

## Bushfire Risk Assessment

Building 4E

Oakdale West Estate

Prepared for

**Goodman Property Services (Aust.)**



Version 1.1

24 June 2021

<b>Project Name:</b>	Oakdale West Estate – Building 4E at Erskine Park
<b>Site Details</b>	Oakdale West Estate
<b>Client Details:</b>	Ms. Stephanie Partridge Senior Development Manager Goodman 1-11 Hayes Road, ROSEBERY NSW 2018
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## 1. Summary

Table 1 is a summary of compliance with relevant documents and approaches to limit bushfire attack and meet the requirements of the NSW planning framework for new development in Bushfire Prone Areas.

**Table 1:** Summary

<b>Planning for Bushfire Protection 2019 Classification</b>	"Other" commercial/ industrial
<b>Location</b>	Lot 26 in DP 1269741
<b>Local Government Area</b>	Penrith
<b>Can this proposal comply with AS3959, 2018</b>	AS3959, 2018 does not apply as a DTS Provision
<b>Does this development comply with the requirements of <i>Planning for Bushfire Protection 2019</i>?</b>	YES
<b>Does this development comply with the Aims and objectives of <i>Planning for Bushfire Protection 2019</i>?</b>	YES
<b>Is referral to the NSW RFS required?</b>	NO

<b>Assessment Framework</b>	<input type="checkbox"/> <i>Planning for Bushfire Protection 2006</i> <input checked="" type="checkbox"/> <i>Planning for Bushfire Protection 2019</i> <input checked="" type="checkbox"/> Meets the deemed to satisfy provisions <input type="checkbox"/> Alternate solution/ performance-based assessment
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## 2. Introduction

Blackash Bushfire Consulting has been engaged by Goodman to provide a Bushfire Hazard Assessment report to support a Development Application (DA) for the construction of Building 4E at the Oakdale West Estate (OWE). The site is shown in **Figure 1** and is part of the larger OWE which comprises 154 hectares of land within the Western Sydney Employment Area [WSEA] and is owned by a Joint Venture (JV) between Goodman and Brickworks Limited (Brickworks, parent company of the Austral Brick Company Pty Ltd).

The OWE was approved as a State Significant Development for the staged development of the land for warehousing and distribution uses. The site is mapped as bushfire prone land and bushfire has been a key consideration in the design process. Commercial and industrial development is designated as “other” development in PBP 2019. As “other” development, a key issue for the proposal will be meeting the aim and objectives of *Planning for Bushfire Protection* and the performance requirements for commercial and industrial development.

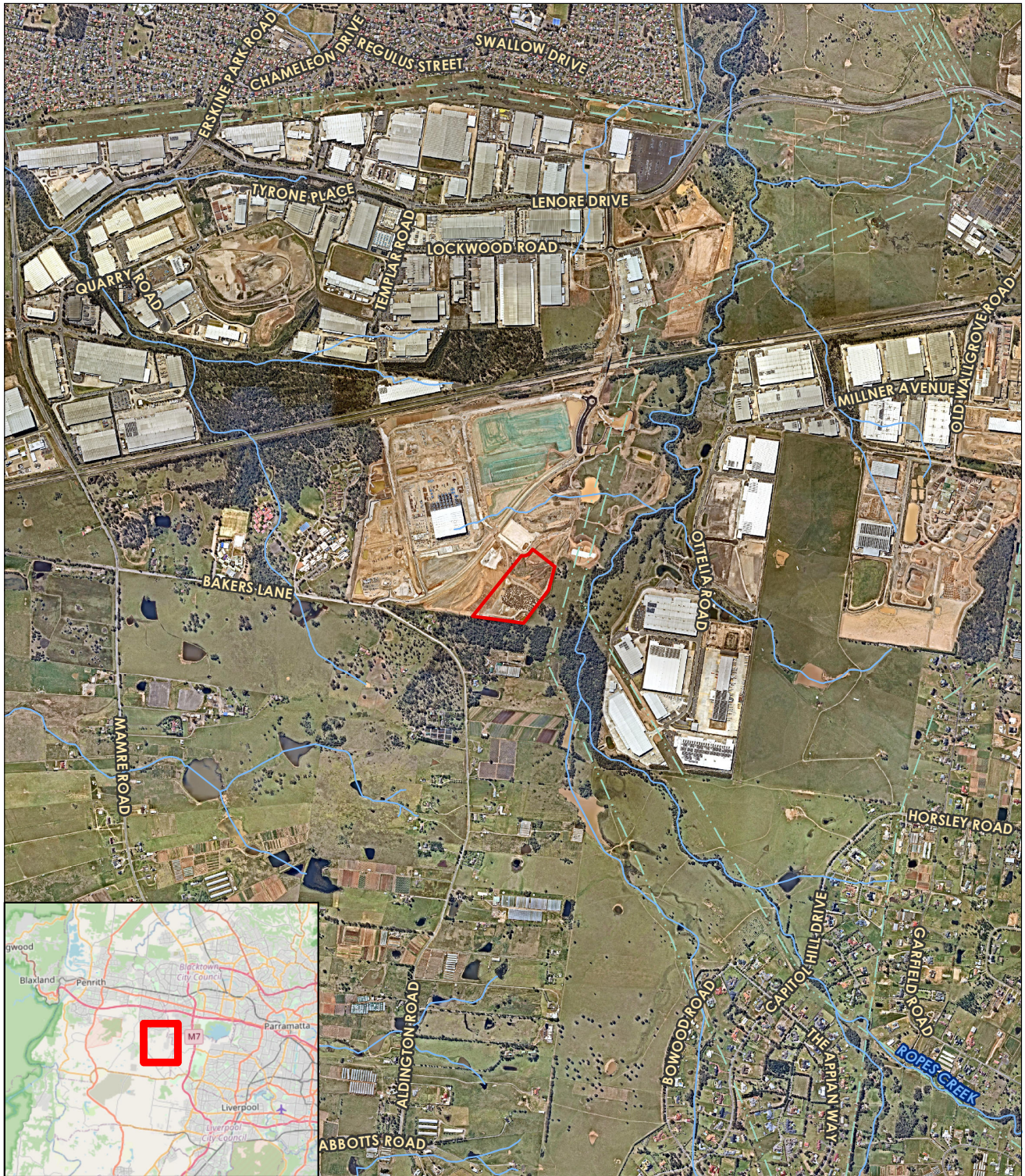
The proposed warehouse is required to respond and implement an appropriate level of bushfire protection measures, as per *Planning for Bushfire Protection 2019* (PBP 2019). This report will demonstrate that an appropriate combination of protection measures has been considered and achieved to provide compliance with the intent and performance measures within PBP 2019 and consistent with the original SSD approved Concept Plan and Consent Condition B20 – Bushfire Protection of Schedule B – Conditions for the Concept Proposal.

The NSW Rural Fire Service has advised that a bush fire report prepared by a suitably qualified person is required that addresses the requirements under section 8.3.1 and 8.3.9 of PBP 2019. The report must address:




*“the suitability of the proposed use involving the storage of Dangerous Goods in a bush fire prone area and demonstrate the building will be designed to withstand potential bush fire attack. A Fire Safety Study or Dangerous Goods Report must detail fire prevention and mitigation measures for all credible fire hazards (including potential grass and bush fire threats), and if applicable, prepared consistently with the Hazardous Industry Planning and Assessment Papers (HIPAPs).”*

This assessment has been prepared by Corey Shackleton, Principal Bushfire & Resilience (FPAA BPAD Level 3 Certified Practitioner No. BPD-L3-34603) who is recognised by the NSW RFS as qualified in bushfire risk assessment and have been accredited by the Fire Protection Association of Australia as a suitably qualified consultant to undertake alternative solution proposals.





## Legend

-  Watercourse
-  Electricity Transmission Line
-  Subject Land



Date: 18/05/2021

0 250 500 1,000 1,500  
Metres

Coordinate System: GDA 1994 MGA Zone 56  
Imagery: © Nearmap

**Figure 1: Site Location**



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### 3. Legislative Framework

The site is identified as 'bushfire prone land' (see **Figure 2**) for the purposes of Section 10.3 of the *Environmental Planning and Assessment Act, 1979* (EPA Act) and the legislative requirements for development on bushfire prone lands are applicable.

All development on bushfire prone land must consider and comply with PBP 2019. However, industrial development has considerable flexibility, and the nature of the development often results in the structures providing a higher degree of bushfire resistance than required by the NSW RFS.

Under section 4.41 of the EP&A Act, SSD is exempt from the requirement for a bushfire safety authority under Section 100B of the Rural Fires Act.

As "other" development, the proposed industrial development is addressed through demonstrating compliance with the aim and objectives of PBP.

Under the building classification system within the *National Construction Code* (NCC), Class 5 to 8 buildings include offices, shops, factories, warehouses, public car parks and other commercial and industrial facilities. The NCC does not provide for any bushfire specific performance requirements for these particular classes of building. As such the *Australian Standard for Construction of Buildings in Bushfire Prone Areas* (AS 3959) and the NASH Standard are not considered as a set of 'deemed to satisfy' provisions. However, compliance with AS 3959 and NASH should be considered when meeting the aims and objectives of PBP.

Whilst bushfire is not captured in the NCC for Class 5-8 buildings, PBP 2019<sup>1</sup> articulates the following objectives which will be applied in relation to access, water and services, and emergency and evacuation planning:

- to provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation;
- to provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development;
- to provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building; and
- provide for the storage of hazardous materials away from the hazard wherever possible.

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<sup>1</sup> Planning for Bushfire Protection 2019 (p. 76)

The general fire safety construction provisions (of the NCC) are taken as acceptable solutions however construction requirements for bushfire protection will need to be considered on a case-by-case basis.

## 4. Bushfire Prone Land

Bushfire prone land maps provide a trigger for the development assessment provisions and consideration of sites that are bushfire prone.

Bushfire prone land (BFPL) is land that has been identified by council, which can support a bushfire or is subject to bushfire attack. Bushfire prone land maps are prepared by local council and certified by the Commissioner of the NSW RFS.

**Figure 2** shows the Bushfire Prone Land Map for the site. The extract from the Penrith Bushfire Prone Map shows that the site and land to the south and east contains Category 1 Bushfire Prone Vegetation. The vegetation within the site is mapped as Category 2 Bushfire Prone Vegetation but has since been cleared as part of the OWE development.





## Legend

- Watercourse
- Electricity Transmission Line
- Subject Land
- Vegetation Category 1
- Vegetation Category 2

## Bushfire Prone Land

- Vegetation Buffer



Date: 18/05/2021

0 100 200 400 600

Metres

Coordinate System: GDA 1994 MGA Zone 56  
Imagery: © Nearmap

**Figure 2: Bushfire Prone Land Map**



## 5. The Proposal

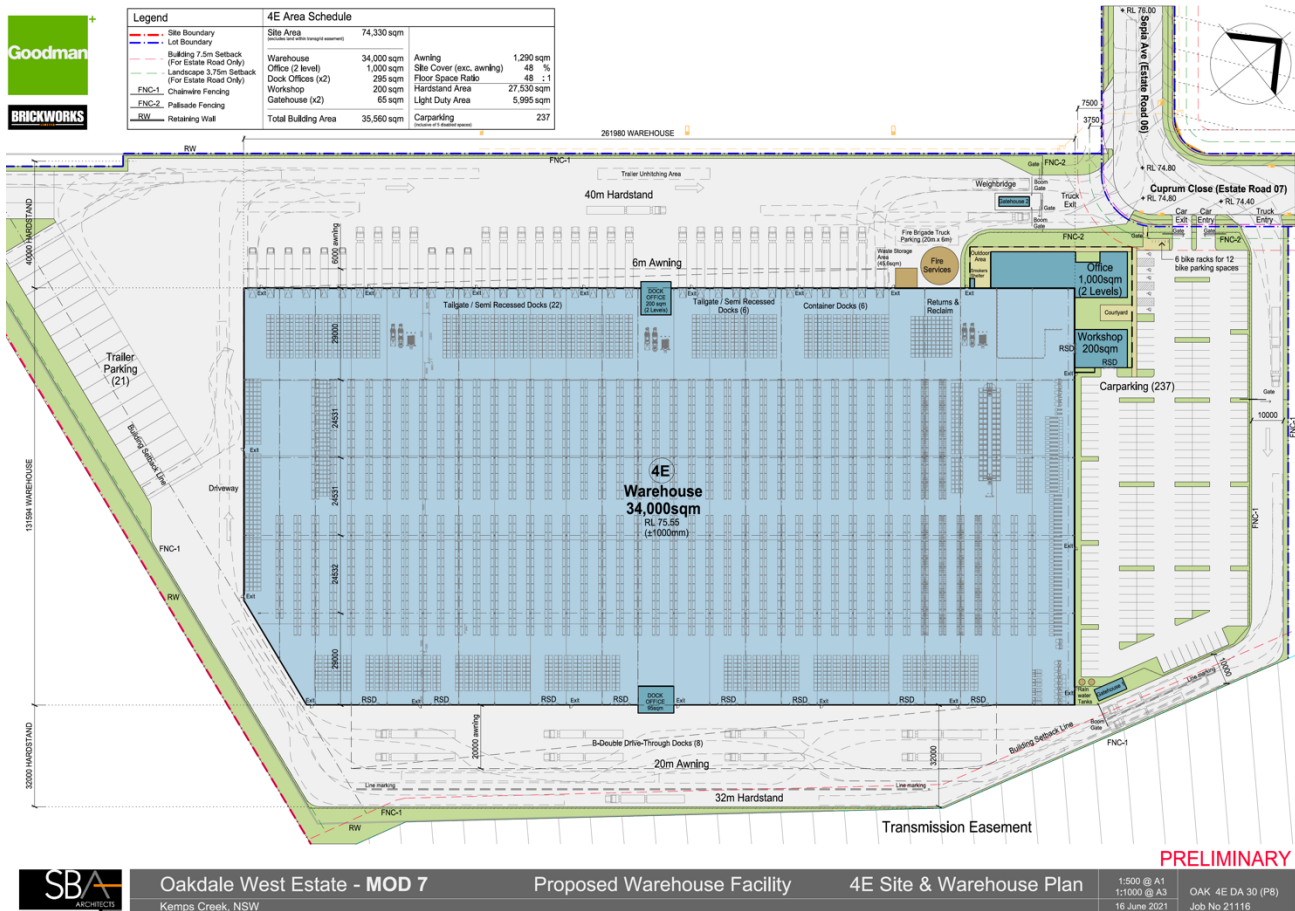
The Concept design for the OWE (**Figure 3**) was developed in consideration of a comprehensive constraint's analysis of the site, with particular reference to riparian lands, vegetation and flooding. The OWE Masterplan was approved through an SSD process, which included proposed Building 4E.

The proposal (**Figure 4**) includes the construction, fit-out and use of Building 4E as the first stage of development within Precinct 4 of the Oakdale West Estate (Stage 4 Development). The proposed development comprises a warehouse and associated car and truck parking, office facilities and loading bays along with landscaping, signage, solar panels and lighting and includes subdivision approval. The proposed development will facilitate warehouse and distribution uses consistent with the IN1 General Industrial zone under the State Environmental Planning Policy (Western Sydney Employment Area) 2009 includes the storage and distribution of liquor.

The proposal does not require clearing or supporting infrastructure as all necessary infrastructure installation and other investigations were approved and undertaken under SSD 7348.



**Figure 3:** Oakdale West Estate Concept Masterplan



**Figure 4: Proposed Development**

## 6. Site Assessment Methodology

The Bushfire Assessment Report is based on a desktop and site assessment of the site utilising the following resources:

- *Planning for Bushfire Protection* (NSW RFS, 2019);
- Aerial mapping;
- Site inspection; and
- Detailed GIS analysis.

This assessment is based on mapping of vegetation formations and slope assessment in accordance with PBP 2019. The methodology used in this assessment is in accordance with PBP 2019 and is outlined in the following sections.

## 6.1. Bushfire Hazard

An assessment of the bushfire hazard is necessary to determine the application of bushfire protection measures such as Asset Protection Zone (**APZ**) locations and dimensions and future building levels.

The vegetation formations (bushfire fuels) and the topography (effective slope) combine to create the bushfire threat that may affect bushfire behaviour at the site, and which determine the planning and building response of PBP 2019.

## 6.2. Fire Weather

The fire weather is dictated by PBP 2019 and assumes a credible worst-case scenario and an absence of any other mitigating factors relating to aspect or prevailing winds. The site has a Fire Danger Index (**FDI**) of 100 as per PBP 2019.

## 6.3. Vegetation

Predominant Vegetation is classified by structure or formation using the system adopted by Keith (2004) and by the general description using PBP 2019. Vegetation types give rise to radiant heat and fire behaviour characteristics.

The predominant vegetation is determined over a distance of at least 140 metres in all directions from the proposed site boundary or building footprint on the development site. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate.

The land surrounding the site is identified as bushfire prone land (see **Figure 2**) and is made up of a mixture of forest vegetation (see **Figure 5**) and managed land.

## 6.4. Slopes Influencing Bushfire Behavior

The 'effective slope' influencing fire behaviour approaching the sites has been assessed in accordance with the methodology specified within PBP 2019. This is conducted by measuring the worst-case scenario slope where the vegetation occurs over a 100 m transect measured outwards from the development boundary or the existing/ proposed buildings.

The slopes within and adjoining the site are mild and generally fall downslope from the site (**Figure 5**).





## Legend

- Contour - 2m
- Electricity Transmission Line
- Subject Land
- Vegetation Formation**
- Forest



Date: 18/06/2021

0 12.5 25 50 75

Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

**Figure 5:** Vegetation, Slope and APZ.



## 6.5. Asset Protection Zones

An Asset Protection Zone (APZ) is a buffer zone between a bush fire hazard and buildings. The APZ is managed progressively to minimise fuel loads and reduce potential radiant heat levels, flame, smoke and ember attack. The appropriate APZ distance is based on vegetation type, slope and the nature of the development.

The APZ can include roads or properties managed to be consistent with APZ standards set out in RFS document *Standards for Asset Protection Zones*. The APZ provides a fuel-reduced, physical separation between buildings and bush fire hazards is a key element in the suite of bush fire measures and dictates the type of construction necessary to mitigate bushfire attack.

PBP 2019 requires APZs for commercial and industrial development to provide a defensible space and minimises material ignition. APZs are shown in **Figure 5** and are consistent with the original SSD approval and the *Oakdale Industrial Estate – West Bushfire Protection Assessment*, prepared by Australian Bushfire Protection Planners Pty Ltd, dated September 2016 and updated 13 January 2020 and the *SSD-7348 (MOD 6) Bushfire Hazard Assessment* prepared by Blackash Bushfire Consulting, dated 12 November 2020.

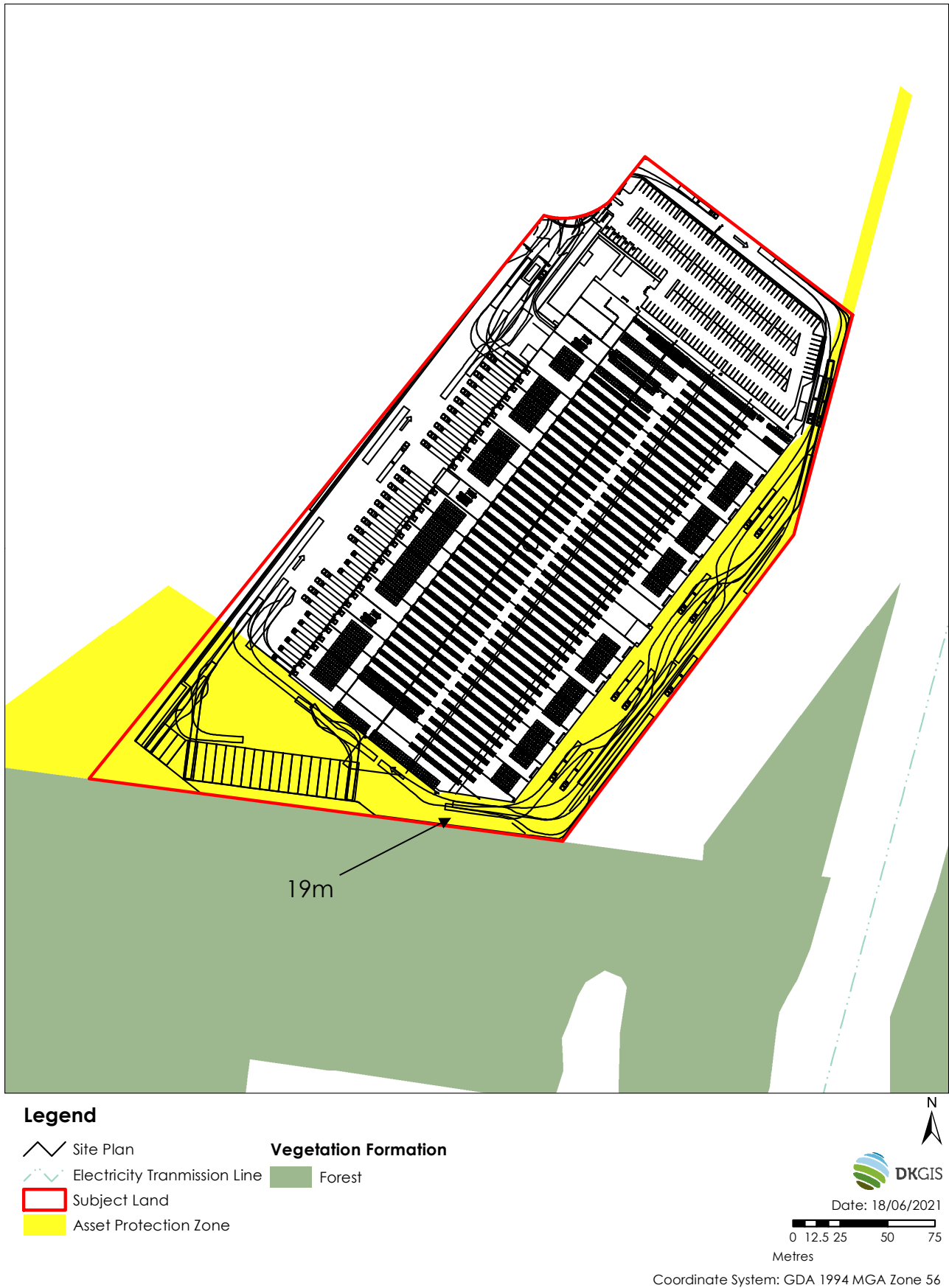
The site will be managed and maintained to prevent the spread of a bushfire towards the building and to prevent the spread of fire onto or from the site in accordance with section 63 of the *Rural Fires Act 1997* (RF Act).

The area around the buildings is cleared and maintained to mineral earth or non-combustible surfaces and is not a fire hazard. Areas of retained trees within the APZ is acceptable provided they are not directly adjacent to the building and the ongoing operational management of the site should ensure ground fuels around the trees is maintained consistent with the APZ requirements.

**Table 2** below provide a summary of the APZ for the proposed building and **Figure 6** provides a depiction of the APZ.

**Table 2:** APZ Assessment.

Direction	Slope	Vegetation	Flame Zone Width	APZ Proposed
Northeast	NA	No hazard	Nil	NA
Southeast	NA	No hazard	Nil	NA
South	0-5° Downslope	Forest	22 metres	19 metres
Southwest	NA	No hazard	Nil	NA
Northwest	NA	No hazard	Nil	NA



**Figure 6: Asset Protection Zones**

## 6.6. Bushfire Attack Levels

The Bushfire Attack Level (BAL) is a means of measuring the severity of a buildings or sites potential exposure to ember attack, radiant heat and direct flame contact. In the Building Code of Australia, the BAL is used as the basis for establishing the requirements for construction to improve protection of building elements.

The Bushfire Attack Levels to the site (**Table 3**) have been calculated through site specific radiant heat modelling. As "Other" development, the development must comply with objective 3 of PBP 2019 which requires that the development:

3. *Provide appropriate separation between a hazard and buildings, which, in combination with other measures, prevent the likely fire spread to buildings.*

Asset Protection Zones (see section 6.5) will be provided around the development that will include perimeter roads and hardstand areas. The buildings will be constructed to meet the relevant requirements of AS3959-2018 as identified through the radiant heat modelling consistent with the methodology in PBP 2019.

The building requirements for design and construction vary according to the bushfire attack level for the building. The building requirements for each BAL are set out in *Australian Standard: 3959 Construction of buildings in bushfire-prone areas 2009 (AS3959)*.

**Table 3** (below) provides a summary of the Bushfire Attack Levels across the building and **Figure 7** depicts the BAL as mapped across the building. The Bushfire Attack Levels have been determined based on the site assessment methodology in PBP 2019.

**Table 3:** Bushfire Attack Levels.

Direction	Slope	Vegetation	APZ Proposed	Bushfire Attack Level
Northeast	NA	No hazard	NA	BAL-12.5
Southeast	NA	No hazard	NA	BAL-FZ
South	0-5° Downslope	Forest	19 metres	BAL-FZ
Southwest	NA	No hazard	NA	BAL-FZ
Northwest	NA	No hazard	NA	BAL-12.5

*\*Note: The BALs for the building cannot be reduced below BAL-12.5 on the non-exposed elevations of the building. Figure 7 depicts the Bushfire Attack Levels for the site.*

## 7. Access

PBP 2019 requires that the design of access roads enables safe access and egress for people attempting to leave the area at the same time that emergency service personnel are arriving to undertake firefighting operations.

**Figure 3** shows the OWE Masterplan which includes the access to the site.

Vehicular access to the proposed Oakdale West Estate will be provided in the north-eastern part of the site, providing a link north to Lenore Drive and the broader external road network.

This road and the proposed internal access roads will be constructed to provide heavy rigid and articulated vehicle access to each of the proposed buildings. This internal road network provides suitable access for fire-fighting appliances similar to NSW RFS Category 1 Tankers and Fire & Rescue NSW Composite and Aerial Appliances.

The OWE design provides access around the entire proposed 4E buildings and to the bushfire prone vegetation within the corridor along the western boundary by a perimeter service road.

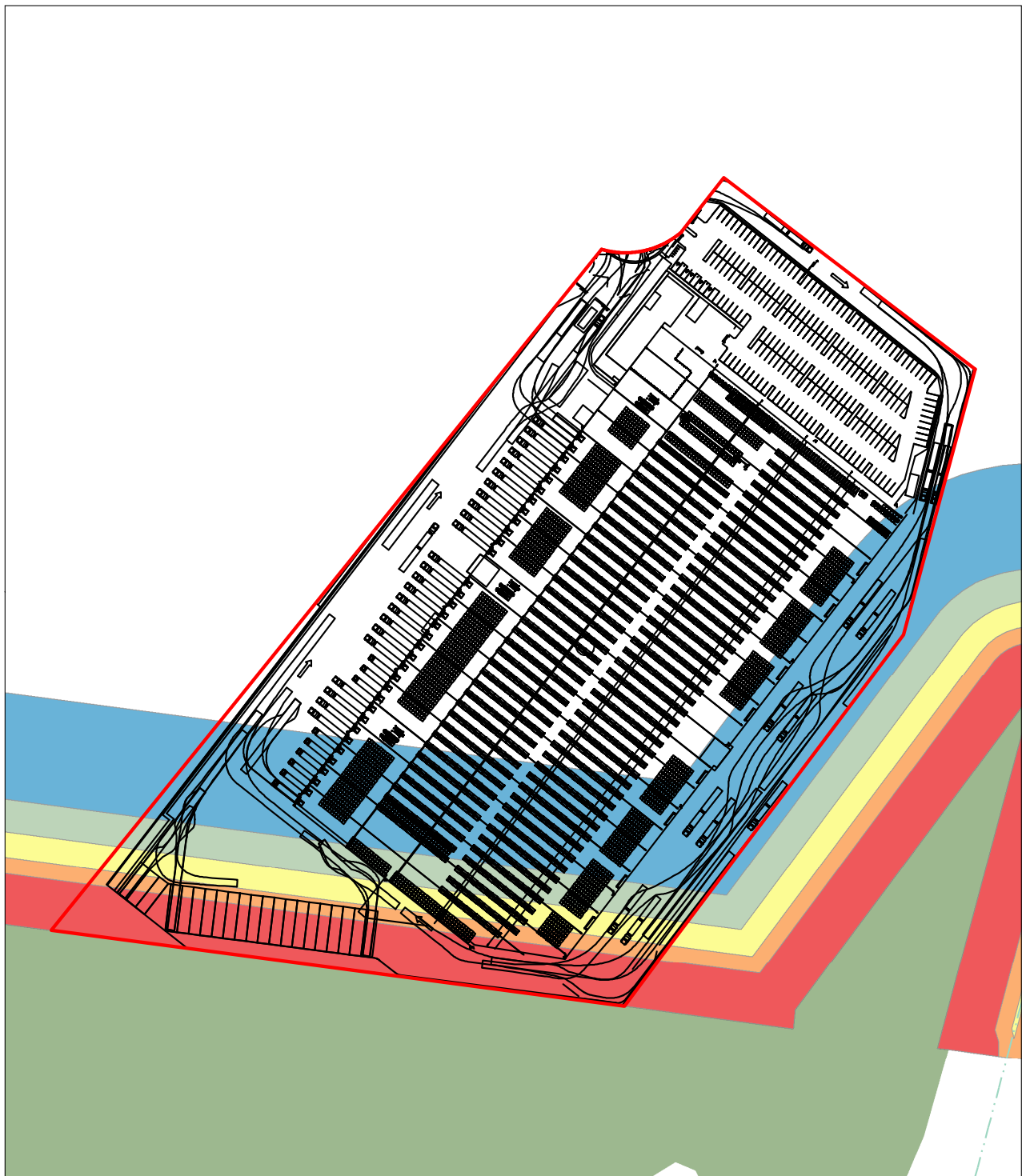
Given the comprehensive nature of the road design, access complies with the requirements of PBP 2019.

## 8. Water Supply and Utilities

PBP 2019 (p. 47) requires that adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.

Suitable water supply arrangements will be provided for firefighting that meet the NSW RFS requirements. A reticulated water supply for potable water supply and fire hydrants will be provided to the site. The fire-fighting water supply to the proposed building shall comply with the Building Code of Australia [BCA] and A.S. 2419.1 – 2005.

The proposed facility shall be provided with a ring-main to the hazard (western) side of the building, complete with Millcock Valves fitted with Stortz Coupling and Blanking Cap.



### Legend

- Site Plan
- Electricity Transmission Line
- Subject Land
- Vegetation Formation**
- Forest

- Bushfire Attack Level (BAL)**
- BAL - Flame Zone
  - BAL - 40
  - BAL - 29

- BAL - 19
- BAL - 12.5



Date: 18/06/2021

0 12.5 25 50 75  
Metres

Coordinate System: GDA 1994 MGA Zone 56

**Figure 7: Bushfire Attack Levels**

## 9. Emergency Management Arrangements

Emergency management arrangements will be demonstrated through a separate Bushfire Emergency Management and Evacuation Plan which will be provided prior to occupation that will include triggers for closing the site and what to do in the event of a bushfire emergency.

## 10. Storage of Dangerous Goods

A portion of the products being stored in the proposed warehouse will contain ethanol concentrations exceeding 24% which results in a classification as a Class 3 Flammable Liquid under the Australian Dangerous Goods Code (ADG). Riskcon has prepared a SEPP 33 assessment (dated 23/6/21) to allow for the compliant storage and handling of DGs on the site per the *Environmental Planning and Assessment Regulations 2000*. Based on the Riskcon review of the storage of flammable liquids at the proposed site, it was determined by Riskcon that:

*“the facility will be compliant with “Applying SEPP 33” and thus the EPA Regulation if the storage of flammable liquids is no closer than 10 m to the site boundary. This will prevent the facility from being considered potentially hazardous.”*

In addition, a Fire Safety Strategy has been prepared (by Core Engineering Group dated 18 June 2021). This study provides details of all credible fire hazards and the associated fire prevention and mitigation measures for the development.

The building will be built to the relevant BAL under AS3959 and afforded the preventative and protective measures identified within Section 6.3 of the Fire Safety Strategy. These measures include (but are not limited to) Type C Construction, Occupant Warning System, Sprinkler System, Fire Hose Reels and continuous vehicular perimeter access. The combination of AS3959 and the fire safety preventative and protective measures provide a suite of bushfire protection commensurate with the bush fire hazard and associated risks. Any Dangerous Goods stored within the building will therefore be adequately protected from bushfire impacts.

The provisions within Chapter 7 of PBP 2019 were used to establish a package of bushfire measures for the development. Importantly, given its location within the Oakdale West Estate the facility does not impact on existing developments.

## 11. Assessment Against the Aim and Objectives of PBP

All development on Bushfire Prone Land needs to comply with the aim and objectives of PBP. **Table 4** shows the compliance with PBP.

**Table 4: Compliance with Aim & Objectives of PBP**

Aim	Meets Criteria	Comment
The aim of PBP is to use the NSW development assessment system to provide for the protection of human life (including fire fighters) and to minimise impacts on property from the threat of bushfire, while having due regard to development potential, onsite amenity and the protection of the environment.	Yes	Landscaping, defensible space, access and egress, emergency risk management and construction standards are in accordance with the requirements of PBP and the aims of PBP have been achieved.
Objectives	Meets Criteria	Comment
Afford occupants of any building adequate protection from exposure to a bushfire.	Yes	The development provides opportunity for all occupants to be shielded from any external bushfire. Construction material will comply with the relevant AS3959 requirements.
Provide for a defensible space to be located around buildings.	Yes	Defensible space is provided on all sides of the proposed building.
Provide appropriate separation between a hazard and buildings, which, in combination with other measures, prevent the likely fire spread to buildings.	Yes	The building is separated from the forest vegetation and is provided APZs and commensurate construction in accordance with AS3959.
Ensure that safe operational access and egress for emergency service personnel and occupants is available.	Yes	The site has direct access to public roads, and access and egress for emergency vehicles and evacuation is adequate. A perimeter road is provided around the building. The development provides for the movement of heavy articulated trucks about the site.
Provide for ongoing management and maintenance of bushfire protection measures.	Yes	The site will be managed by Goodman including all APZ and landscaping in accordance with PBP.
Ensure that utility services are adequate to meet the needs of firefighters.	Yes	Utility services are adequate to meet the needs of firefighters (and others assisting in bushfire fighting).

The suite of bushfire protection measures provided for the proposed development satisfies the objectives for buildings of Class 5-8 under the NCC as identified in section 8.3.1 and 8.3.9 of PBP 2019.



## 12. Recommendations

The following recommendations are made to ensure the Oakdale West Estate is provided with adequate bushfire protection in accordance with PBP:

**Recommendation 1:** At the commencement of building works and in perpetuity, an Asset Protection Zone shall be established and maintained on the site as per Figure 6. The APZ shall be established and maintained as an inner protection area as outlined within *Planning for Bushfire Protection 2019* and the NSW RFS document '*Standards for Asset Protection Zones*'.

**Recommendation 2:** Fire hydrants are provided in accordance with Building Code of Australia E1.3, AS2419.1:2005, including the ring main complete with Millcock Valves fitted with Stortz Coupling and Blanking Cap.

**Recommendation 3:** The building is constructed in accordance with *Australian Standard AS 3959-2009 Construction of buildings in bushfire-prone areas (AS 3959-2018)* as identified in Table 3 and also include the following additional measures:

- The downpipe/stormwater system to the internal box gutters shall be sized to provide a self-flushing of combustible materials from the roof/gutter. This shall include increased fall in the box gutters to the sumps;
- Any operable windows shall be fitted with aluminium/stainless steel mesh flyscreens having a maximum mesh aperture size of 2mm;
- Access doors [PA and Vehicle] to the buildings shall be fitted with seals that seal the bottom, stiles and head of the door against the opening/frame to prevent the entry of embers into the building. Particular attention shall be given to the gap at the head of the curtain of the roller doors, where mohair type seals can be used;
- External timber doors shall be fitted with a stainless steel/Colorbond kick plate of 400mm high on the outside of the door;
- External glazed doors and windows shall comply with the requirements for glazing less than 400mm above finished ground level; paths / pavement and elevated roofs;
- Any external vents, grilles and ventilation louvres shall have stainless steel mesh with a maximum aperture of 2mm square fitted to prevent the entry of embers into the building or be fitted with a louvre system which can be closed in order to maintain a maximum aperture or gap of no more than 2mm; and
- Roof ventilators shall be fitted with stainless steel flymesh [2mm aperture] to prevent the entry of embers into the building or be fitted with a louvre system which can be closed in order to maintain a maximum aperture or gap of no more than 2mm.

### 13. Conclusion

The Bushfire Hazard Assessment to support a Development Application (DA) for the construction of Building 4E at the Oakdale West Estate (OWE).

The site is on bushfire prone land. Commercial and industrial development is designated as “other” development in PBP 2019. As “other” development, the proposed development has considerable flexibility, and the nature of the development often results in the structures providing a higher degree of bushfire resistance than that specified by PBP and AS3959.

The proposed new building and the site is able to respond and implement an appropriate level of bushfire protection measures, as per PBP 2019. The suite of bushfire protection measures provided for the proposed development satisfies the objectives for buildings of Class 5-8 under the NCC as identified in section 8.3.1 and 8.3.9 of PBP 2019.

In accordance with Condition C12 of SSD 7348, proposed Building 4E complies with the provisions of *Planning for Bushfire Protection 2019* and satisfies the construction standards and asset protection zone requirements recommended in the Oakdale Industrial Estate - West Bushfire Protection Assessment, prepared by Australian Bushfire Protection Planners Pty Ltd, dated September 2016 and updated 13 January 2020, and the SSD-7348 (MOD 6) Bushfire Hazard Assessment prepared by Blackash Bushfire Consulting, dated 12 November 2020. Building 4E also complies with AS2419.1 – 2005 Fire Hydrant Installations for firefighting water supply.

This Report is a Bush Fire Hazard Assessment that responds to the NSW RFS advice dated Monday 21 June 2021 and provides the required information to assist the Department of Planning, Industry and Environment in determining compliance in accordance with the aims and objectives of *Planning for Bushfire Protection 2019*.



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## Appendix 1 References

Australian Building Codes Board Building Code of Australia Volumes 1&2

Councils of Standards Australia AS3959 (2018) – Australian Standard Construction of buildings in bushfire-prone areas

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