.

Canning Road being a Regional Distributor, is constructed to a two-lane undivided highway, with one lane in each direction. The road pavement width is 7.0m wide and generally carries around 3, 000 to 6, 000 vehicles per day. The Technical Note concludes that Canning Road (west and south) has the capacity to handle the evacuation volumes in addition to typical volumes on the route, noting the need for improved directional signage to Canning Road south (refer to **Appendix 1**).

Bushfire scenario 2 (Fire activity advance from north-west):

A bushfire advancing from the north-west or west (refer **Figure 14**) is considered less likely than scenarios associated with prevailing summer conditions. However, under severe fire weather, including conditions that may generate hot, dry and gusty winds from the north-west or west, a fire in this sector could still develop and advance towards the Pickering Brook townsite and the proposed expansion area.

The north-western and western approach to the townsite contains patches of Class A Forest vegetation classified as extreme BHL, interspersed with and fragmented by significant areas of low and moderate BHL associated with the outer suburbs of Mundaring, rural land, orchards along Glenisla Road and managed land extending east towards the Pickering Brook townsite. The band of low and moderate BHL between Western Road and Repatriation Road provides a degree of hazard separation between the townsite, the proposed expansion area and a potential bushfire approaching from the north-west or west. This separation is approximately 600 metres wide on average.

As a fire front advances through this fragmented landscape, areas of low and moderate BHL, existing development, orchards and managed land may assist in moderating fire behaviour. These areas may also provide opportunities for suppression activities and may reduce the continuity of fuel between the broader forested landscape and the townsite interface.

Ember attack remains likely under this scenario. Future dwellings within the expansion area will be constructed in accordance with AS 3959 bushfire construction requirements applicable to their assessed BAL rating, which will mitigate this risk. The presence of low and moderate BHL areas along parts of the western and north-western interface, including the hazard separation described above, may also reduce ember exposure and provide a degree of separation between the broader bushfire hazard and the townsite.

In the event of a bushfire approaching from the north-west or west, the principal evacuation options from the existing and proposed townsite expansion would be to the south via Canning Road towards Roleystone and Armadale, and to the north via Pickering Brook Road and Patterson Road towards Mundaring Weir or along Walnut Road to Kalamunda, subject to prevailing fire behaviour, road conditions and emergency services direction.

As detailed above, Canning Road (south) is a Regional Distributor, and is constructed as a two-lane undivided highway, with one lane in each direction. The road pavement width is 7.0m wide and generally carries around 3, 000 to 6, 000 vehicles per day. In the event that Canning Road is no longer available for evacuation, the alternative is Patterson Road.

The Technical Note states that Patterson Road, is constructed as a two-lane undivided highway, with one lane in each direction. The southern section achieves 6m sealed pavement width, with sealed shoulders, but further north is reduced to a pavement width of 5.5m.

Patterson Road is designated as an Access Road, under care and control of the Local Government. The Technical Note concludes that the sections of the road that are 5.5m wide are likely to restrict traffic flow. Walnut Road, west of Patterson Road intersection, is also designated as an Access Road, with a 5.5m pavement seal, which some large trees along the northern edge and an open drain along the south.

Bushfire scenario 3 (Fire activity advance from south-east):

A bushfire advancing from the east or south-east (refer **Figure 15**) is considered a credible scenario under typical summer prevailing wind conditions. Under severe fire weather, a fire in this sector could develop into a landscape-scale event within the surrounding Mundaring State Forest and adjoining forested reserves. This risk is influenced by the extent of contiguous Class A Forest vegetation and the extreme BHL values identified within the broader landscape.

As a fire front advances towards the south-eastern interface of the Pickering Brook townsite and the proposed expansion area, areas of low and moderate BHL associated with existing development, orchards and managed land may assist in moderating fire behaviour. These areas may provide opportunities for suppression activities and may reduce the continuity of fuel between the broader forested landscape and the townsite interface.

Ember attack remains likely under this scenario. Future dwellings within the expansion area will be constructed in accordance with AS 3959 bushfire construction requirements applicable to their assessed BAL rating, which will mitigate this risk. The presence of low and moderate BHL areas along parts of the south-eastern interface and road network may also provide a degree of hazard separation between the broader bushfire hazard and the townsite.

In the event of a bushfire approaching from the east or south-east, the principal evacuation options from the existing and proposed townsite expansion would be to the west via Canning Road towards Lesmurdie and Kalamunda, and to the south via Canning Road towards Roleystone and Armadale, subject to prevailing fire behaviour, road conditions and emergency services direction.

As detailed above, Canning Road (south and west) have sufficient carrying capacity to provide for evacuation. In the event that Canning Road (south) is no longer available, Glenisla Road provides an additional evacuation route north of Canning Road (west). Glenisla Road is a Regional Distributor road and has sufficient capacity to cater for the required traffic volumes.

Bushfire scenario 4 (Fire activity advance from south-west):

A bushfire advancing from the south or south-west (refer **Figure 16**) is considered likely under typical summer prevailing wind conditions. Under severe fire weather, a fire in this sector could develop into a landscape-scale event within the surrounding Greenmount National Park, Korung National Park, Mundaring State Forest and adjoining forested reserves. This risk is influenced by the extent of contiguous Class A Forest vegetation and the extreme BHL values identified within the broader landscape.

As a fire front advances towards the south-western interface of the Pickering Brook townsite and the proposed expansion area, areas of low and moderate BHL associated with existing development, orchards, managed land and the Pickering Brook Golf Course may assist in moderating fire behaviour. These areas may provide opportunities for suppression activities and may reduce the continuity of fuel between the broader forested landscape and the townsite interface. The Pickering Brook Golf Course and Pickering Brook Road also provide a degree of hazard separation between the broader bushfire hazard and the proposed townsite expansion.

Ember attack remains likely under this scenario. Future dwellings within the expansion area will be constructed in accordance with AS 3959 bushfire construction requirements applicable to their assessed BAL rating, which will mitigate this risk. The presence of low and moderate BHL areas along parts of the south-western interface, together with the Pickering Brook Golf Course, Pickering Brook Road and adjoining managed land, may also provide a degree of hazard separation between the broader bushfire hazard and the townsite.

In the event of a landscape-scale bushfire approaching from the south or south-west, the principal evacuation options from the existing and proposed townsite expansion would be to the west via Canning Road towards Lesmurdie and Kalamunda, and to the north via Glenisla Road. A third option is east along Pickering Brook Road, north onto Patterson Road and west onto Walnut Road towards Kalamunda. An additional option may be available via Patterson Road and Lockwood Road towards Mundaring Weir.

As detailed above, the Technical Note found that Canning Road (west) has sufficient carrying capacity to provide for evacuation, and Glenisla Road provides an additional evacuation route north of Canning Road (west). Glenisla Road is a Regional Distributor road and has sufficient capacity to cater for the required traffic volumes.

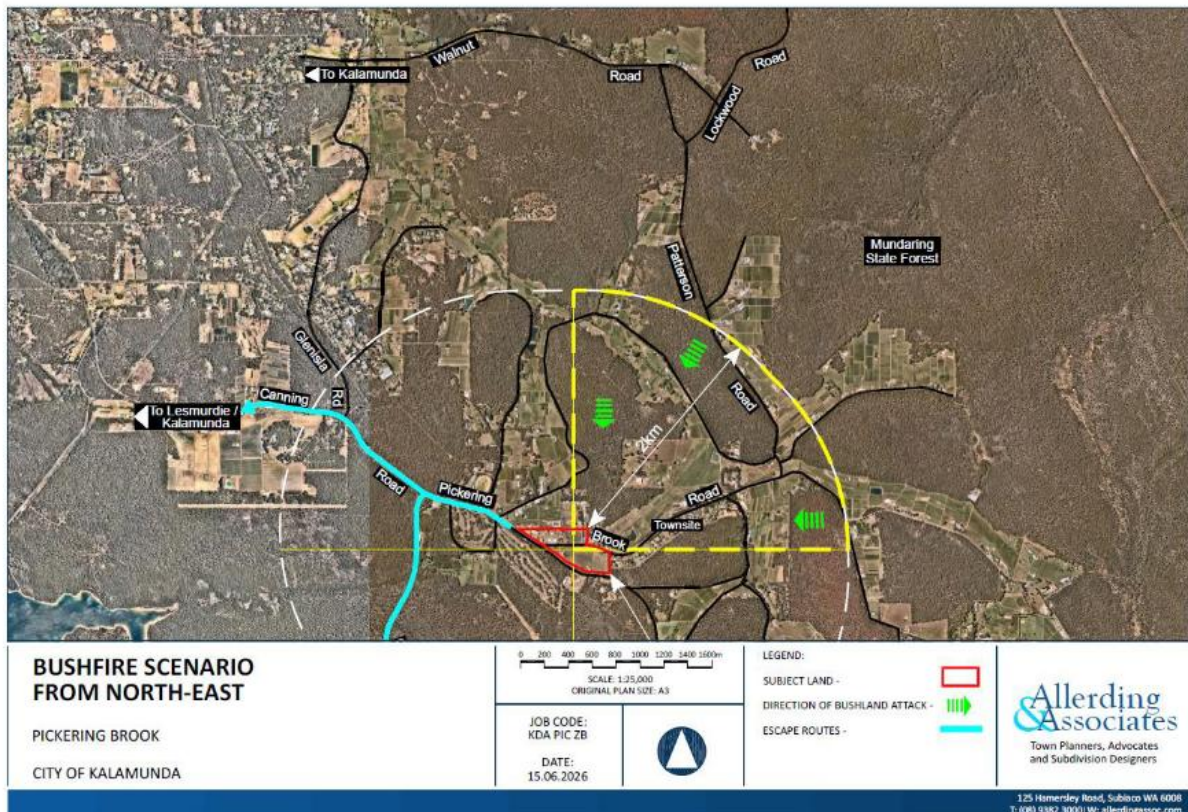


Figure 13: Bushfire scenario (North-east)

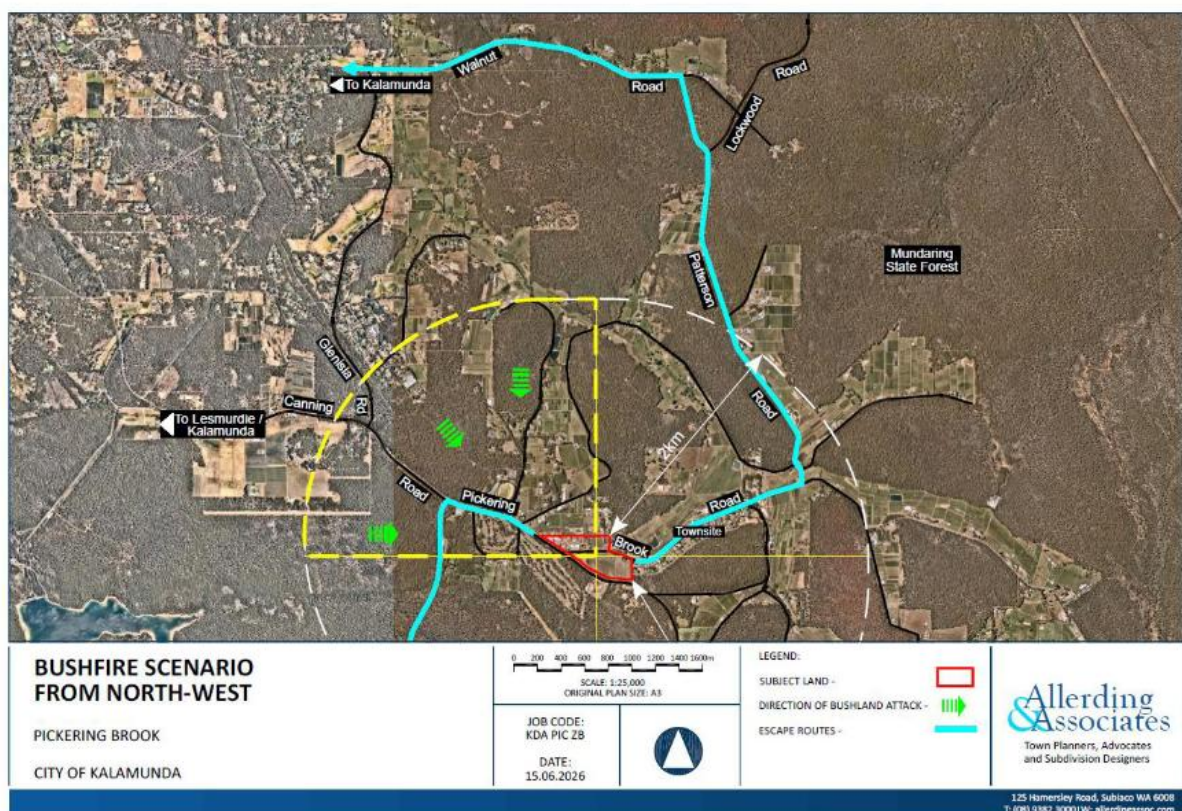


Figure 14: Bushfire scenario (North-west)

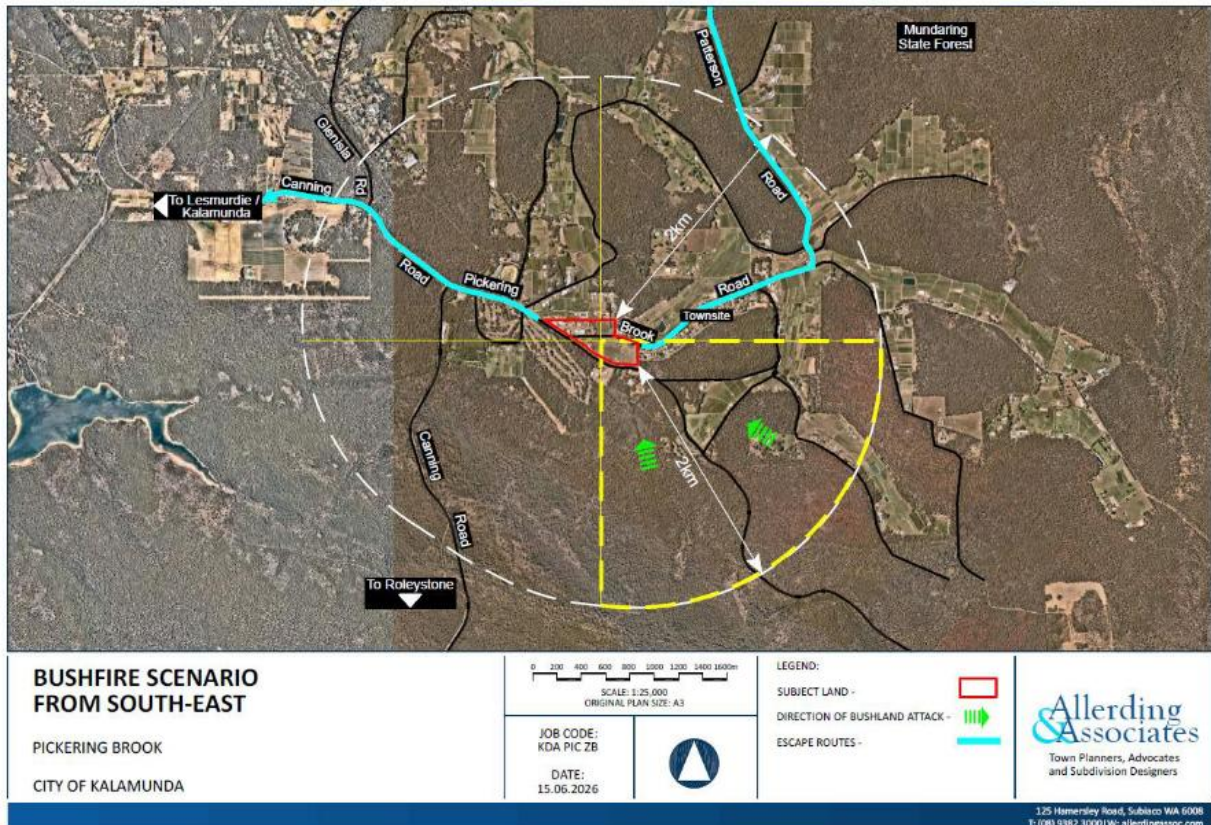


Figure 15: Bushfire scenario (South-east)

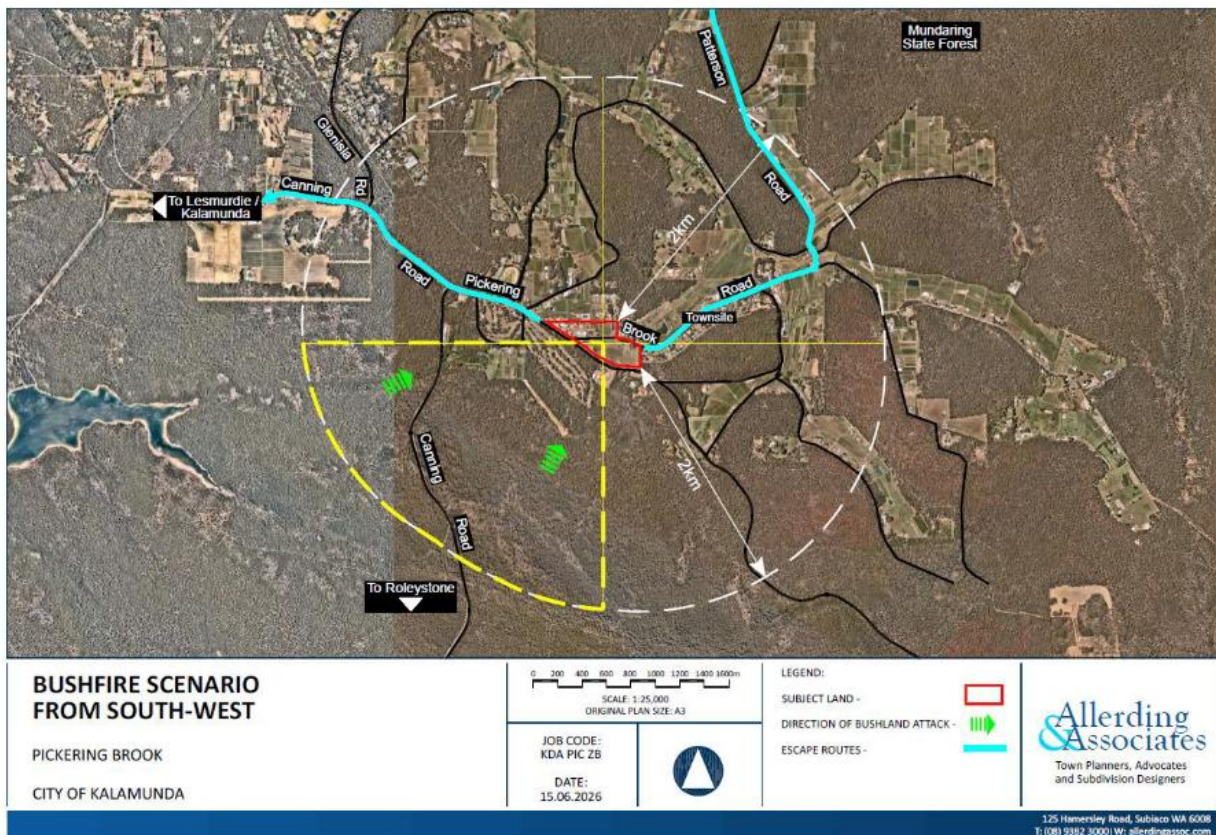


Figure 16: Bushfire scenario (South-west)

9.0 RESPONSIBILITIES FOR IMPLEMENTATION AND MANAGEMENT OF MEASURES

The relevant responsibilities for implementation and management of the required actions contained within this BMP are summarised below. Many of the measures will be implemented at subsequent stages of the planning process.

Measure	Responsibility	Timing
Investigate current reticulated water capacity	Water Corporation	To support MRS rezoning
Explore options for BRMP with DFES	Local Government	Prior to LPS rezoning
Discuss options with DFES and DBCA for more regular fuel management within Lot 81 Cunnold Street, and Reserve 47881 Pickering Brook Road	Local Government	Prior to LPS rezoning or subdivision
Prepare community information on retrofitting existing homes to improve bushfire resilience	Local Government	Prior to LPS rezoning or subdivision
Install signage in accordance with the recommendations of this BMP and detailed within the Pickering Brook Bushfire Evacuation Technical note	Local Government	Prior to subdivision
Undertake road upgrades in accordance with the recommendations of this BMP and detailed within the Pickering Brook Bushfire Evacuation Technical note	Local Government	Prior to subdivision
Manage roadside verge vegetation to ensure a minimum 6m horizontal clearance and 4.5m vertical clearance, at all times	Local Government	Prior to subdivision and on an on-going basis
Install and maintain a 50, 000 litre bushfire water tank	Developer/Local Government	Install prior to development and maintain on an on-going basis.
New dwellings constructed in accordance with AS3959 with a minimum construction of BAL-12.5 for BAL-Low areas.	Developer	Prior to occupation of new dwellings.

10.0 REFERENCES

Australian Institute for Disaster Resilience 2020, *Australian Disaster Resilience Handbook 10: National Emergency Risk Assessment Guidelines*

City of Kalamunda 2025, *Fire Hazard Reduction Notice 2025/2026*, [www.kalamunda.wa.gov.au/docs/default-source/fire-emergency-docs/fire-hazard-reduction notice](http://www.kalamunda.wa.gov.au/docs/default-source/fire-emergency-docs/fire-hazard-reduction-notice)

Department of Planning, Lands and Heritage 2020. *Pickering Brook and Surrounds Sustainability and Tourism Strategy – Part 1 – Pickering Brook Townsite Working Group report and recommendations to the State Government Taskforce* Government of Western Australia

Department of Planning, Lands and Heritage 2025. *Pickering Brook and Surrounds Sustainability and Tourism Strategy – Part 2 – Facilitating Sustainable Economic Opportunities* Government of Western Australia

Donald Veal Consultants 2026 *Pickering Brook Bushfire Evacuation Technical Note*. City of Kalamunda

Element 2020 *Pickering Brook and Surrounds Perth hills Tourism Product Gap Analysis* DPLH

Emerge April. Associates *Bushfire Management Plan Pickering Brook Townsite Bushfire Risk Assessment* DPLH

Emerge July. Associates *Bushfire Management Plan Pickering Brook and Surrounds Bushfire Risk Assessment* DPLH

Macroplan 2020. *Pickering brook townsite sustainability assessment* Department of Planning, Lands and Heritage

MNG 2026, MNG Access, <https://app.mngaccess.com.au/>

Standards Australia Online 2018, *Construction of buildings in bushfire-prone areas*, AS 3959:2018.
Western Australian Planning Commission 2024, *Planning for bushfire guidelines*, Government of Western Australia

Western Australian Planning Commission 2024, *State Planning Policy 3.7 bushfire*, Government of Western Australia

<https://www.planning.wa.gov.au/wapc-agendas-and-minutes/28-jan-2026---western-australian-planning-commission---agenda> MRS Pickering Brook

**APPENDIX 1 –
PICKERING BROOK BUSHFIRE EVACUATION TECHNICAL NOTE**



June 2026

Revised Final Draft

Pickering Brook Bushfire Evacuation

Prepared For:
City of Kalamunda



Technical Note



DOCUMENT ISSUE AUTHORISATION

Issue	Rev	Date	Description	Prepared by	Checked by	Approved by
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1	1	19/06/2026	Final Draft Report	SGY	GTT	SGY
1	2	30/06/2026	Revised Final Draft Report	SGY	GTT	SGY

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Donald Veal Consultants Pty Ltd

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1. INTRODUCTION

1.1 BACKGROUND

Donald Veal Consultants (DVC) has been commissioned to provide transport engineering input to a Strategic Bushfire Management Plan (BMP) for Pickering Brook.

1.2 SCOPE OF THIS REPORT

The focus of this report is to identify and evaluate suitable evacuation routes from the townsite of Pickering Brook in the event of a bushfire.

The Technical Note will consider the types and volumes of traffic that will need to be accommodated on the evacuation routes, the likely staging of the decisions to leave and the expected time taken to evacuate people to a safer location.

Potential infrastructure upgrades are also touched upon which will improve the traffic flow and safety of evacuation from a traffic perspective.

2. PICKERING BROOK

2.1 LOCATION

Pickering Brook is a rural suburb in the Perth hills, lying some 30kms to the southeast of the Perth CBD, in the City of Kalamunda. Refer to **Figure 2.1** for its general locality. The area is characterised as a farming community, but has a significant element of tourist-based activities.

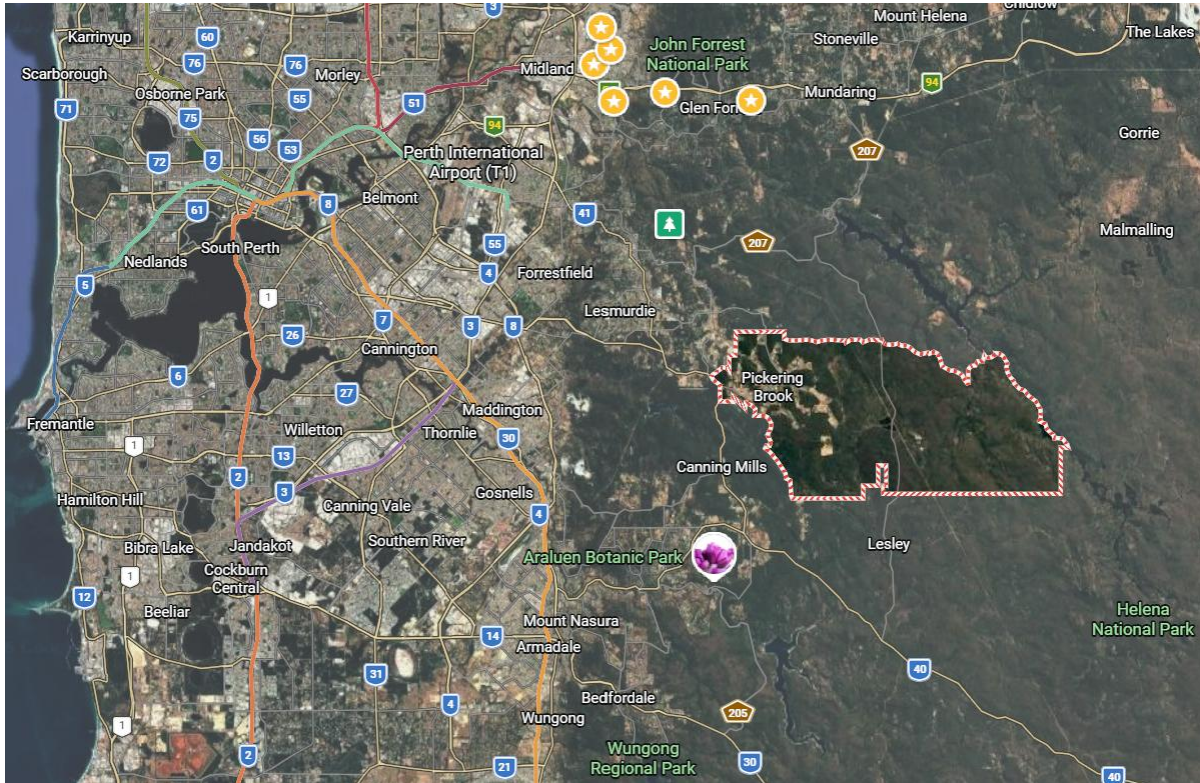


Figure 2.1: General location of Pickering Brook.

Source: Google Maps

2.2 ROAD NETWORK

The main townsite area is located along Pickering Brook Road, which is classified in MRWA's Functional Road Hierarchy as a Local Distributor Road. The majority of the other roads within the suburb are classified as Access Roads, and are generally signed as being 'No Through Roads'.

As can be seen in **Figure 2.2** below, the townsite of Pickering Brook is served by a number of Regional Distributor roads, providing direct links to the north, via Canning Road and Glenisla Road, to the west via Canning Road and to the south, again via Canning Road, but it cannot be directly accessed from the east.

Whilst there are a number of smaller roads, that can provide alternative links between these main route options, many of the roads within this area simply provide access to small numbers of rural properties, with no through access.

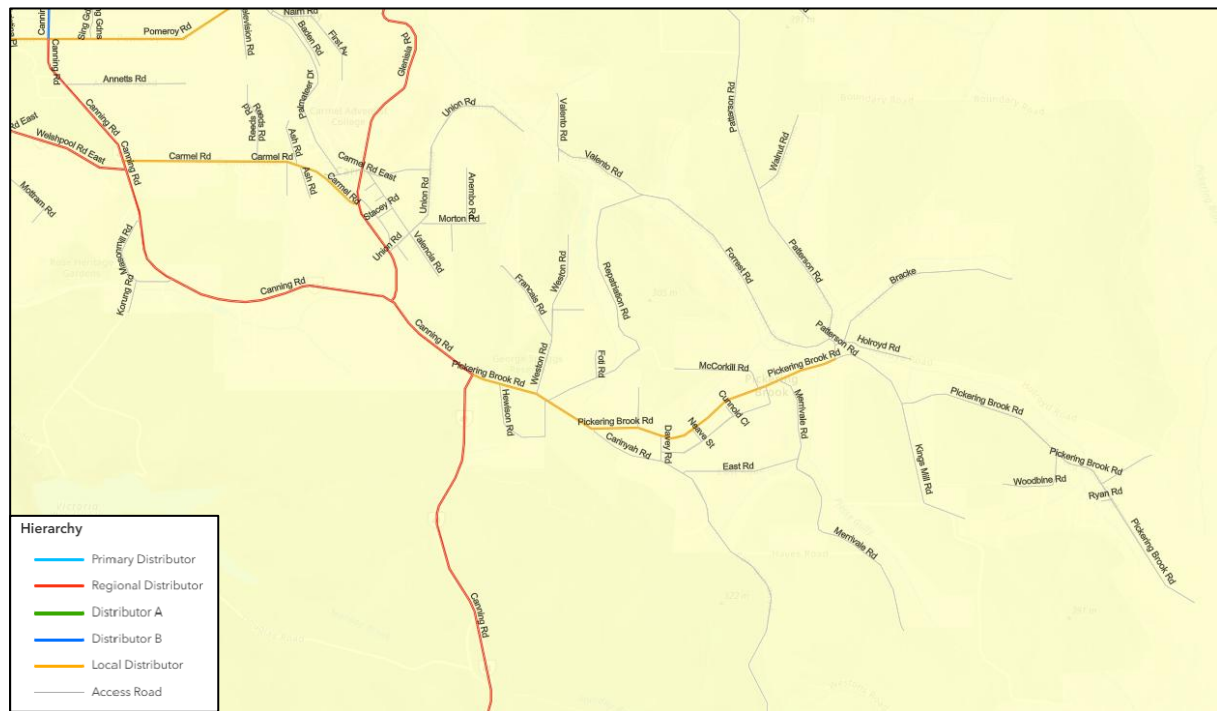


Figure 2.2: Road network hierarchy around Pickering Brook

Source: MRWA's Road Info Mapping

3. BUSHFIRE SCENARIOS

Historically, it is understood that bush fires in this area are most likely to approach from the east, but potentially also from the south east or north east. However, depending upon prevailing conditions, other scenarios are certainly possible.

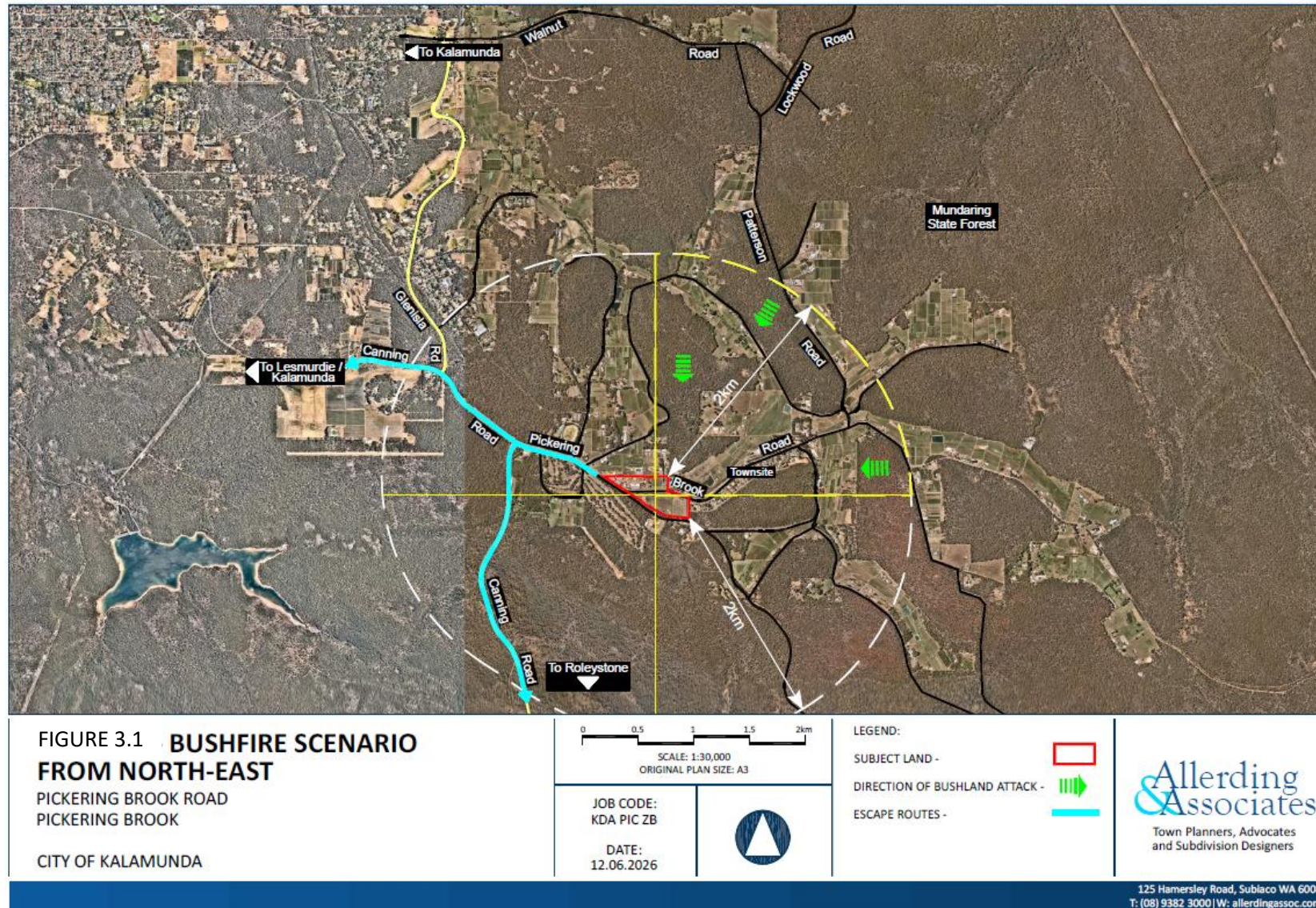
Clearly, the decision to recommend an evacuation from the area would depend upon a number of factors, including an assessment of the threat presented by a fire, given its location, intensity, predicted path and speed. These factors would also determine which potential evacuation route option would be the most appropriate.

Typical bushfire scenarios, showing potential bushfire approach paths and corresponding evacuation route options, can be seen in **Figures 3.1 to 3.4**.

It should be noted that other possible evacuation routes are available, and may be preferred in a particular scenario. Some of these will be considered in subsequent sections of this report.

Client: City of Kalamunda

Project: Pickering Brook Bushfire Evacuation



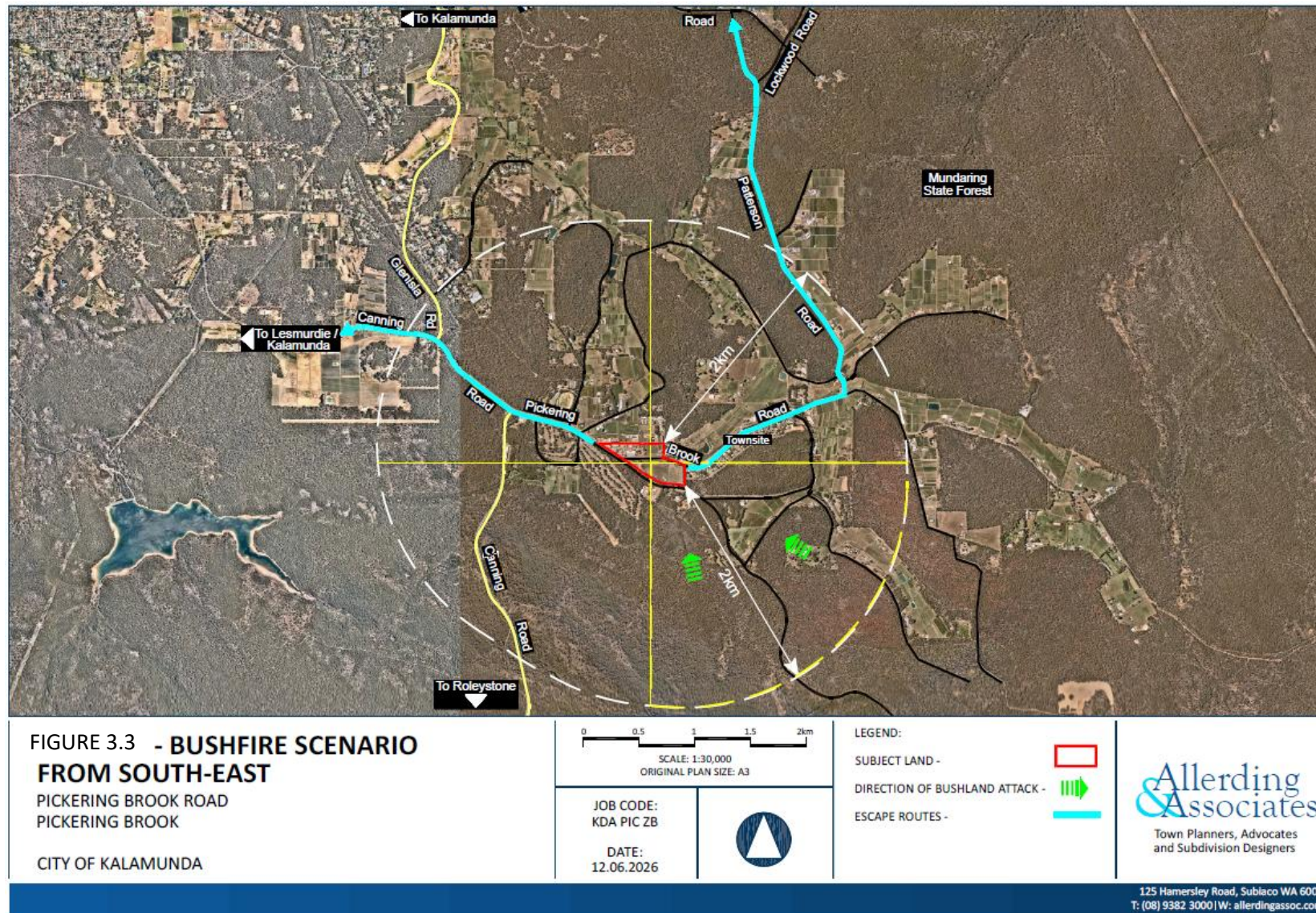
Client: City of Kalamunda

Project: Pickering Brook Bushfire Evacuation



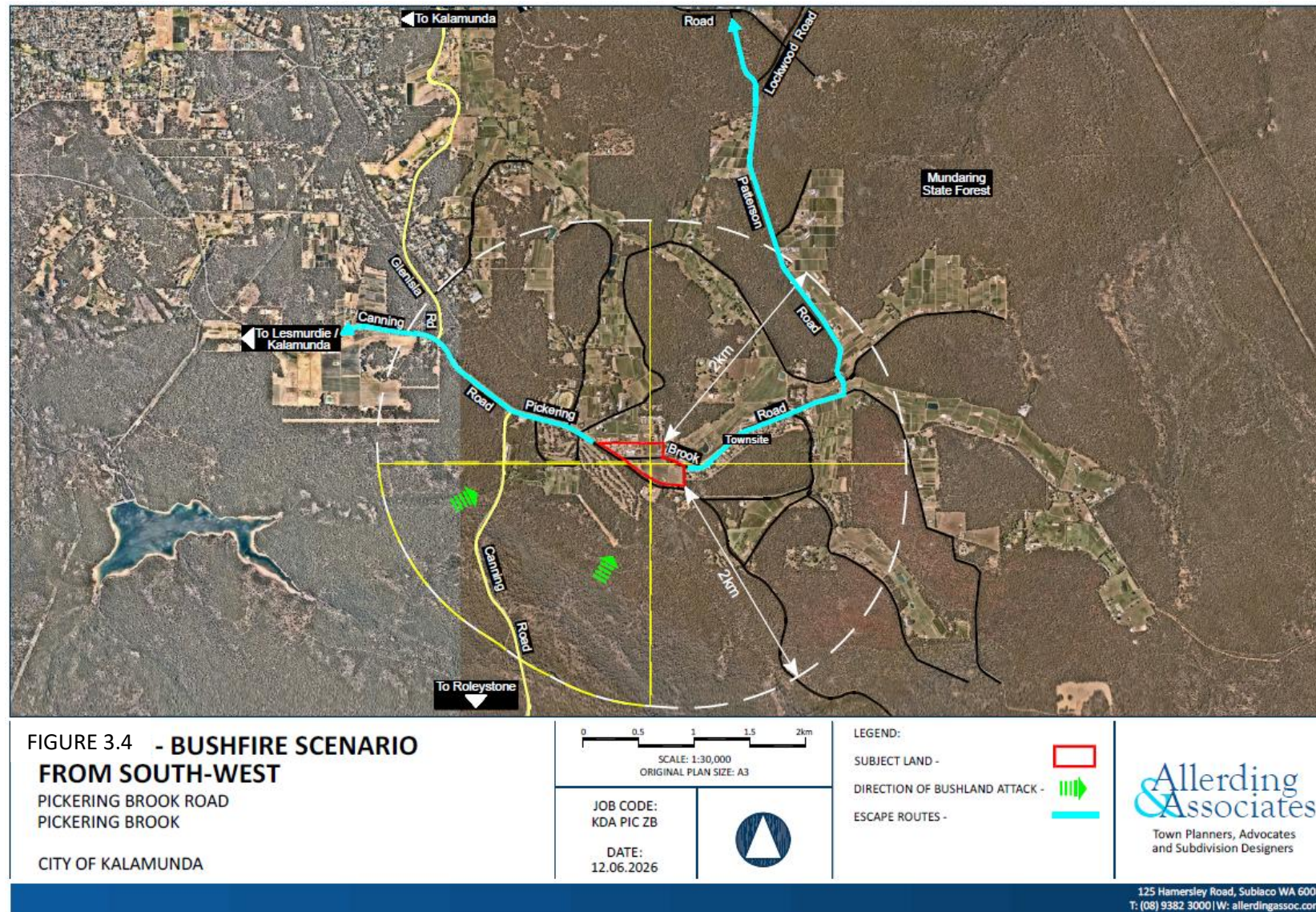
Client: City of Kalamunda

Project: Pickering Brook Bushfire Evacuation



Client: City of Kalamunda

Project: Pickering Brook Bushfire Evacuation



4. ASSESSMENT OF EVACUATION NUMBERS

4.1 GENERAL

Generally, different people behave in different ways.

In a bushfire situation, this remains true. Some will refuse to leave their homes, and vow to defend their property, come what may. Others will leave as soon as they are advised that this is the safest option. A few will have already left. Yet others may delay their decision, until the last possible moment.

There will also be differences in the time taken for people to prepare to leave.

Thus, the timing of an evacuation, the vehicle types, numbers and their potential speeds are difficult to predict.

In their peer review comments*, Meridian Urban quoted data gathered during interviews with residents, regarding their intentions with respect to leaving the area in the event of a future fire warning.

*[28-jan-2026---western-australian-planning-commission---agenda](#)

The data identified the following proportions:

- 12% stated that they would leave early;
- 24% intended to wait to see whether a fire started, and then leave if it did;
- 27% stated they would prepare to stay and defend their properties; and
- 24% were uncertain as to their likely course of action.

It is noted that this does not add up to 100%.

From the above survey up to 73% of residents may well leave in the event of a fire warning. In this Technical Note, however, it has initially been assumed, as a worst-case scenario, that the vast majority of the residents, the visitors, the workers and the tourists, will all leave together, within a short window of time. Clearly, if this is possible, then other, perhaps more realistic, evacuation scenarios should also be achievable.

4.2 RESIDENTS

The latest population figures made available from the 2021 Census indicate that there are approximately 579 residents in the Pickering Brook area. With 228 private dwellings in the area, this gives an average of 2.7 residents per dwelling.

Given that the population figure includes children and others who may not be able to drive, a conservative estimate must be made for the number of evacuation vehicles that might be expected.

On average, the census shows that there are 2.7 vehicles per dwelling. Allowing for people to be keen to try to evacuate as many of their vehicles as possible, we would conservatively estimate that each dwelling may evacuate using up to 2.5 vehicles. This would generate around 570 vehicles for the residential element.

4.3 WORKERS, TOURISTS & OTHER VISITORS

Generally, particularly during the high season, it would be expected that a number of people would be working at the various businesses within the Pickering Brook area, not all of whom would be local residents. Although some may arrive by bus, most would likely do so in single occupant private vehicles.

These people might reasonably be expected to be able to leave quite quickly, given there would be no decision to be made regarding staying and defending.

The number of tourists and other visitors present in the area could be influenced by a number of factors, and as such, is difficult to predict.

A search of Australian Bureau of Statistics (ABS) data indicates that local businesses within Pickering Brook employ around 470 people. Whilst this number appears high, a proportion of these people will be residents, whilst others will commute from other areas. 2021 Census data from ABS also identifies that approximately 306 people living in Pickering Brook are employed. However, this did not indicate whether their places of employment were within the area or beyond.

Similarly, there is little information regarding tourist numbers, with most being casual visitors, rather than those seeking accommodation. These visitors come and go at random times throughout the day and week, although seasonal peaks do exist.

Short of carrying out detailed surveys, or collecting staffing and visitor data from all local businesses, there does not appear to be a simple way to get an accurate estimate of the numbers of these people. Even then, numbers may vary significantly from day to day and week to week.

In order to make a basic estimate of the potential number of workers, tourists and other visitors that may need to be evacuated in the event of a fire, DVC has made some assumptions, based on available data:

- A maximum of 250 external staff vehicles within the area at any one time;
- A maximum of 200 vehicles, driven by tourists and other visitors, within the area at any one time;
- The majority of tourists would leave early, or not visit, once aware of the fire danger*; and
- The majority of external, non-resident workers would also leave early*.

*The latter assumptions are made based on these persons not having to make a decision as to whether to stay and defend, and with little time required to prepare to leave.

4.4 TOTAL VEHICLES TO BE EVACUATED

Thus, the total number of vehicles estimated to require evacuation would be as follows:

Residents = 570

External workers = 250

Tourists and other visitors = 200

Total number of vehicles = 1,020.

4.5 VEHICLE TYPES

Whilst it is expected that the majority of vehicles being used to evacuate will be standard sedans, 4WDs and SUVs, there may be a proportion of vehicles towing trailers, caravans and horseboxes.

Such vehicles would generally be able to keep up with other traffic, although horse boxes may slow down progress, particularly if it is necessary to use the Patterson Road evacuation route.

There is also a haulage business located along Pickering Brook Road, with a number of Prime Movers parked in front. Although these are quite large, unless they have fully laden trailers attached, they are likely to be able to travel at the same speed as other traffic. It is expected that these would be evacuated reasonably early, rather than at the last moment.

Given the significance of agricultural pursuits in this area, some residents or business owners may wish to remove larger machinery from the risk area.

Consideration should be given to a suitable policy for the early evacuation of vehicles and machinery that would be reasonably expected to impede the general evacuation process.

5. EVACUATION ROUTES

5.1 GENERAL

Fundamentally, there are three main evacuation directions available, depending upon the direction of an approaching bushfire: North, South or West. As previously identified, there is no feasible evacuation route from Pickering Brook towards the east.

5.2 WESTERN ROUTE (ROUTE 1)

The main Western evacuation route entails heading west from Pickering Brook along Pickering Brook Road, which becomes Canning Road, and is signposted for Kalamunda. This is shown in **Figure 3.1**.

Further along to the west, drivers may choose to continue on to Kalamunda on Canning Road, or turn left onto Welshpool Road East.

5.3 SOUTHERN ROUTE (ROUTE 2)

The main Southern evacuation route consists of again heading west from Pickering Brook along Pickering Brook Road, before turning left onto Canning Road, signposted for Kelmscott and Brookton. This is also shown in **Figure 3.1**.

This is the only real option for a southern evacuation.

5.4 NORTHERN ROUTE (ROUTE 3)

Depending upon the direction from which the fire is approaching, the best Northern evacuation route may consist of heading west from Pickering Brook along Pickering Brook Road, and continuing west along Canning Road, signposted for Kalamunda, and then taking a right turn onto Glenisla Road.

An alternative northern route (Route 4) may be used if this route is inaccessible.

5.5 ALTERNATIVE ROUTES AND DETOURS

5.5.1 North / West (Route 4)

Should there be an unforeseen situation, whereby the primary exit route from Pickering Brook to either the north or west - i.e. Canning Road and/or Glenisla Road - is not available, then there is an alternative north/west option further to the east.

This would involve heading east along Pickering Brook Road through the townsite, before turning left onto Bracken Road, and then using Patterson Road, Walnut Road and Lawnbrook East Road. Following this route would allow one to rejoin Glenisla Road or Canning Road, further to the west. This is shown in **Figure 3.3**.

5.5.2 West (Route 1a)

Should access to Canning Road west of the townsite be blocked, a potential detour via Glenisla Road and Carmel Road may also be considered.

5.5.3 South

It is noted that if the recommended evacuation direction is south, there is only one feasible road in that direction – i.e. Canning Road. No realistic alternative routes are available.

5.5.4 Unsealed routes

Whilst there are some alternative routes along unsealed roads, these would not be considered as viable options in most cases, especially for persons unfamiliar with the area. Driving on unsealed roads requires a skill set that not all have and the roads may not be signed appropriately as not highly trafficked. Generally, these roads run through densely forested regions, where the risks of fire would be higher, the potential to get lost may rise, and road conditions cannot be guaranteed. Hence, use of such roads for evacuation should not be encouraged.

5.6 CRITICAL LINKS

As can be seen from the main and alternative route options, there are some key links within the area that need to be kept open in order to allow people to access the preferred or necessary alternative routes.

The main key links are:

- i. **Pickering Brook Road**, between Bracken Road and Canning Road;
This link allows access to both the southern and western Canning Road options, as well as the north / west Patterson Road option.
- ii. **Canning Road** between Pickering Brook Road and Glenisla Road.
This link allows access to both the northern Glenisla Road and western Canning Road options.
- iii. **Bracken Road** between Pickering Brook Road and Patterson Road.
This link allows access to the northern Patterson Road / Walnut Road route.

6. ASSESSMENT OF EVACUATION ROUTES

6.1 ROUTE CHARACTERISTICS AND ISSUES

DVC has driven along the majority of the links in each potential route and detour, in order to assess the suitability of each to provide both an evacuation route and an entry route for emergency services.

The following sections provide some notes regarding potential issues and characteristics of the various links.

6.1.1 Common Link – Pickering Brook Road

A majority of the vehicles leaving Pickering Brook will need to use Pickering Brook Road in order to access whichever evacuation route they are intending to use.

The road is constructed as a two-lane undivided highway, partly kerbed, with one lane in each direction. The sealed road width is generally over 7.0m, although this drops slightly further east. Nonetheless, it remains above the required minimum of 6.0m throughout. The road is designated as a Local Distributor, which can be defined as follows:

Urban - (Built Up Area)

Roads that carry traffic within a cell and link District Distributors or Regional Distributors at the boundary, to access roads. The route of Local Distributors should discourage through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to, or serving the area. These roads should accommodate buses, but discourage trucks.

Rural - (Non Built Up Area)

Connect to other Rural Distributors and to Rural Access Roads. Not Regional Distributors, but which are designed for efficient movement of people and goods within regional areas.

Urban and Rural Local Distributor roads are managed by local government.

6.1.2 Route 1: West along Canning Road

Canning Road, west of Pickering Brook, is constructed as a two-lane undivided highway, with one lane in each direction. The traffic lanes are generally 3.5m wide. The road is designated as a Regional Distributor, which can be defined as:

Roads that are not Primary Distributors but which link significant destinations and are designed for efficient movement of people and goods within and beyond regional areas. They are managed by local government.

As such, these roads would generally carry around 3,000 to 6,000 vehicles per day.

The route is readily identifiable, as it is a direct continuation of Pickering Brook Road, as one exits the townsite to the west. However, it is noted that there are no easily visible direction signs confirming the road as leading to Kalamunda.

No issues were identified along the route in terms of cross section, throttle points, overhead or underground elements etc. No issues were identified in terms of visibility, gradients or intersections.

6.1.3 Route 2: South along Canning Road

Whilst the geometry and capacity of Canning Road heading south from Pickering Brook is much as per the western section, again with no issues identified regarding cross section, gradient or other restrictions, it was noted that the route is not as easy to identify on leaving the townsite.

The southern section of Canning Road is effectively a side road off the through east-west route, which consists of Pickering Brook Road and the western section of Canning Road.

This side road intersection is less obvious, and may be missed, due to the location and partial obstruction of the direction signs.

See **Photos 1 & 2**.



Photo 1: The intersection with the southern Canning Road route is not very visible from the Pickering Road approach.



Photo 2: The intersection is signposted for Kelmscott and Brookton, but this could easily be missed.

6.1.4 Route 3: North along Canning Road / Glenisla Road, then west on Lawnbrook Road

Glenisla Road, between Canning Road and Lawnbrook Road East, in Bickley, is constructed as a two-lane undivided highway, with one lane in each direction. The road seal is generally 6 to 6.2m wide, for the majority of its length. Whilst the seal widens to over 7.0m just south of Bickley, it is noted that there are some significant (unprotected) embankment drop offs to the eastern side of the road in this area.

Glenisla Road is designated as a Regional Distributor, which are defined as:

Roads that are not Primary Distributors but which link significant destinations and are designed for efficient movement of people and goods within and beyond regional areas. They are managed by local government.

Again, this road would generally carry around 3,000 to 6,000 vehicles per day.

Lawnbrook Road is designated a Distributor B road in MRWA's functional road hierarchy. These roads are intended to carry an indicative volume of over 6,000 vpd, and are defined as follows:

District Distributor B : Urban area roads - (Built Up Area)

Perform a similar function to type A District Distributors but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These are often older roads with a traffic demand in excess of that originally intended. District Distributor A and B roads run between land-use cells and generally not through them, forming a grid which would ideally space them around 1.5 kilometres apart. They are managed by local government.

6.1.5 Route 4: North along Bracken Road / Patterson Road and then west on Walnut Road

Patterson Road, between Bracken Road and Walnut Road, is constructed as a two-lane undivided highway, with one lane in each direction. The southern section has been widened to provide two three metre lanes, with edge lines and sealed shoulders, but this drops back to a 5.5m seal, further north. See **Photo 3**.



Photo 3: Patterson Road transitions from over 6.0m between edge lines to the south, to a 5.5m seal in the north.

Both Bracken Road and Patterson Road are designated as Access Roads, which are defined as:

Access Roads: Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by local government.

In a Built-Up Area, the Maximum desirable volume of an Access Road is stated as 3 000 vpd. In non-Built-Up Areas this reduces to 'up to 75 vpd'.

Apart from the limited general width of the road, another issue identified along this evacuation route is the presence of two culverts beneath Bracken Road and Patterson Road, just north of Pickering Brook Road. These culverts are near intersections and horizontal curves, and are only around 5.5m wide. This is likely to restrict traffic flow.

See **Photos 4 & 5**.



Photo 4: Narrow culvert under Bracken Road, just north of Pickering Brook Road intersection.



Photo 5: Narrow culvert under Patterson Road, between Bracken Road and Forrest Road intersections.

Walnut Road, west of the Patterson Road intersection, is also relatively narrow, with a generally 5.5m seal, on a fairly steep downhill gradient. There are large trees along the northern edge, and an open drain along the south.

Again, this road is designated as an Access Road.

Whilst this route offers an acceptable alternative evacuation route from the Pickering Brook area, it is not currently suitable for emergency vehicle access to occur concurrently with the evacuation of residents.

6.2 EVACUATION ROUTE CAPACITY

6.2.1 General

The capacity of a route to accommodate the number of vehicles wishing to use it is generally limited primarily by the capacity of the intersections along it. This in turn is restricted by the number of vehicles wishing to turn, particularly right, and the number of vehicles on the intersecting road. Capacity is rarely limited purely by mid-block issues, except in very specific cases.

Generally, the capacity of a single lane of traffic, in free-flowing, uninterrupted conditions, is estimated to be in the region of 1,800 to 2,200 vehicles per hour. However, this can be affected significantly by a number of factors, including, as indicated above, intersections and other interruptions, such as pedestrian crossings, access points etc. The nature of the vehicles may also have an effect, with significant numbers of heavy vehicles, caravans and trailers etc reducing the overall capacity. Narrow lanes may also reduce capacity, as drivers tend to reduce speed if they are closer to oncoming traffic.

In the case of an evacuation scenario, it is expected that most of the vehicles will be travelling in one direction, and that the majority will be making the same turning movements at each intersection, except where alternative routes commence, and evacuees can choose to head south, say, instead of west. It is expected that there will be little opposing traffic, and that – where necessary – intersection movements will be traffic managed by the Department of Fire and Emergency Services (DFES) or Police personnel, giving priority to the evacuating vehicles.

These factors mean that the usual effect of intersections on overall capacity and timing may be significantly reduced. Nonetheless, in an evacuation scenario, factors including the volume of traffic, the types of vehicles and the general atmosphere of a bushfire situation, may reduce speeds along the route. Other factors that may affect speeds generally, particularly in the later stages of evacuation, might include reduced visibility due to smoke, which may also affect the ability of drivers to read signs and therefore identify the appropriate evacuation route.

In this assessment we will look at the expected ability of various key links, generally those closer to the Pickering Brook area, to cater for the forecast numbers of evacuating vehicles. Once drivers are clear of the immediate area, depending upon the initial route used, additional route options may open up, and they may choose to head in different directions, depending upon their particular circumstances. In this way, the load on subsequent links and routes will reduce as the evacuating vehicles spread across more of the road network.

As previously identified, there will be a small number of key critical links, along which - depending upon the directions of the fire and the evacuation - almost all vehicles will need to travel. Canning Road being a Regional Distributor is taken to have the capacity to handle the evacuation volumes in addition to typical volumes on the route. Other critical routes are described below.

6.2.2 Pickering Brook Road

In the worst-case scenarios for this road, with a bushfire approaching from the east or northeast, virtually all evacuating vehicles will need to drive west along Pickering Brook Road.

There are no physical impediments or capacity issues to Pickering Brook Road being able to cater for the volume of traffic forecast, during a one-hour evacuation period of this type. However, as this road is the main artery through the townsite, it is clear that various smaller streams of traffic will be joining it at the various intersections, as well as individual vehicles from frontage properties.

This creates what is known as ‘side friction’ and can reduce the speed of vehicles significantly.

Nonetheless, with an absolute maximum of just over 1,000 vehicles heading west, this should remain well within the capacity of the road.

6.2.3 Glenisla Road

Should the section of Canning Road west of Glenisla Road be blocked, Glenisla Road would be the main northern escape route. Normally, a right turn into this road might present a delay, but in these circumstances, it is assumed that DFES would close off the through route, and there would be no opposing traffic.

Whilst it is perhaps unlikely that both Canning Road to the west and Patterson Road to the east would be blocked simultaneously, as a Regional Distributor road, Glenisla Road is considered to have sufficient capacity to cater for the required traffic volumes should this eventuate.

6.2.4 Bracken Road / Patterson Road

This route has perhaps the lowest potential capacity for carrying the entire evacuation traffic volume, given the steep nature of some sections and the limited width along others.

As Access Roads, the roads are generally not expected to cater for higher volumes of traffic on a regular basis, but with the vast majority of vehicles heading in one direction, this still offers an alternative option if required.

6.3 EVACUATION ROUTE TIMINGS

6.3.1 General

The time taken for vehicles to evacuate along any given route is primarily conditional upon speed and distance.

Whilst speed will vary both along the route, depending upon factors associated with the road, such as gradient, alignment and visibility, as well as individual factors, such as driver confidence and vehicle type, distance will also vary, depending upon where evacuees begin their journey, and at what point they can be considered to have reached ‘a safer place’.

Generally, one might assume that vehicles would be considered to have completed their evacuation once they have reached the nearest major townsite, as these should be equipped with evacuation centres in the event of a large bushfire.

In a lot of cases, however, particularly when residents have decided to leave early, it is expected that people will be relocating to the houses of friends or relatives, rather than to a central 'safe place'. Visitors, tourists and external workers are also likely to head back to their own homes, if that is beyond the fire risk area. Clearly, different evacuees may be on the road for a longer or shorter time and distance, depending on their particular origins and destinations.

Timings indicated by Google Maps have been shown for the main routes, as a base indicator. However, these are based on drivers generally travelling at or near to the speed limit. This may not be possible in an evacuation scenario, especially within the immediate townsite area.

The key to evacuating the townsite will be the capacity of the critical road links nearest to the town. Once drivers have reached Canning Road, for example, traffic should flow more freely, and no further capacity issues would be expected.

For the purpose of this exercise, it has been assumed that the average speed of those leaving the townsite - once they have reached a larger road, such as Canning Road - will be 40km/h, but restricted to 20km/h within the townsite, where some queuing may be expected, as vehicles join the evacuation routes from various side roads and driveways. On Access Roads, such as the Patterson Road route, we have assumed average speeds would reach perhaps 30km/h.

6.3.2 Townsite evacuation speeds and vehicle spacing

For the timing estimate for people to exit the immediate townsite area, we will assume that all 1,020 vehicles are to be evacuated as quickly as possible following a final evacuation notice.

Again, using a worst-case scenario, if we assume that it takes one hour to get all vehicles out of the townsite, and use an average speed through Pickering Brook of 20 km/h, the vehicles would then be leaving the area spaced, on average, 20m apart. This would allow plenty of gaps for vehicles to join the main route from property accesses and side roads. Generally, vehicles moving along in a queue situation might be expected to travel somewhat closer.

Thus, even with the maximum total number of vehicles evacuating, using a single route, it should be possible for all vehicles to leave in a one-hour period.

However, it is far more likely that the evacuation will be carried out in stages, with the majority of the (200 of 250) external workers, (150 of 200) tourists and other visitors leaving gradually, over a longer period, well before any final instruction to evacuate. This would leave around 100 worker and tourist vehicles, along with perhaps 80% of the 570 predicted resident vehicles. It should also be noted that from their aforementioned interviews, Meridian Urban identified that 27% of residents indicated that they intended to remain in place and defend. Should this scenario eventuate, and assuming that the

interviews were undertaken with only one person per dwelling, this would reduce the number of exiting vehicles by a further 150.

This equates to a total of perhaps 400 vehicles leaving in the hour following the final instruction to evacuate. These vehicles would then need to leave the townsite at a rate of just one vehicle every 9 seconds. Again, based on an average speed of 20km/h, these vehicles could be spaced at around 50 metre intervals. This number of vehicles would therefore be able to clear the townsite in well under an hour.

As previously identified, speeds would increase once the vehicles are clear of the townsite, and are travelling in convoy, with significantly reduced side friction, particularly on the higher order roads. The estimated 'second stage' route timings are described below.

6.3.3 Route 1

Route 1 will involve vehicles travelling west along Canning Road.

If we assume they would head to Kalamunda, rather than turning onto Welshpool Road, Google maps indicates a base time of around 13 minutes for this 12.4km route, travelling with no traffic. See **Figure 6.1**.

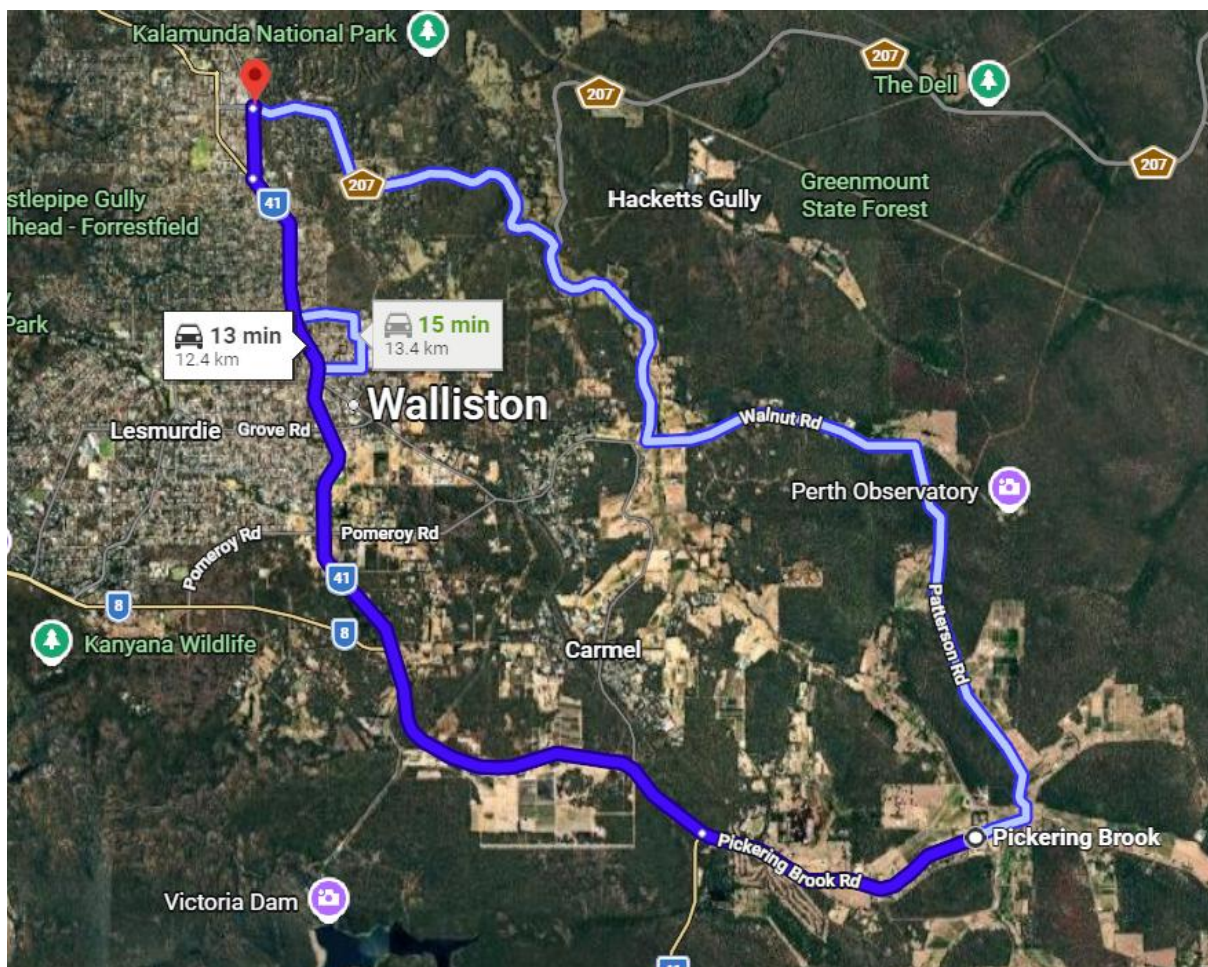


Figure 6.1: Google Maps timing for Route 1

This assumes an average speed of just under 60 km/h. If, due to the circumstances and the volume of traffic, this were to be reduced to, say 40km/h, the second stage of the evacuation journey should then take around 20 minutes.

6.3.4 Route 2

The southern evacuation route, along Pickering Brook Road and then south along Canning Road is a very straightforward route, if available. The only intersection along the route, between Pickering Brook and the Brookton Highway at Karragullen, is the left turn from Pickering Brook Road onto Canning Highway, at which vehicles would simply turn left, with no expected delays. At Brookton Highway, it is expected that most drivers would turn right towards Roleystone.

Google Maps shows that, with normal traffic, this journey of around 11km would take in the order of 10 minutes. This indicates an average speed of around 66km/h. See **Figure 6.2**.

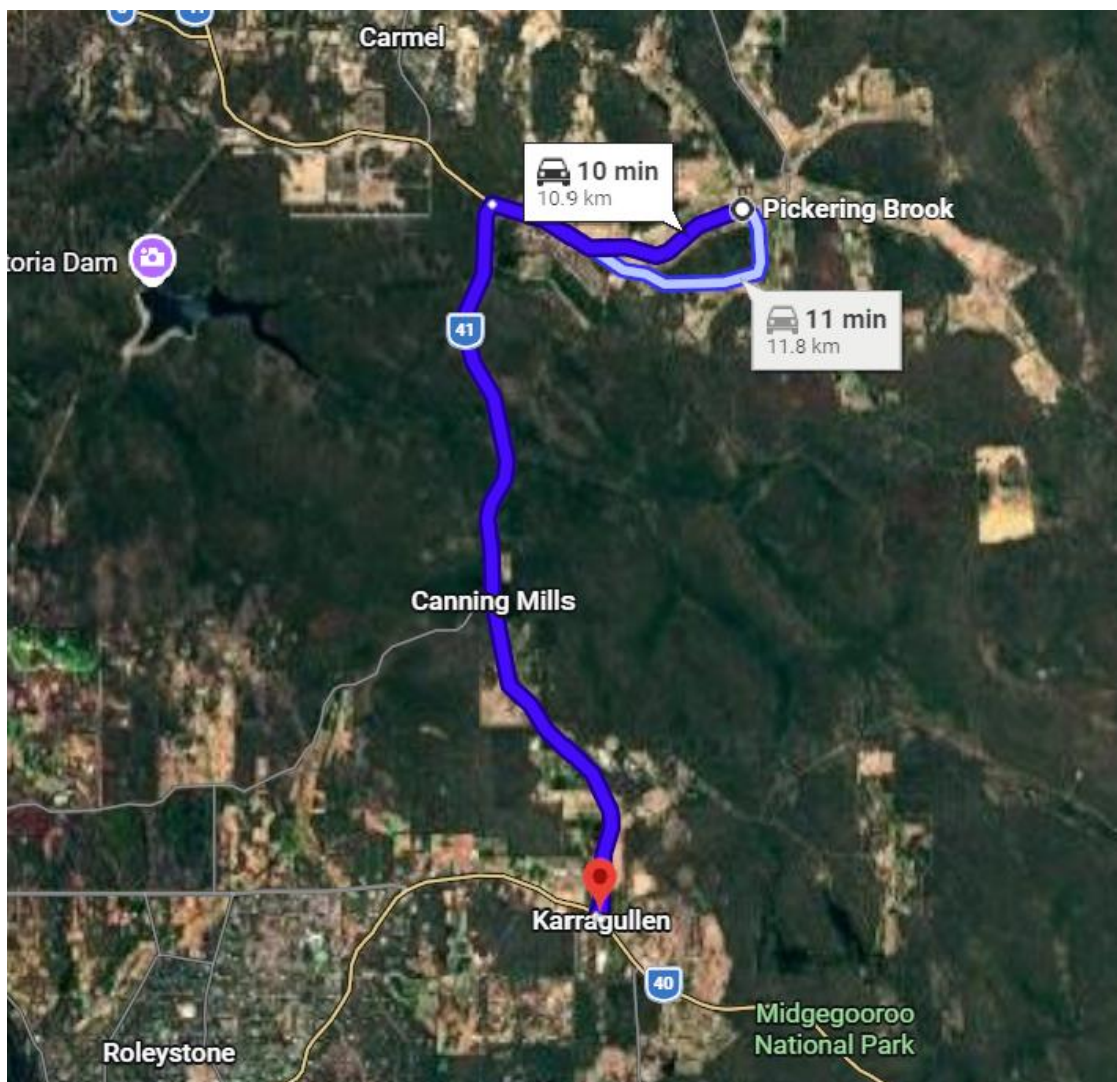


Figure 6.2: Google Maps timing for Route 2

Even if the average speed of vehicles evacuating the town site were to be reduced to 40 km/h, this route would only take around 17 minutes.

6.3.5 Route 3

The northern evacuation route, travelling along Pickering Brook Road, Canning Road, Glenisla Road and Lawnbrook Road is a more direct route through Walliston to Kalamunda.

Nonetheless, Google Maps shows that, with normal traffic, this journey of around 12km would take in the region of 14 minutes. See **Figure 6.3**.

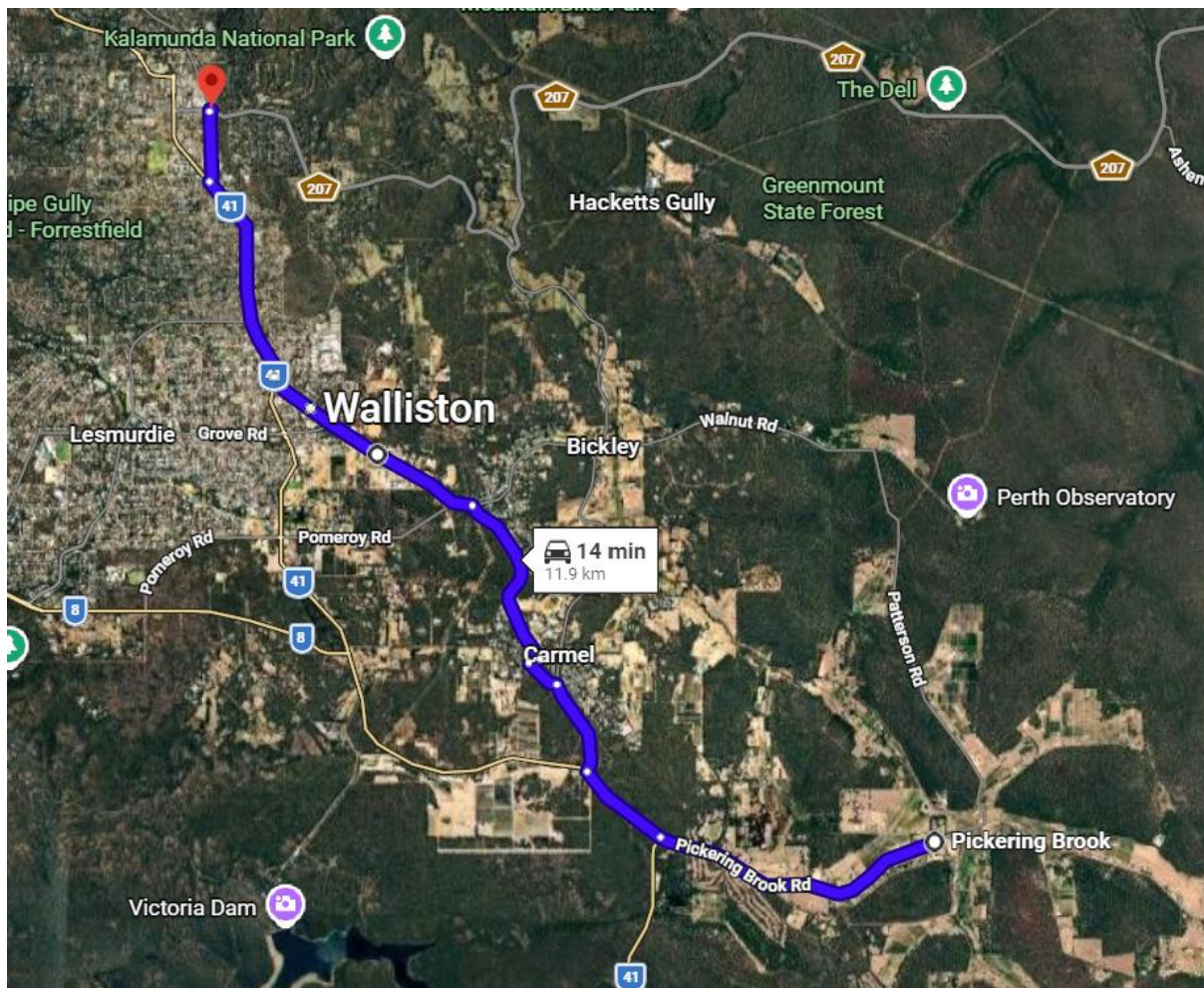


Figure 6.3: Google Maps timing for Route 3

This gives an average speed of around 51km/h. Reducing the average speed to 40 km/h would result in a travel time of around 18 minutes.

6.3.6 Route 4

The alternative north / west evacuation route, travelling east along Pickering Brook Road, Bracken Road, Patterson Road, Walnut Road and Lawnbrook Road is a less direct route through Walliston to Kalamunda.

Google Maps shows that, with normal traffic, this journey of around 13.5 km would take in the region of 16 minutes. See **Figure 6.4**.

This indicates an average speed of just over 50km/h. However, it is expected that the geometry of these roads would be less amenable to carrying the potential maximum volume of traffic using this route, during an evacuation scenario, potentially resulting in lower average speeds. We have therefore assumed an average speed of 30km/h, giving a journey time of 27 minutes.

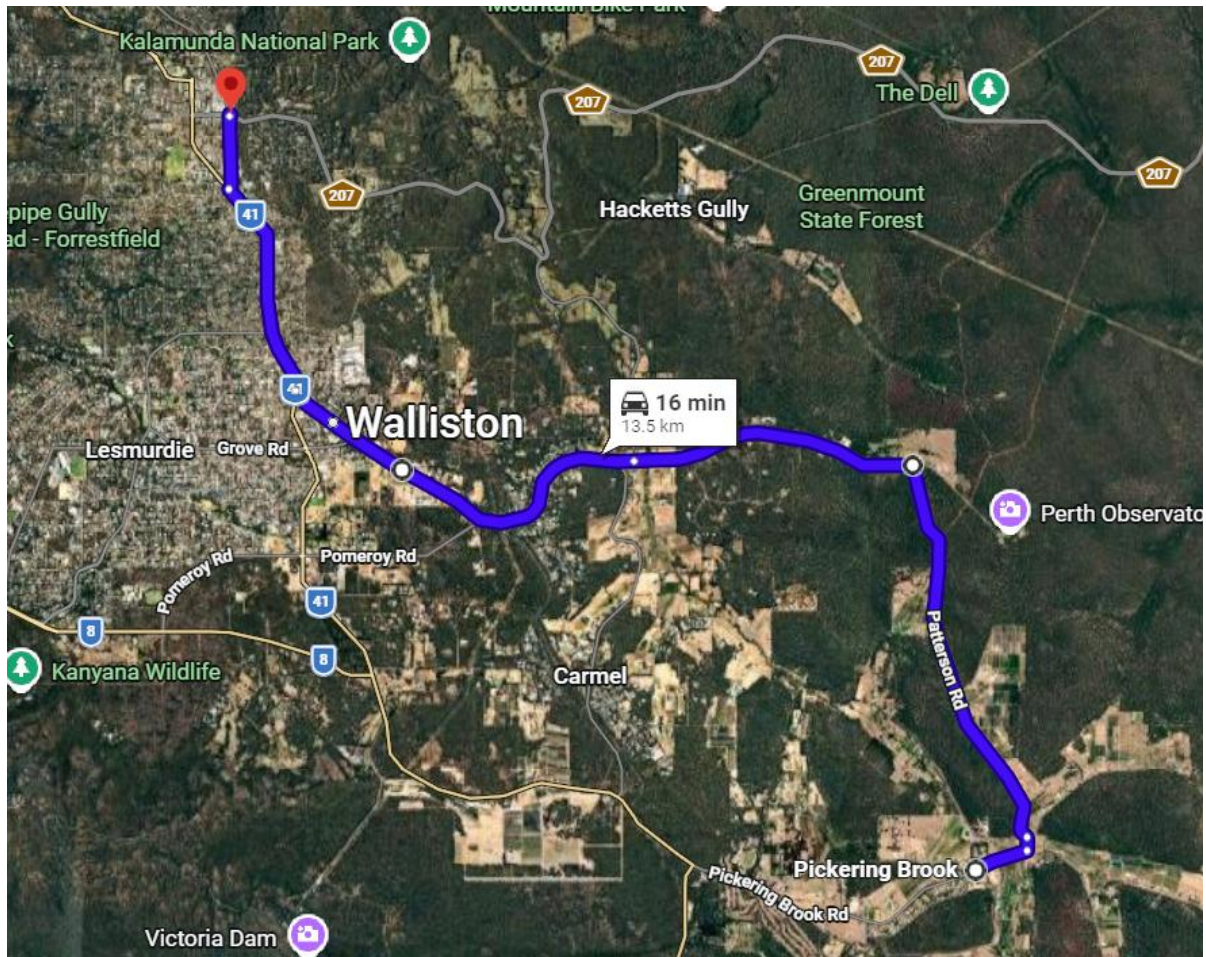


Figure 6.4: Google Maps timing for Route 4

7. IMPACT OF MRS AMENDMENT

The proposed amendment to the Metropolitan Regional Scheme (MRS) would result in the creation of an additional 44 residential blocks within Pickering Brook. This would increase the population of the townsite by around 131 residents.

Using the same methodology, the additional dwellings, once fully occupied, might produce a maximum of $2.5 \times 44 = 110$ more vehicles to be evacuated in the event of a bush fire event. Again, this is based on each family evacuating using an average of 2.5 vehicles. In reality, this may be on the high side.

As the new lots will be zoned residential, they would not be expected to generate any additional tourist or external worker trips.

As before, if we assume that perhaps 27% of the dwellings' residents would remain in place, the number of vehicles potentially evacuating then reduces to around 80. A proportion of these would be likely to leave early.

However, if we once again look at the worst-case scenario, with all residents, tourists and external workers leaving in a relatively short window, the additional vehicles generated by the new lots would represent a maximum increase of just over 10%.

In the more realistic scenario previously employed, with a previous final evacuation being undertaken by around 400 vehicles, the additional lots might contribute a further 58, or an additional 15%.

Given the capacity and timings previously determined, this increase should not cause any issues with the ability of these vehicles to evacuate the townsite in a timely manner.

8. EMERGENCY VEHICLE ACCESS

The routes to be taken by emergency vehicles into the area will of course depend upon their initial location and the direction of the approaching fire.

Given the road network around Pickering Brook, and the lack of access from the east, the nearest fire stations to the area are generally to the north and west. See **Figure 8.1**.

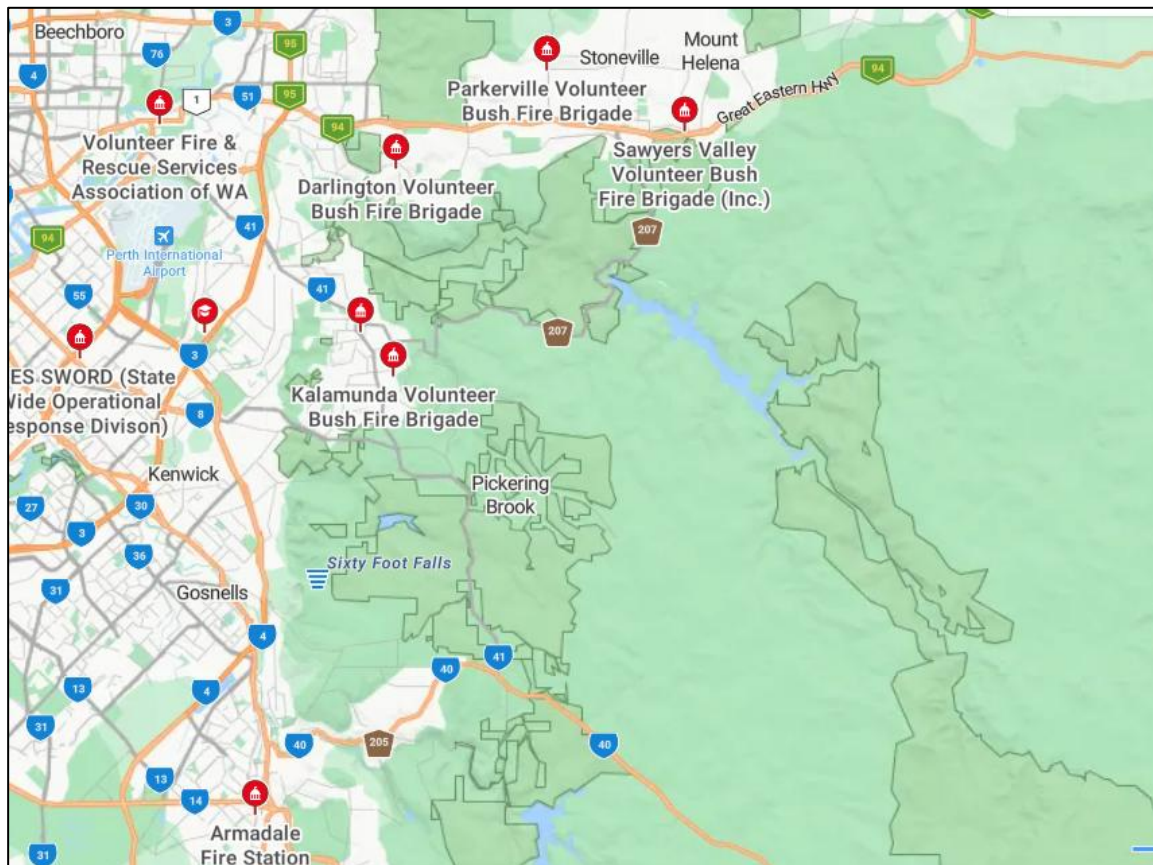


Figure 8.1: Fire stations in the vicinity of Pickering Brook.

Source: Google Maps

However, in a significant bush fire event, DFES resources may come from further afield.

Generally, however, the most likely access route into the area would be via Canning Road, either from the west or the south. Both of these roads are of a suitable width and geometry to allow simultaneous access and egress by emergency vehicles and those evacuating the area.

Should a section of Canning Road become inaccessible, alternative routes would include Carmel Road, Lawnbrook Road, Glenisla Road, Walnut Road and Patterson Road.

As previously identified, some of these roads have limited width and other issues that may make simultaneous use more difficult, and certain upgrades should be considered.

9. POTENTIAL INFRASTRUCTURE UPGRADES

From the assessment of evacuation routes and their suitability above, the following are recommended infrastructure improvements to improve the traffic flow and safety of the evacuation from a traffic perspective.

9.1 BRACKEN ROAD / PATTERSON ROAD CULVERTS

Whilst only a short section of Bracken Road is likely to be used as part of an evacuation route, there are two culverts on the bends just north of Pickering Brook Road, which may present an issue in the event of this route being used. See **Figure 9.1**.

The culverts allow only a 5.5m carriageway, which is likely to restrict evacuation movements, especially if DFES vehicles also need to access the townsite via this road.

These culverts should be extended and the road widened to at least 7.0m, and possibly more, given the horizontal geometry of the road in this location. The widening here should be designed to take the swept path of opposing design vehicles.

9.2 PATTERSON ROAD

The sealed width of the eastern section of Walnut Road, west of its intersection with Patterson Road, is approximately 5.5m. Whilst this may be adequate for a one-way evacuation route, it would limit the ease and safety of concurrent use as an emergency vehicle access route. Ideally, the seal would be widened to at least 6.0m.

9.3 WALNUT ROAD

The sealed width of the northern section of Patterson Road, south of its intersection with Walnut Road, is approximately 5.5m. Whilst this may be adequate for a one-way evacuation route, it would limit the ease and safety of concurrent use as an emergency vehicle access route. Ideally, the seal would be widened to at least 6.0m.

However, it is noted that Walnut Road has significant gradients, which may not be suited to the passage of emergency vehicles. Liaison with DFES would be recommended before committing to any upgrades.

9.4 GLENISLA ROAD

Glenisla Road generally meets or exceeds the required sealed width of 6.0m. However, it was noted that there are some significant roadside hazards towards its northern end, including trees, power poles and unrecoverable batters, with no formal protection.

Improving this road's safety should be considered, particularly if it will be a recommended evacuation route – as not all evacuees will be familiar with the terrain and hazards. The improvements could be staged, with improved delineation (such as edge lines) and additional signage (if required) which may

assist drivers, particular in ‘darker’ road conditions. The more costly improvements, such as the treatment of hazards, would need to be assessed and programmed.

9.5 SIGNAGE

There are a number of areas where signage could be improved, to facilitate those unfamiliar with the area to find the appropriate evacuation route in the event of a bushfire.

9.5.1 Pickering Brook Road / Bracken Road Intersection

It was noted on site that the initial southern section of what becomes Patterson Road, and is generally referred to as the ‘Patterson Road route’ is actually sign posted as Bracken Road, which then branches off as a side road to the east. See **Figure 9.1**.

This may potentially confuse people, especially if they are unfamiliar with the roads, and particularly under the stress of finding an evacuation route.

Ideally, this short section of Bracken Road should be renamed and signposted as ‘Patterson Road’.



Figure 9.1: This road section is signposted Bracken Road (green). Note culverts restricting road width (magenta).

9.5.2 Pickering Brook Road / Canning Road Intersection

As detailed above, the priority movement at this intersection is given to the east-west movements between Pickering Brook Road and Canning Road, rather than following Canning Road. This is exacerbated by the poorly located directional signs, and may lead to evacuees from Pickering Brook missing the left turn onto Canning Road, when intending to follow the southern evacuation route.

Whilst it is expected that DFES or Police staff would be located at the intersection to direct traffic in the event that use of the southern route were required, the signage in this location should still be reviewed and relocated to be more visible, clearly indicating that this is the southern evacuation route.

9.5.3 No Through Roads

There are a number of roads within the Pickering Brook area that do not link through to anywhere, and that would be unsuitable in the event of a bushfire. Whilst several of these are marked with 'No Through Road' signage, these should be reviewed, and improvements made where necessary. Additional signs may be deemed appropriate in some locations.

10. SUMMARY & CONCLUSIONS

10.1 SUMMARY

Donald Veal Consultants (DVC) has been commissioned to provide transport engineering input to a Strategic Bushfire Management Plan (BMP) for Pickering Brook.

The focus of this report is to identify and evaluate suitable evacuation routes from the townsite of Pickering Brook in the event of a bushfire.

Historically, it is understood that bush fires in this area are most likely to approach from the east, but potentially also from the south east or north east. However, depending upon prevailing conditions, other scenarios are certainly possible.

Clearly, the decision to recommend an evacuation from the area would depend upon a number of factors, including an assessment of the threat presented by a fire, given its location, intensity, predicted path and speed. These factors would also determine which potential evacuation route option would be the most appropriate.

In their peer review comments, Meridian Urban quoted data gathered during interviews with residents, regarding their intentions with respect to leaving the area in the event of a future fire warning.

The data showed that up to 73% of residents may well leave in the event of a fire warning. In this Technical Note, however, it has initially been assumed, as a worst-case scenario, that the vast majority of the residents, the visitors, the workers and the tourists, will all leave together, within a short window of time.

The latest population figures made available from the 2021 Census indicate that there are approximately 579 residents in the Pickering Brook area. With 228 private dwellings in the area, this gives an average of 2.7 residents per dwelling.

On average, the census shows that there are 2.7 vehicles per dwelling. Assuming that each dwelling may evacuate using up to 2.5 vehicles, this would generate around 570 vehicles for the residential element.

In order to make a basic estimate of the potential number of workers, tourists and other visitors that may need to be evacuated in the event of a fire, DVC has made some assumptions, based on available data:

Thus, the total number of vehicles estimated to require evacuation would be as follows:

Residents = 570

External workers = 250

Tourists and other visitors = 200

Total number of vehicles = 1,020.

Whilst it is expected that the majority of vehicles being used to evacuate will be standard sedans, 4WDs and SUVs, there may be a proportion of vehicles towing trailers, caravans and horseboxes.

Such vehicles would generally be able to keep up with other traffic, although horse boxes may slow down progress, particularly if it is necessary to use the Patterson Road evacuation route.

Given the significance of agricultural pursuits in this area, some residents or business owners may also wish to remove larger machinery from the risk area. Consideration should therefore be given to a suitable policy for the early evacuation of vehicles and machinery that would be reasonably expected to impede the general evacuation process.

Fundamentally, there are three main evacuation directions available, depending upon the direction of an approaching bushfire: North, South or West. As previously identified, there is no feasible evacuation route from Pickering Brook towards the east.

The main Western evacuation route entails heading west from Pickering Brook along Pickering Brook Road, which becomes Canning Road, and is signposted for Kalamunda.

The main Southern evacuation route consists of again heading west from Pickering Brook along Pickering Brook Road, before turning left onto Canning Road, signposted for Kelmscott and Brookton.

Depending upon the direction from which the fire is approaching, the best Northern evacuation route may consist of heading west from Pickering Brook along Pickering Brook Road, and continuing west along Canning Road, signposted for Kalamunda, and then taking a right turn onto Glenisla Road.

Should there be an unforeseen situation, whereby the primary exit route from Pickering Brook to either the north or west - i.e. Canning Road and/or Glenisla Road - is not available, then there is an alternative north/west option further to the east.

This would involve heading east along Pickering Brook Road through the townsite, before turning left onto Bracken Road, and then using Patterson Road, Walnut Road and Lawnbrook East Road. Following this route would allow one to rejoin Glenisla Road or Canning Road, further to the west. Unsealed routes

Whilst there are some alternative routes along unsealed roads, these would not be considered as viable options in most cases, especially for persons unfamiliar with the area.

DVC has driven along the majority of the links in each potential route and detour, in order to assess the suitability of each to provide both an evacuation route and an entry route for emergency services.

A majority of the vehicles leaving Pickering Brook will need to use Pickering Brook Road in order to access whichever evacuation route they are intending to use.

In this assessment we have looked at the expected ability of various key links, generally those closer to the Pickering Brook area, to cater for the forecast numbers of evacuating vehicles. Once drivers are clear of the immediate area, depending upon the initial route used, additional route options may open up, and

they may choose to head in different directions, depending upon their particular circumstances. In this way, the load on subsequent links and routes will reduce as the evacuating vehicles spread across more of the road network.

The time taken for vehicles to evacuate along any given route is primarily conditional upon speed and distance. Whilst speed will vary both along the route, depending upon factors associated with the road, such as gradient, alignment and visibility, as well as individual factors, such as driver confidence and vehicle type, distance will also vary, depending upon where evacuees begin their journey, and at what point they can be considered to have reached 'a safer place'.

Generally, one might assume that vehicles would be considered to have completed their evacuation once they have reached the nearest major townsite, as these should be equipped with evacuation centres in the event of a large bushfire.

Timings indicated by Google Maps have been shown for the main routes, as a base indicator. However, these are based on drivers generally travelling at or near to the speed limit. This may not be possible in an evacuation scenario, especially within the immediate townsite area.

The key to evacuating the townsite will be the capacity of the critical road links nearest to the town. Once drivers have reached Canning Road, for example, traffic should flow more freely, and no further capacity issues would be expected.

For the purpose of this exercise, it has been assumed that the average speed of those leaving the townsite - once they have reached a larger road, such as Canning Road - will be 40km/h, but restricted to 20km/h within the townsite, where some queuing may be expected, as vehicles join the evacuation routes from various side roads and driveways. On Access Roads, such as the Patterson Road route, we have assumed average speeds would reach perhaps 30km/h.

Our assessment indicates that, even with the maximum total number of vehicles evacuating, using a single route, it should be possible for all vehicles to leave in a one-hour period.

However, it is far more likely that the evacuation will be carried out in stages, with the majority of the external workers, tourists and other visitors leaving gradually, over a longer period, well before any final instruction to evacuate. Meridian Urban identified that 27% of residents indicated that they intended to remain in place and defend.

This then equates to a total of perhaps 400 vehicles leaving in the hour following the final instruction to evacuate. This number of vehicles would therefore be able to clear the townsite in well under an hour.

In terms of the proposed MRS amendment, which would see an additional 44 residential properties added to the townsite, this would represent an increase of around 10% on the number of vehicles potentially attempting to evacuate in the worst-case scenario. In the more likely scenario, the increase would be nearer to 15%. However, neither increase would significantly affect the ability of all vehicles to evacuate the townsite in a timely manner.

The routes to be taken by emergency vehicles into the area will of course depend upon their initial location and the direction of the approaching fire. Given the road network around Pickering Brook, and the lack of access from the east, the nearest fire stations to the area are generally to the north and west. However, in a significant bush fire event, DFES resources may come from further afield.

Generally, however, the most likely access route into the area would be via Canning Road, either from the west or the south. Both of these roads are of a suitable width and geometry to allow simultaneous access and egress by emergency vehicles and those evacuating the area.

Should a section of Canning Road become inaccessible, alternative routes would include Carmel Road, Lawnbrook Road, Glenisla Road, Walnut Road and Patterson Road. However, some of these roads have limited width and other issues that may make simultaneous use more difficult, and certain upgrades should be considered.

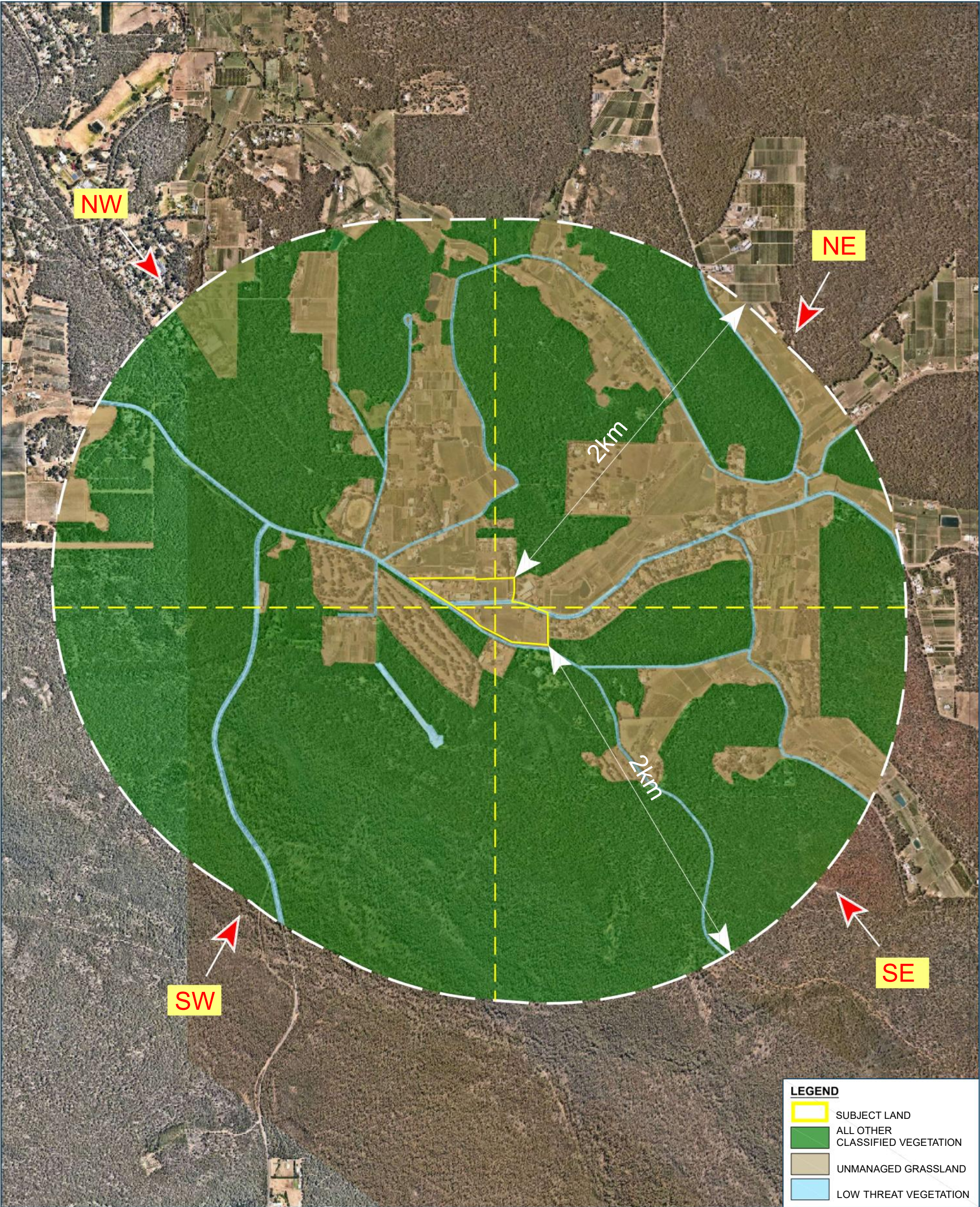
There are a number of areas where signage could be improved, to facilitate those unfamiliar with the area to find the appropriate evacuation route in the event of a bushfire.

10.2 CONCLUSIONS

Based on the available information and some reasonable assumptions, the analysis contained within this Technical Report indicates the following conclusions:-

- A maximum of 1,020 vehicles could be expected to leave the townsite in the event of a significant bushfire event, although with a number indicating an intention to remain in place and the likely early exit of a proportion, including workers, tourists and other visitors to the area, this could potentially be reduced to around 400.
- There are three main evacuation routes, which are generally considered suitable for both the evacuation of vehicles from the area and the simultaneous entry of DFES and other emergency vehicles. These routes include one to the west, one to the south and one to the north. There is no viable route to the east.
- Alternative routes and detours do exist that may be used in certain circumstances. Some of these may benefit from targeted upgrades. A review of the existing signage should also be undertaken.
- Based on estimated values for capacity, speed and timing, the required number of evacuation vehicles will be able to exit the townsite and reach the nearest major townsite within an acceptable timeframe.

It should be noted that this assessment is based, to some extent, on census data, resident surveys, and a number of assumptions that rely to some extent on factors such as human behaviour, which can be variable, and difficult to predict. These factors may also change as circumstances alter, particularly in the light of an imminent threat such as a bush fire event.



VEGETATION TYPE AND ASPECT ASSESSMENT

PICKERING BROOK ROAD
PICKERING BROOK

CITY OF KALAMUNDA

0 200 400 600 800 1000 1200m

SCALE: 1:20,000
ORIGINAL PLAN SIZE: A3

JOB CODE:
KDA PIC ZB

DATE:
15.06.2026



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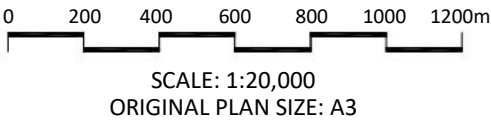
LEGEND

-  SUBJECT LAND
-  LARGE TRACTS OF CLASSIFIED VEGETATION
-  MOSAIC PATTERN

PREDOMINANT VEGETATION PATTERN

PICKERING BROOK ROAD
PICKERING BROOK

CITY OF KALAMUNDA



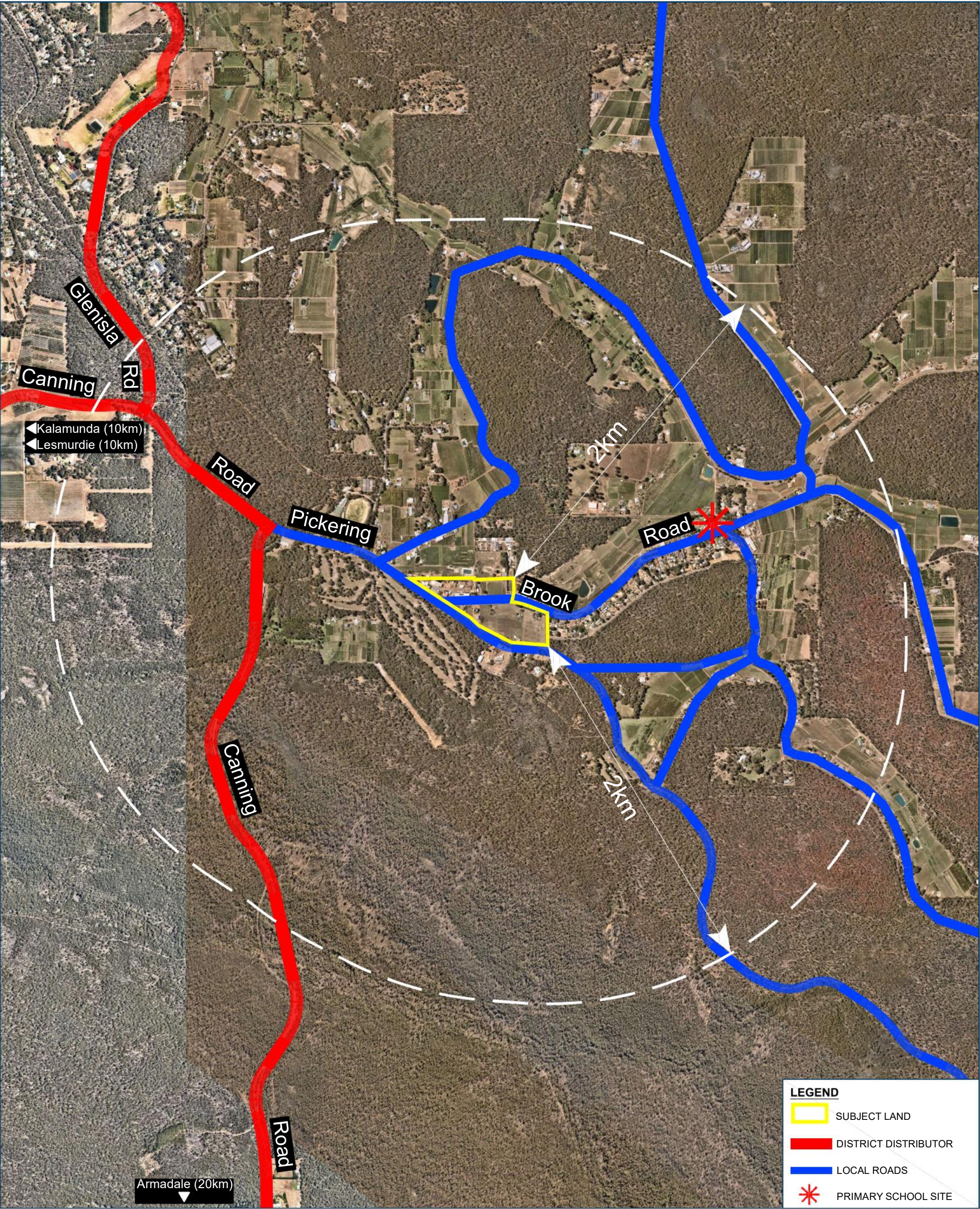
JOB CODE:
KDA PIC ZB

DATE:
15.06.2026



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ROAD PATTERN AND SUITABLE DESTINATION

PICKERING BROOK ROAD
PICKERING BROOK

CITY OF KALAMUNDA

0 200 400 600 800 1000 1200m

SCALE: 1:20,000
ORIGINAL PLAN SIZE: A3

JOB CODE:
KDA PIC ZB

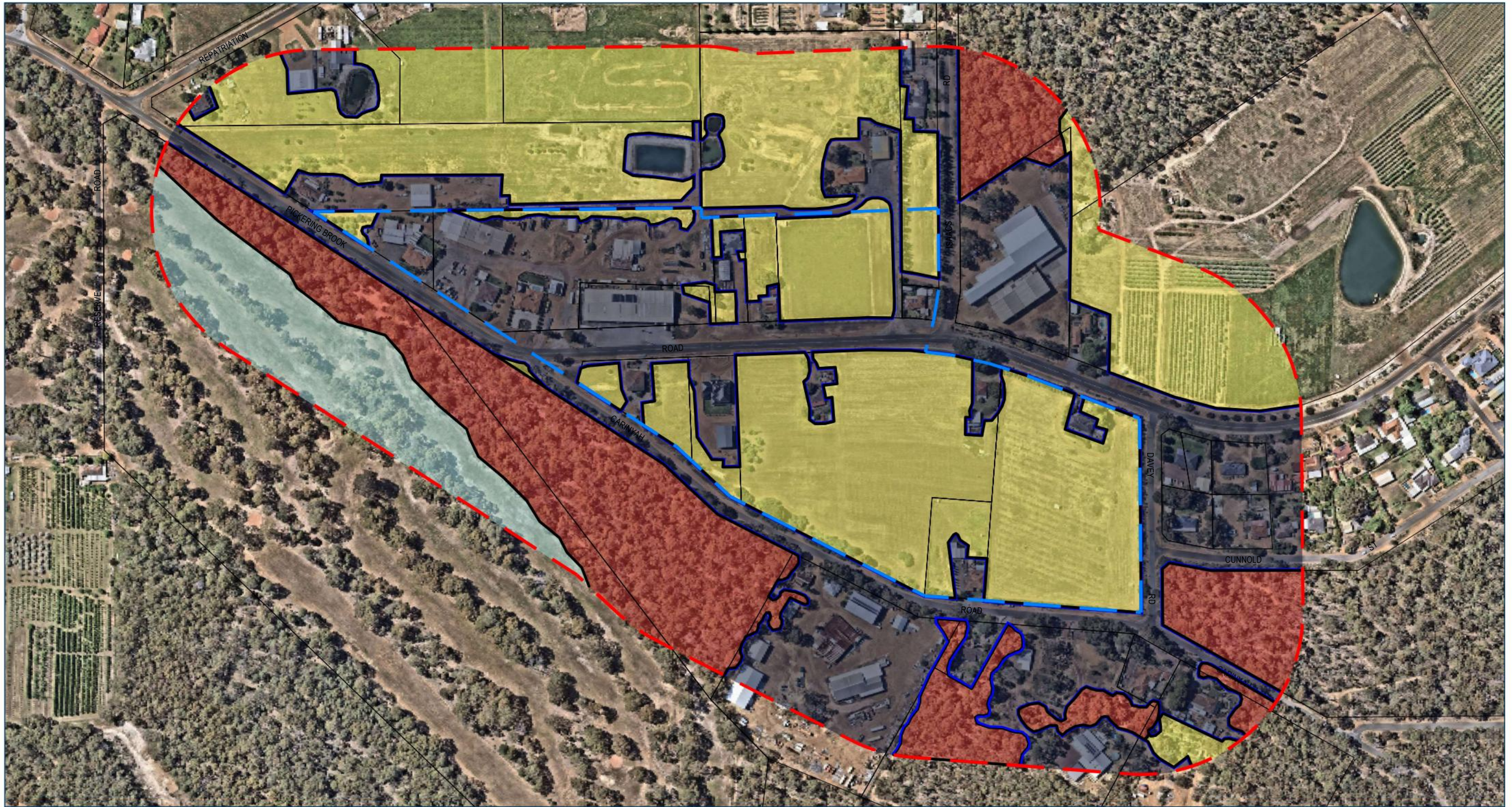
DATE:
14.04.2026



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BUSHFIRE HAZARD LEVEL VEGETATION CLASSIFICATION

PICKERING BROOK ROAD
PICKERING BROOK

CITY OF KALAMUNDA



SCALE: 1:3500
ORIGINAL PLAN SIZE: A3

JOB CODE:
KDA PIC ZB

DATE:
16.06.2026



LEGEND:

SUBJECT LAND -

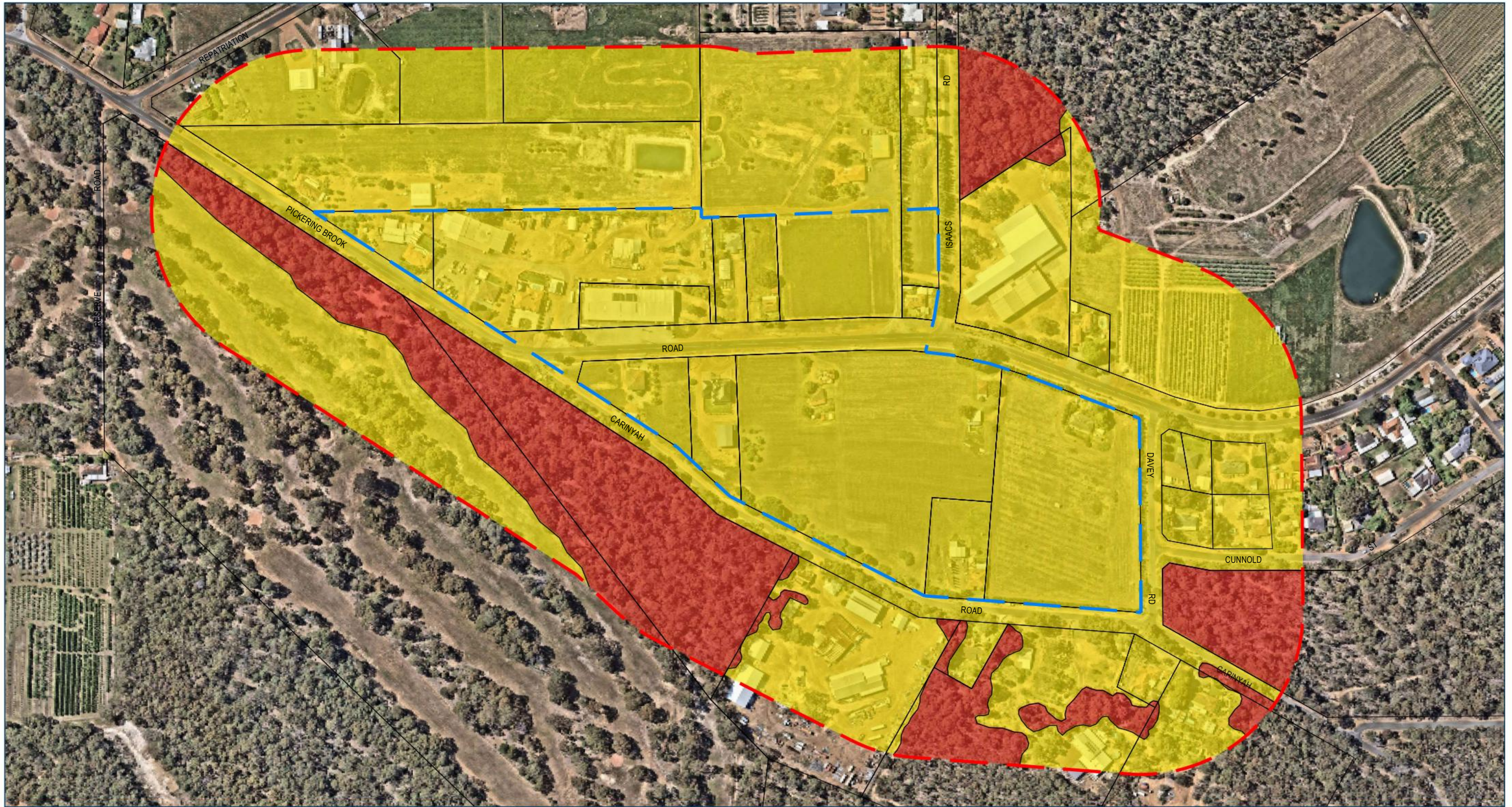
150m ASSESSMENT AREA -

- CLASS A FOREST
- CLASS G GRASSLAND (Sown - pasture & crops)
- EXCLUSION CLAUSE 2.2.3.2(e) (Non-vegetated)
- EXCLUSION CLAUSE 2.2.3.2(f) (Low threat)

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BUSHFIRE HAZARD LEVEL ASSESSMENT

PICKERING BROOK ROAD
PICKERING BROOK

CITY OF KALAMUNDA

0 50 100 150 200 250m

SCALE: 1:3500
ORIGINAL PLAN SIZE: A3

JOB CODE:
XXX XXX ZB

DATE:
13.04.2026



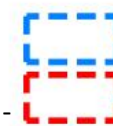
LEGEND:

SUBJECT LAND -

150m ASSESSMENT AREA -

BUSHFIRE HAZARD LEVEL

EXTREME
MODERATE
LOW



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**APPENDIX 3 –
VEHICULAR ACCESS AND WATER TECHNICAL REQUIREMENTS**
(Extracted from the *Planning for Bushfire Guidelines 2024*, Appendix B)

Element 3: Vehicular Access

The following requirements for vehicular access from the Guidelines is provided for the City of Kalamunda for ease of implementation.

Pickering Brook is within Area 2 and for public roads these should be to the standards as outlined by the Institute of Public Works Engineering Australasia (IPWEA), subdivision guidelines, Liveable Neighbourhoods, Austroads Standards, Main Roads standards, supplement, policy or guideline and/or any applicable or relevant local government standard or policy (refer to Note 5 in the table below).

The Guidelines suggest that a minimum of 6m horizontal clearance is sufficient for public roads to provide for efficient and effective evacuation during a bushfire emergency (refer to Figure A below).

Acceptable solution 3.1 Public roads: Public roads, including perimeter roads should meet the technical requirements in Appendix B.3, Table 10 of the Guidelines.

	1		2		3		4		5	
TECHNICAL REQUIREMENTS	PERIMETER ROADS		PUBLIC ROADS		EMERGENCY ACCESS WAY ³		FIRE SERVICE ACCESS ROUTE ³		BATTLE-AXE & 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 (metres)	12	8	See note 5		10	6	10	6	6	
Minimum vertical clearance (metres)	4.5									
Minimum weight capacity (tonnes)	15									
Maximum grade unsealed road ²	See note 5		See note 5		1:10 (10% or 6°)					
Maximum grade sealed road ^{2,4}					1:7 (14.3% or 8°)					
Maximum average grade sealed road					1:10 (10% or 6°)					
Minimum inner radius of road curves (metres)					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.

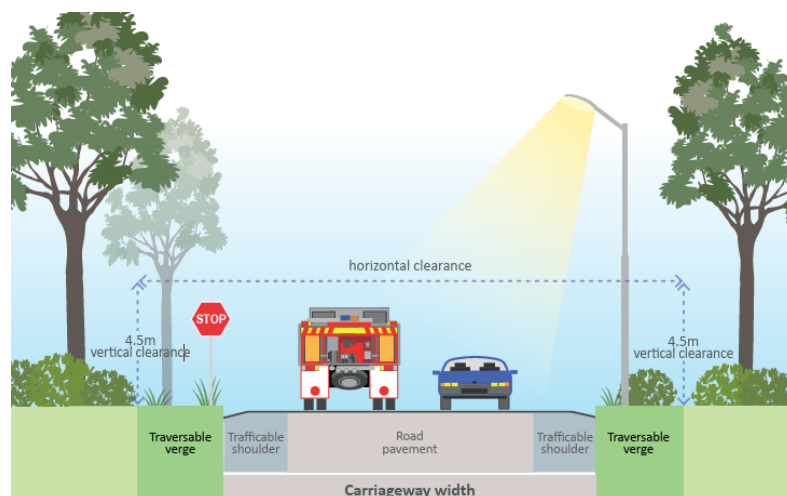


Figure A: Area encompassing horizontal clearance and vertical clearance (WAPC: 2024)

Horizontal clearance: the carriageway width (including the road pavement and trafficable shoulder) and traversable verge that provide for the movement and parking of vehicles and area required by emergency services to operate. Infrastructure and vegetation within the traversable verge should be frangible, however non-frangible items can occur providing they do not restrict vehicular movements in the event of an emergency (WAPC Guidelines: 2024).

Acceptable solution 3.2 Access routes: Public road access should be provided in two different directions, to two different suitable destinations; and with an all-weather surface. If the public road access to the subject site is via a no-through road which cannot be avoided due to demonstrated site constraints.

Acceptable solution 3.3a No-through roads: Public road access should be provided in two different directions, to two different suitable destinations; and with an all-weather surface.

If the public road access to the subject site is via a no-through road which cannot be avoided due to demonstrated site constraints, the public road access is to be a maximum of 200 metres from the subject site boundary to an intersection where two-way access is provided.

The no-through road may exceed 200 metres if it is demonstrated that an alternative access, including an emergency access way, cannot be provided due to site constraints, and the following requirements are met:

- the no-through road travels towards a suitable destination; and
- the balance of the no-through road that is greater than 200 metres from the subject site is wholly within BAL-LOW, or is within a residential built-out area or within Area 1.

Acceptable solution: 3.3b No-through roads requirements A no-through road is to meet all the following requirements:

- requirements of a public road (Table 10, Column 2); and
- turn-around area/head.

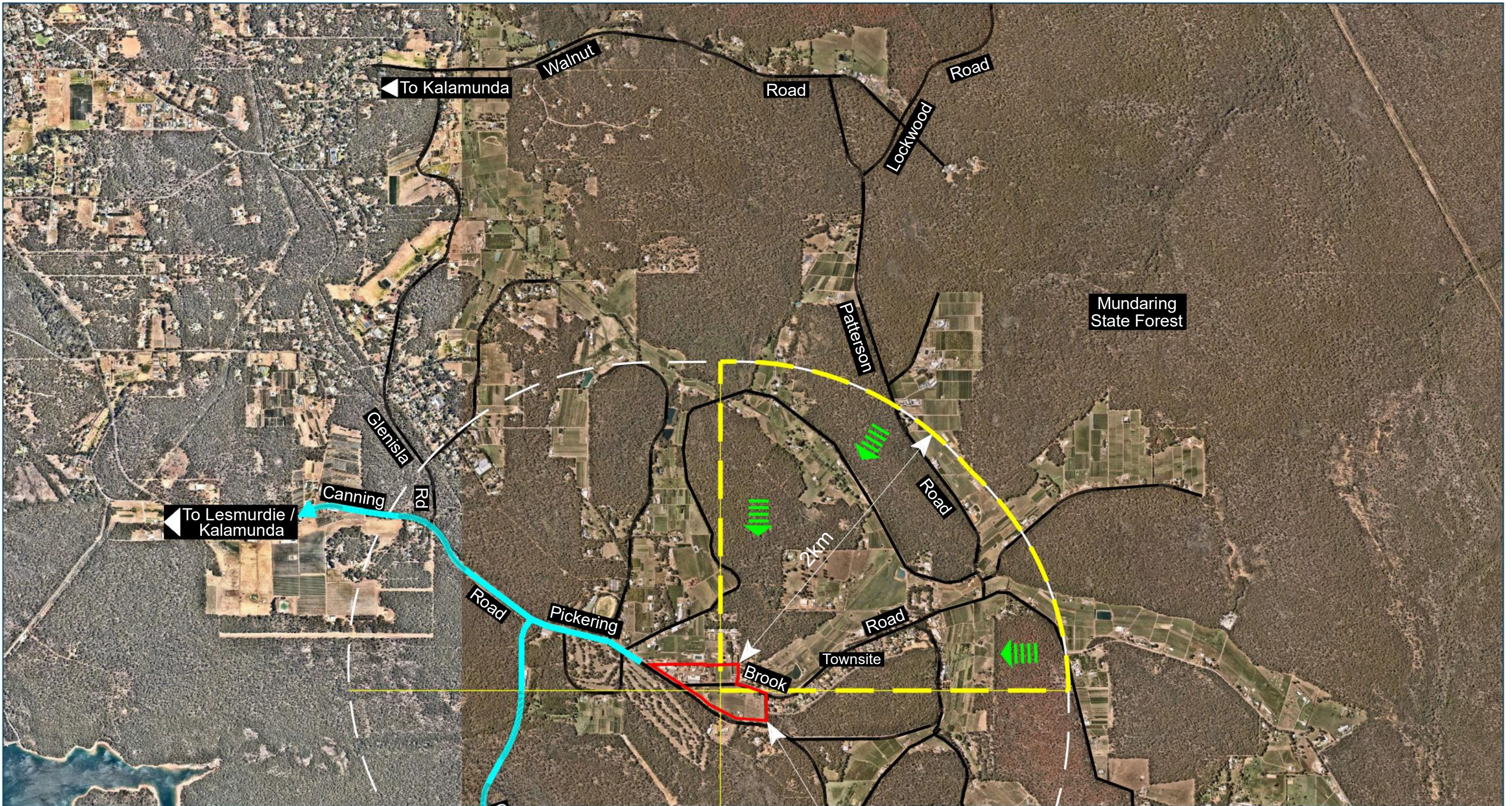
Element 4: Water

Acceptable solution: 4.1 Water supply Evidence that a sufficient and accessible reticulated or non-reticulated water supply for bushfire firefighting can be provided at the subdivision and/or development application stage, in accordance with the specifications of the relevant water supply authority or the requirements in Appendix B4: Water Supply dedicated for bushfire firefighting.

Where strategic water tank for bushfire fighting purposes is proposed, it should be located no more than 10 minutes from the farthest development site (20 minute turnaround time at a maximum). The turnaround time is the time it takes an emergency services vehicle to travel at legal road speeds from a lot to the water supply and back to the lot.

A 50, 0000 litre strategic water tank is recommended to supplement water for firefighting purposes. The tanks should be a condition of subdivision approval and provided by the developer. On-going management will be the responsibility of the Local Government.

**APPENDIX 4 –
BUSHFIRE SCENARIO MAPPING**



BUSHFIRE SCENARIO FROM NORTH-EAST

PICKERING BROOK

CITY OF KALAMUNDA

0 200 400 600 800 1000 1200 1400 1600m

SCALE: 1:25,000
ORIGINAL PLAN SIZE: A3

JOB CODE:
KDA PIC ZB

DATE:
15.06.2026



LEGEND:

SUBJECT LAND -

DIRECTION OF BUSHLAND ATTACK -

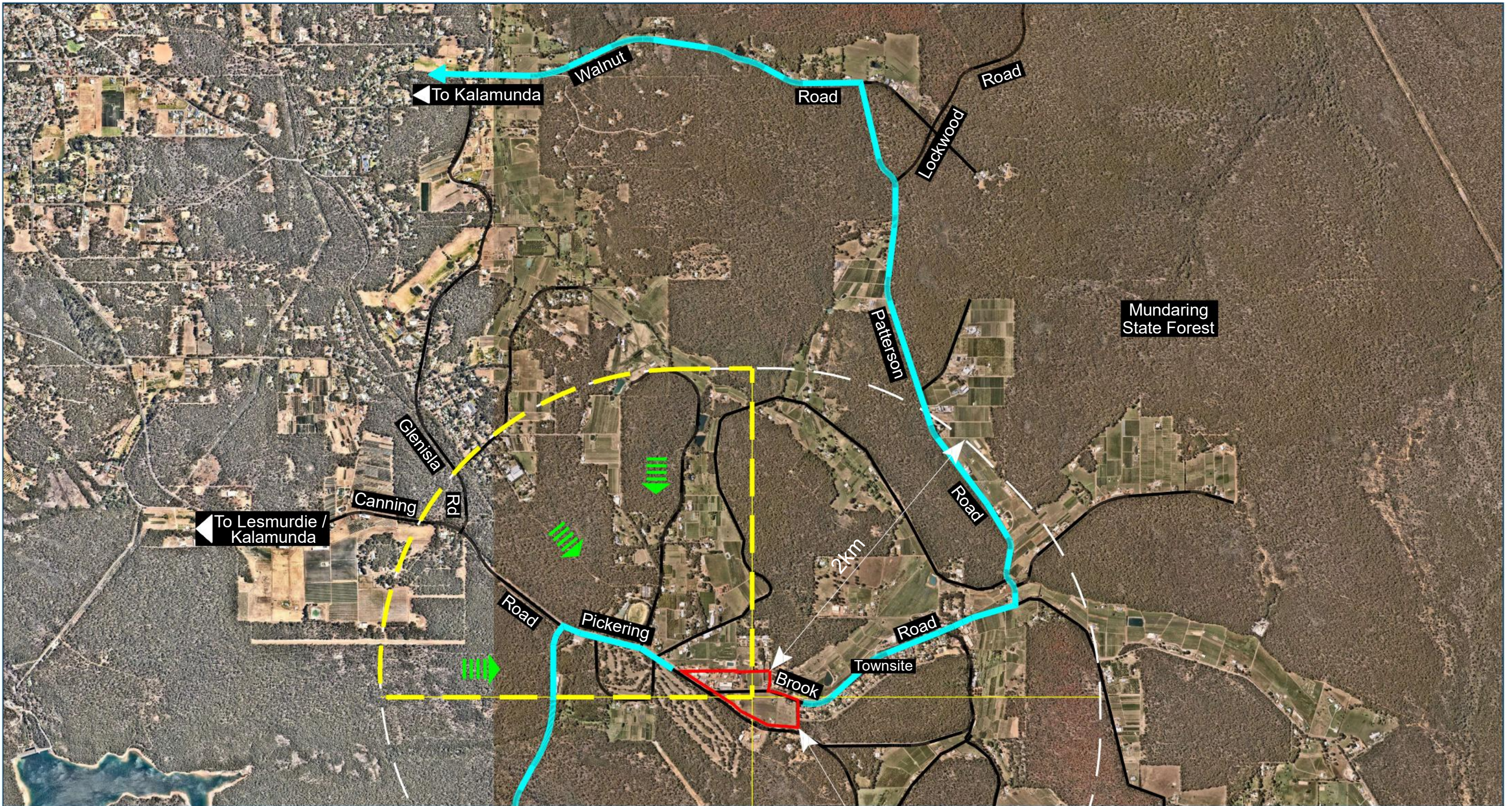
ESCAPE ROUTES -



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BUSHFIRE SCENARIO FROM NORTH-WEST

PICKERING BROOK

CITY OF KALAMUNDA

0 200 400 600 800 1000 1200 1400 1600m

SCALE: 1:25,000
ORIGINAL PLAN SIZE: A3

JOB CODE:
KDA PIC ZB

DATE:
15.06.2026



LEGEND:

SUBJECT LAND -

DIRECTION OF BUSHLAND ATTACK -

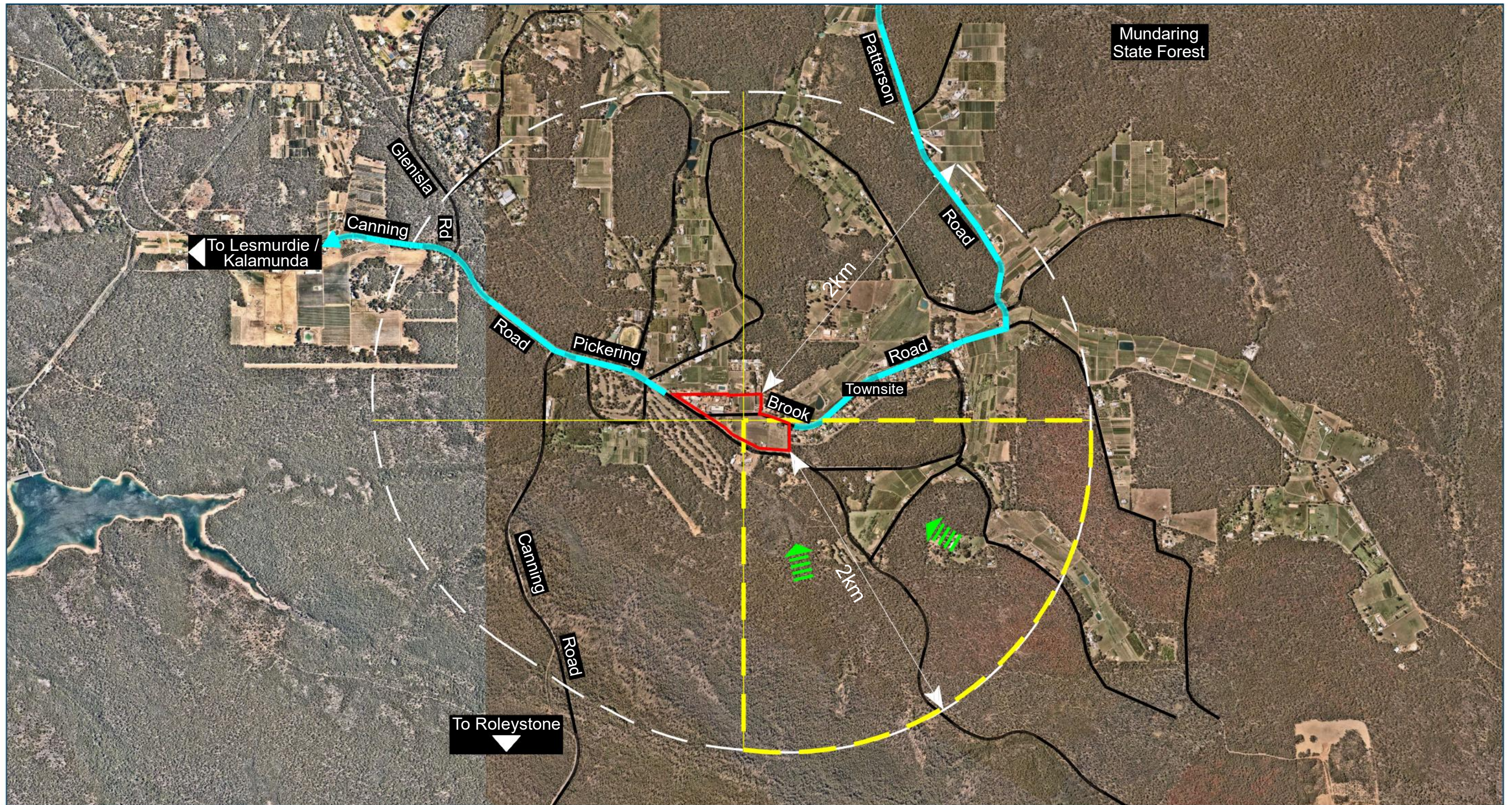
ESCAPE ROUTES -



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BUSHFIRE SCENARIO FROM SOUTH-EAST

PICKERING BROOK

CITY OF KALAMUNDA



SCALE: 1:25,000
ORIGINAL PLAN SIZE: A3

JOB CODE:
KDA PIC ZB

DATE:
15.06.2026



LEGEND:

SUBJECT LAND -

DIRECTION OF BUSHLAND ATTACK -

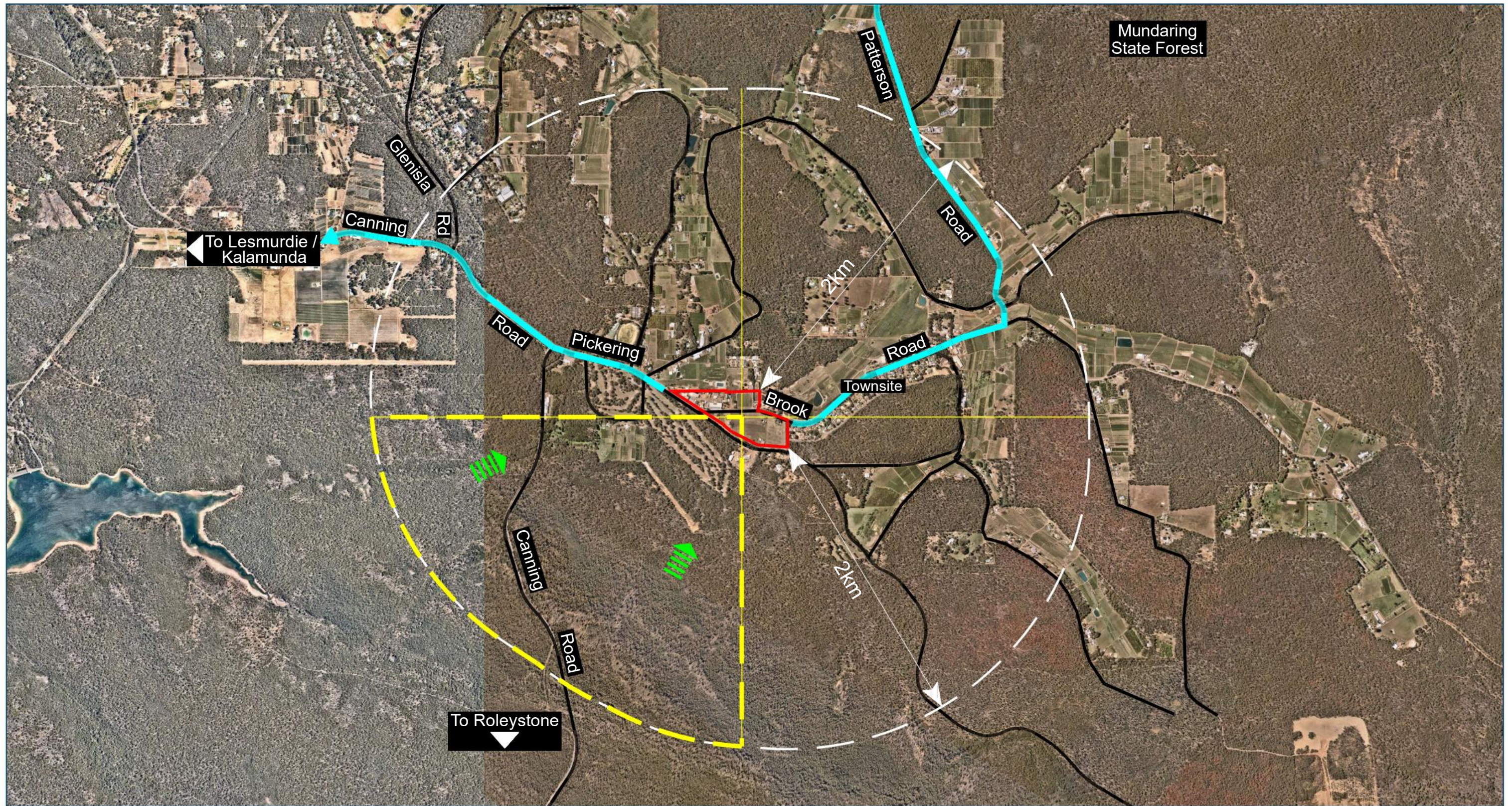
ESCAPE ROUTES -



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BUSHFIRE SCENARIO FROM SOUTH-WEST

PICKERING BROOK

CITY OF KALAMUNDA



SCALE: 1:25,000
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LEGEND:

SUBJECT LAND -

DIRECTION OF BUSHLAND ATTACK -

ESCAPE ROUTES -



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