BLACKASH
BUSHFIRE CONSULTING

Bushfire Hazard Assessment

SSD-77020757

Proposed Industrial Warehouse

Precinct 2

Oakdale East Industrial Estate

Horsley Park

Prepared for

Goodman Property Services (Aust.) Pty Ltd

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

Version 1.0

28 March 2025

Project Name:	Oakdale East Industrial (Precinct 2): SSD-77020757
Site Details	Oakdale East Industrial Estate
Client Details:	Luke Ridley Development Manager Goodman The Hayesbery 1-11 Hayes Road, ROSEBURY, NSW 2018
BlackAsh Contact Details	
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Version	Primary Author(s)	Description	Date Completed
0.1	Corey Shackleton	Draft	11 October 2024
0.2	Corey Shackleton	Draft (updated plans)	5 November 2024
0.3	Corey Shackleton	Draft (updated plans)	6 January 2025
1.0	Corey Shackleton	Final	28 March 2025

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Contents

1. Abbreviations

APZ	Asset protection zone
AS2419	*Australian Standard – Fire hydrant installations*
AS3745	*Australian Standard – Planning for emergencies in facilities*
AS3959	*Australian Standard – Construction of buildings in bushfire-prone areas 2018*
BAL	Bushfire Attack Level
NCC	*National Construction Code*
BFSA	Bush Fire safety authority
EP&A Act	*Environmental Planning & Assessment Act 1979*
EPA Reg	*Environmental Planning and Assessment Regulation 2000*
GTA	General terms of approval
PBP	*Planning for Bush Fire Protection 2019*
RF Act	*Rural Fires Act 1997*
RFS	NSW Rural Fire Service
RFR	*Rural Fires Regulation* 2013

2. Glossary

AS3959	Australian Standard AS 3959 Construction of buildings in bushfire-prone areas, Standards Australia, 2018, that outlines construction standards applicable to residential developments in bush fire prone areas
Bushfire Prone Area	An area of land that can support a bush fire or is likely to be subject to bush fire attack.
Bush fire safety authority	An approval of the Commissioner of the RFS required for a subdivision for residential or rural residential purpose or for a special fire protection purpose listed under section 100B of the *Rural Fires Act 1997*.
Infill Development	Refers to the development of land by the erection of or addition to a residential building (or buildings) which does not require the spatial extension of services including public roads, electricity or water and is within an existing allotment.

3. Property, Proposal & Summary

Address:	Precinct 2, Oakdale East Industrial Estate, Horsley Park
Lot/ DP:	Lot 102 DP1268366 & 103 DP1268366
Suburb, town or locality:	Horsley Park
Local Government Area:	Fairfield
Type of development:	Infill development – Other (Industrial)
Existing use	Vacant
Intended use	Industrial

4. Compliance with *Planning for Bush Fire Protection 2019*

Type of Development	Infill - Other
Aim of PBP	Yes
Objectives of PBP	Yes
Specific Objectives for Infill	Yes
BAL	See Figure 7

5. Introduction

Blackash Bushfire Consulting has been engaged by Goodman Property Services (Aust.) Pty Ltd (Goodman) to provide a Bushfire Hazard Assessment report to support the proposed industrial warehouse development at Precinct 2 of the Goodman's Oakdale East Industrial Estate ("Estate").

The Estate is shown in Figure 1 and forms part of the larger Oakdale Industrial Estate which is part of 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 development is located on bushfire prone land, necessitating compliance with the NSW Rural Fire Service's *Planning for Bush Fire Protection 2019* (PBP 2019) guidelines for any new development.

PBP 2019 recognises that infill development proposals will be constrained by existing situations – pre-existing subdivision patterns and existing built forms surrounding the subject site. Consequently, each proposal must be considered on its merits and in accordance with the intent and performance criteria for infill development. Industrial development such as the proposed 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 that required by the NSW Rural Fire Service (NSW RFS). 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 development.

This report has been completed having regard to Secretary for Planning and Environment's (the Secretary) Environmental Assessment Requirements (SEARs) issued for the proposal on 15 November 2024. The SEARs require the following in relation to bushfire:

> *"a bush fire assessment report that addresses the aims and objectives of Planning for Bushfire Protection 2019, and the construction standards and asset protection zone requirements recommended in the Bushfire Hazard Assessment for the Oakdale East Industrial Estate, prepared by Blackash Bushfire Consulting, dated 23 March 2023."*

The proposed industrial facility is required to respond and implement an appropriate level of bushfire protection measures, as per PBP 2019. This report will demonstrate that an appropriate combination of protection measures has been provided to meet the aims and objectives of *Planning for Bush Fire Protection 2019* and the construction standards and asset protection zone requirements recommended in the *Bushfire Hazard Assessment for the Oakdale East Industrial Estate*, prepared by Blackash Bushfire Consulting, dated 23 March 2023.

This assessment has been prepared by Corey Shackleton, Principal Bushfire and Resilience, Blackash Bushfire Consulting. Corey is a person who is recognised by the NSW RFS as a qualified consultant in bush fire risk assessment (FPAA BPAD-Level 3 Certified Practitioner No. BPD-PA-34603).

Figure 1: Site Location

6. Site Description & Proposal

The Estate is shown in Figure 1 and forms part of the larger Oakdale Industrial Estate which is part of 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 site is in the Fairfield City Local Government Area (LGA) in the south-western part of the WSEA. The site is legally described as Lot 102 and Lot 103 in DP1268366.

The Estate is bound to the north by Precinct 5 and to the east by the Reedy Creek riparian corridor. Land further to the east is industrial development, while south is Burley Road and west is other precincts of the Oakdale East Estate.

Given the existing land use the Estate site is almost entirely cleared, with the Reedy Creek area in the east forming the only area of bushland / bushfire hazard within the site.

The proposal is to construct a new industrial warehouses on the site (see Figure 2).

7. 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 3 shows the Bushfire Prone Land Map for the site. The extract from the Fairfield Bushfire Prone Map shows that the site is adjoined by Category 2 vegetation to the east and Burley Road to the south has been incorrectly mapped as Category 2 vegetation.

Figure 2: Proposed Development

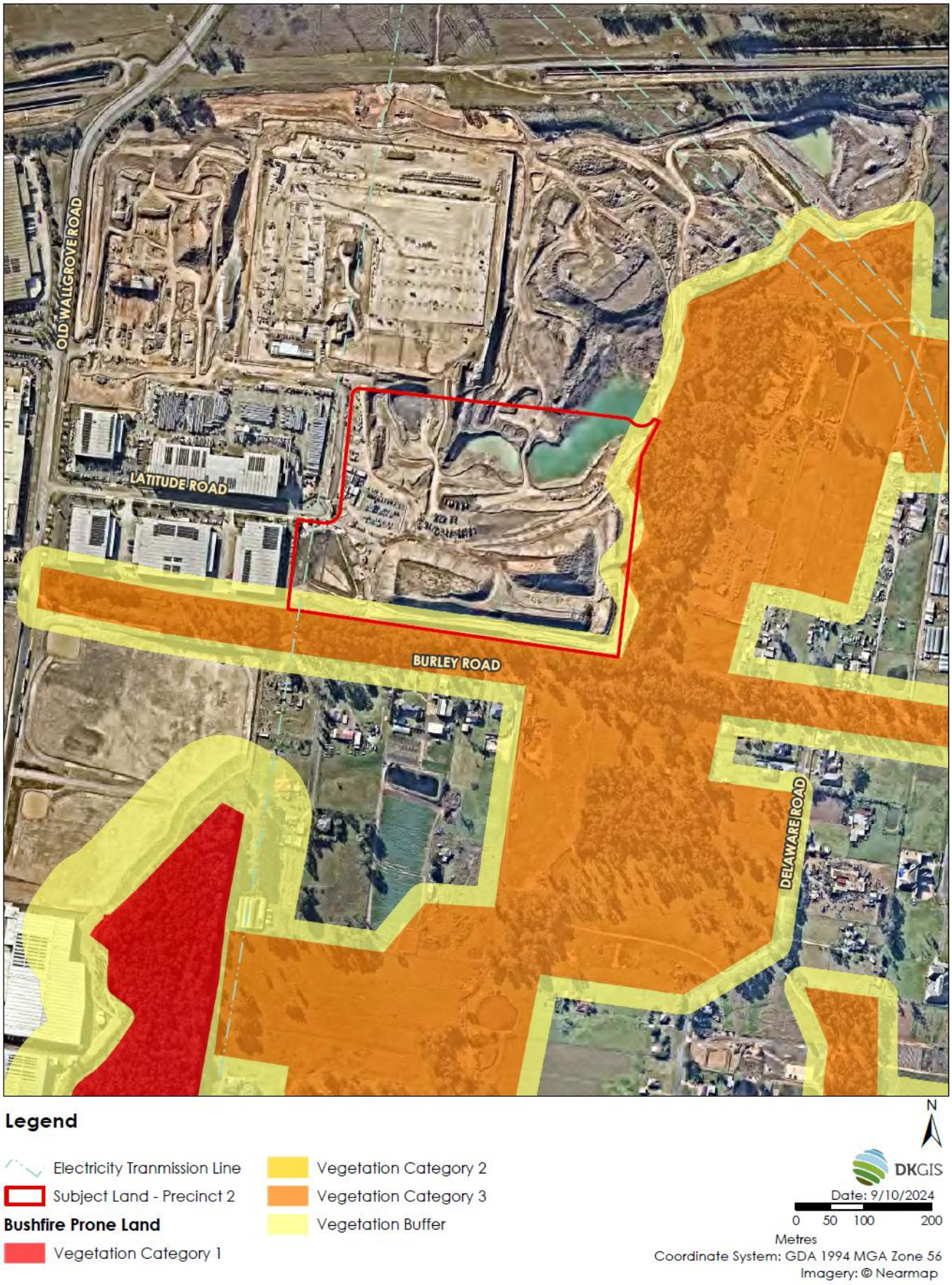

Figure 3: Bushfire Prone Land

8. Legislative Framework

The site is identified as 'bushfire prone land' (see Figure 3) 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.

A defendable space is provided through onsite setbacks. This coupled with the suite of bushfire protection measures ensures the proposed warehouse can comply with PBP 2019.

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

Because of their size, complexity, importance and/or potential impact, the Department of Planning, Industry and Environment (DPIE) is predominantly responsible for assessing development applications relating to State Significant Development. The Minister for Planning is the consent authority for SSD applications.

Applications designated as state significant projects are exempt from requiring a bushfire safety authority (BFSA). Given their scale however, the requirements of PBP should still be applied, and consultation with the NSW RFS has already occurred as part of the original SSD approval process.

9. Bushfire Assessment Requirements

The subject land is identified as being bushfire prone land on the Fairfield Bushfire Prone Land Map. The proposed development is to be assessed in accordance with PBP 2019. The following detailed assessment is based on the methodology and requirements of PBP 2019 and supporting RFS policy.

PBP 2019 recognises the unique attributes of infill development and promotes detailed site analysis and the application of a combination of bushfire protection measures (BPMs) to achieve an acceptable outcome.

The BPMs work in combination to provide a suite of measures that meet the aim and objective and Section 4.3 of PBP 2019. The BPMs are shown in Figure 4.

Appropriate combinations depend upon geographic location and site circumstances.

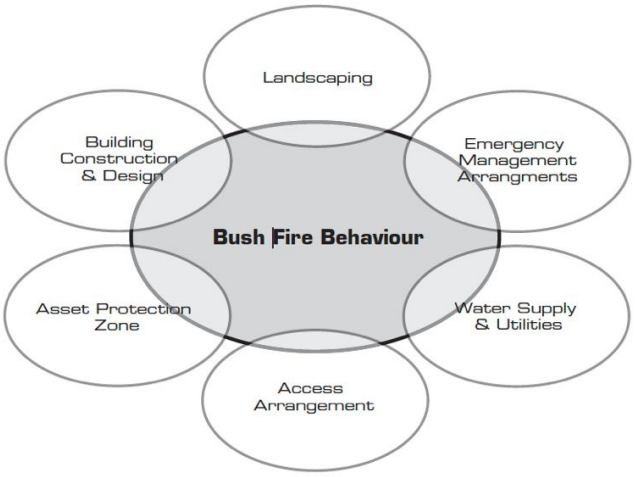

Figure 4: Bushfire Protection Measures in Combination (source PBP 2019 p. 26)

Methodology

PBP 2019 provides a methodology to determine the bushfire threat posed to a site and Australian Standards for the *Construction of Buildings in Bushfire Prone Areas* (AS3959) is used to determine the construction requirement to reduce potential bushfire attack.

The following assessment is prepared in accordance with PBP 2019 and Method 1 from AS3959. This assessment is based on a site inspection and detailed desktop assessment of the site utilising the following resources:

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

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 construction requirements in accordance with AS3959. 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 building response of PBP 2019.

Fire weather

The fire weather is dictated by PBP 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.

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.

Aside from the riparian corridor associated with Reedy Creek to the east of the site, all other bushfire prone vegetation within the site has been removed (see Figure 6). The Reedy Creek riparian corridor is Forested Wetland and exists only within the isolated corridor associated with the creek. The corridor varies from 20-100 metres wide and considered a Short Fire Run.

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 metre transect measured outwards from the development boundary or the existing/ proposed buildings.

The land is flat within the forested wetland in the Reedy Creek riparian corridor (Figure 5).

Figure 5: Vegetation and Slope

10. Asset Protection Zones

An Asset Protection Zone (APZ) is a buffer zone between a bushfire 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 NSW 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 defendable space and minimise material ignition.

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 building is cleared and maintained to mineral earth or non-combustible surfaces and is not a fire hazard.

Table 2 (below) provides a summary of the APZ for the proposed development and Figure 6 depicts them across the site.

Table 2: APZ Assessment.

Direction	Slope	Vegetation	Flame Zone Width	APZ Proposed
North	NA	No hazard	Nil	Nil
East	Level	Forested Wetland	5-7 metres*	9 metres
South	NA	No hazard	Nil	Nil
West	NA	No hazard	Nil	Nil

**Note: The extent of the Flame Zone for the building is based on Radiant Heat Modelling (see section 11.1.1).*

Figure 6: Asset Protection Zones

11. 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 residential construction to improve protection of building elements.

The Bushfire Attack Levels to the site has been completed using the distances from the PBP 2019 Table A1.12.5 (Table 3). The BAL for the site is shown in Figure 7.

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 7.5) will be provided around the development that include existing roads, hardstand areas, development, and managed land. The nearest bushfire hazard is the narrow riparian corridor associated with Reedy Creek to the east of the site.

Table 3 provides a summary of the BALs, and Figure 7 depicts the BAL requirements across the site.

Table 3: Bushfire Attack Levels.

Direction	Slope	Vegetation	APZ Proposed	Bushfire Attack Level
North	NA	No hazard	Nil	See Figure 7*
East	Level	Forested Wetland	9 metres	See Figure 7*
South	NA	No hazard	Nil	See Figure 7*
West	NA	No hazard	Nil	See Figure 7*

**Note: The extent of the BAL for the building is depicted in detail in Figure 7 and Appendix 2 shows the detailed modelling results.*

11.1. Radiant Heat Modelling

Detailed radiant heat modelling has been undertaken for the eastern elevation due to the site-specific inputs. Table 4 below is a summary of the key inputs, while the detailed outputs can be found in Appendix 2. This modelling underpins the BAL mapping for the site and is consistent with that undertaken within the *Bushfire Hazard Assessment for the Oakdale East Industrial Estate*, prepared by Blackash Bushfire Consulting, dated 23 March 2023.

Table 4: Modelling inputs for the Flame Zone width on the eastern elevation.

Direction	Slope	Vegetation	Separation	Short Fire Run	Radiant Heat	Flame Length
East	0°	Coastal Floodplain Forest	5 metres	80 metres	33.55kW/m2	5.008 metres

**Note: Despite the SFR being appropriate for these precincts, it has not been used. This provides additional conservatism in the design.*

11.2. Application of AS3959 (2018)

Construction must comply with the corresponding Bushfire Attack Level (BAL) as shown in Figure 7.

The application of each BAL is as defined in Figure 7 and not broadly applied across the entire elevation/building. The construction must comply with corresponding sections of the Australian Standard AS3959-2018 *Construction of buildings in bush fire-prone areas* or NASH Standard (1.7.14 updated) *National Standard Steel Framed Construction in Bushfire Areas* – 2014 as appropriate, and Section 7.5 of *Planning for Bush Fire Protection 2019*.

The construction for the remainder of the proposed buildings not denoted with a BAL in Figure 8 is greater than 100 metres from any bushfire hazard. Consistent with AS3959, construction greater than 100 metres from a bushfire hazard is classified as BAL-Low. AS3959 describes BAL-Low as "*There is insufficient risk to warrant specific construction requirements*". Therefore, the construction for the remainder of the proposed building not denoted with a BAL in Figure 7, is appropriately BAL-Low.

The construction of the buildings in this manner complies with *Planning for Bush Fire Protection 2019* and the National Construction Code (NCC).

Figure 7: Bushfire Attack Levels

12. 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 buildings shall comply with the Building Code of Australia [BCA] and A.S. 2419.1 – 2005.

13. Access

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

Figure 3 shows the site plan which includes the access to the site.

Vehicular access to Precinct 2 will be provided via Estate Road 01 and Estate Road 02 which link to Old Wallgrove Road which connects in the western part of the Estate. Old Wallgrove Road links well into the broader public road network, including to Burley Road in the south and through to the Westlink M7 in the northeast.

The Estate Road network will be constructed to provide heavy rigid and articulated vehicle access to the proposed warehouses. This internal road network is designed to provide access for a prime mover and semi-trailer. This design is more than adequate to accommodate fire-fighting appliances like NSW RFS Category 1 Tankers and Fire & Rescue NSW Composite and Aerial Appliances.

The road design provides access around the warehouses and to the bushfire prone vegetation within the corridor along the eastern boundary. This is provided by a perimeter service road.

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

14. Assessment Against the Aim and Objective of PBP

All development in Bushfire Prone Areas needs to comply with the aim and objectives of PBP. Table 2 shows the compliance with PBP.

Table 2: 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, defendable 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 will comply with the NCC and AS3959 (2018).
Provide for a defendable space to be located around buildings.	Yes	Defendable space is provided around the 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 vegetated areas and provide APZs and commensurate construction in accordance with the NCC.
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.
Provide for ongoing management and maintenance of bushfire protection measures.	Yes	The site will be managed including all APZ and landscaping in accordance with PBP 2019.
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 of PBP 2019.

15. Recommendations

The following recommendation has been made within this report to ensure the proposed new warehouses are compliant with *Planning for Bush Fire Protection 2019*:

Recommendation 1: At the commencement of building works and in perpetuity, the entirety of Precinct 2 shall be maintained as an Asset Protection Zone. 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 requirements for large, isolated buildings and those identified in Section 9.

Recommendation 3: The warehouses are to be constructed to comply with the National Construction Code (2019), Australian Standard AS 3959:2018, *Construction of buildings in bush fire-prone areas* and/or NASH Standard (1.7.14 updated), *National Standard Steel Framed Construction in Bushfire Areas – 2014*, and Section 7.5 of *Planning for Bush Fire Protection 2019* on a prescriptive (deemed to satisfy and/or acceptable solution) basis and/or performance basis to the extent depicted in Figure 7.

Recommendation 4: All proposed roads must comply with section 5.3.2 of *Planning for Bush Fire Protection 2019* as appropriate.

16. Conclusion

This assessment has demonstrated that the proposed industrial development can comply with *Planning for Bush Fire Protection 2019*. The recommendations have been provided to ensure compliance with *Planning for Bush Fire Protection 2019* and ensure considerable redundancy in the design.

As a person recognized by the NSW RFS as a qualified consultant, this report confirms that the proposed development conforms to the Aim and Objectives of *Planning for Bush Fire Protection 2019* and consistent with the construction standards and asset protection zone requirements recommended in the *Bushfire Hazard Assessment for the Oakdale East Industrial Estate*, prepared by Blackash Bushfire Consulting, dated 23 March 2023.

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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

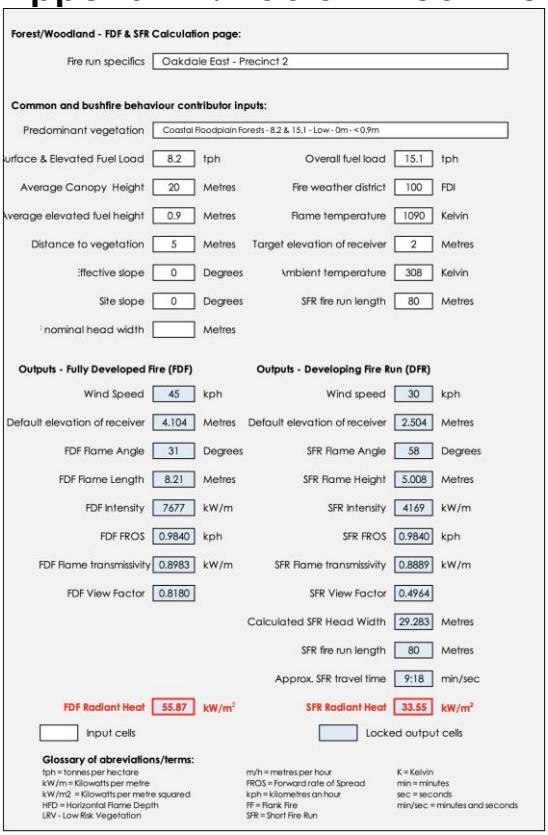
Keith, David (2004) – Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT. The Department of Environment and Climate Change

NSW Rural Fire Service (2015) Guide for Bushfire Prone Land Mapping

NSW Rural Fire Service (NSW RFS). 2019. Planning for Bushfire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners.

NSW Government (1979) Environmental Planning and Assessment Act 1979. NSW Government Printer

Appendix 2: Radiant Heat Modelling



Forest/Woodland - FDF & SFR Calculation page:

Fire run specifics: Oakdale East - Precinct 2

Common and bushfire behaviour contributor inputs:

Predominant vegetation	Coastal Floodplain Forests - 8.2 & 15.1 - Low - 0m - < 0.9m				
urface & Elevated Fuel Load	8.2	tph	Overall fuel load	15.1	tph
Average Canopy Height	20	Metres	Fire weather district	100	FDI
verage elevated fuel height	0.9	Metres	Flame temperature	1090	Kelvin
Distance to vegetation	5	Metres	Target elevation of receiver	2	Metres
ffective slope	0	Degrees	mbient temperature	308	Kelvin
Site slope	0	Degrees	SFR fire run length	80	Metres
nominal head width		Metres			

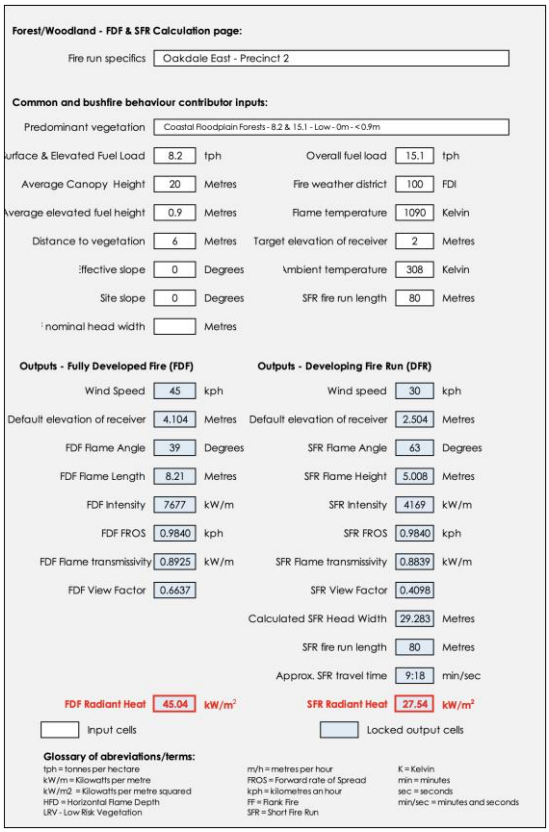
Outputs - Fully Developed Fire (FDF)			Outputs - Developing Fire Run (DFR)		
Wind Speed	45	kph	Wind speed	30	kph
Default elevation of receiver	4.104	Metres	Default elevation of receiver	2.504	Metres
FDF Flame Angle	31	Degrees	SFR Flame Angle	58	Degrees
FDF Flame Length	8.21	Metres	SFR Flame Height	5.008	Metres
FDF Intensity	7677	kW/m	SFR Intensity	4169	kW/m
FDF FROS	0.9840	kph	SFR FROS	0.9840	kph
FDF Flame transmissivity	0.8983	kW/m	SFR Flame transmissivity	0.8889	kW/m
FDF View Factor	0.8180		SFR View Factor	0.4964	
			Calculated SFR Head Width	29.283	Metres
			SFR fire run length	80	Metres
			Approx. SFR travel time	9:18	min/sec
FDF Radiant Heat	55.87	kW/m²	SFR Radiant Heat	33.55	kW/m²

Input cells | Locked output cells

Glossary of abreviations/terms:

tph = tonnes per hectare; kW/m = Kilowatts per metre; kW/m2 = Kilowatts per metre squared; HFD = Horizontal Flame Depth; LRV - Low Risk Vegetation; m/h = metres per hour; FROS = Forward rate of Spread; kph = kilometres an hour; FF = Flank Fire; SFR = Short Fire Run; K = Kelvin; min = minutes; sec = seconds; min/sec = minutes and seconds

East: BAL-40



Forest/Woodland - FDF & SFR Calculation page:

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Predominant vegetation	Coastal Floodplain Forests - 8.2 & 15.1 - Low - 0m - < 0.9m				
urface & Elevated Fuel Load	8.2	tph	Overall fuel load	15.1	tph
Average Canopy Height	20	Metres	Fire weather district	100	FDI
verage elevated fuel height	0.9	Metres	Flame temperature	1090	Kelvin
Distance to vegetation	6	Metres	Target elevation of receiver	2	Metres
ffective slope	0	Degrees	mbient temperature	308	Kelvin
Site slope	0	Degrees	SFR fire run length	80	Metres
nominal head width		Metres			

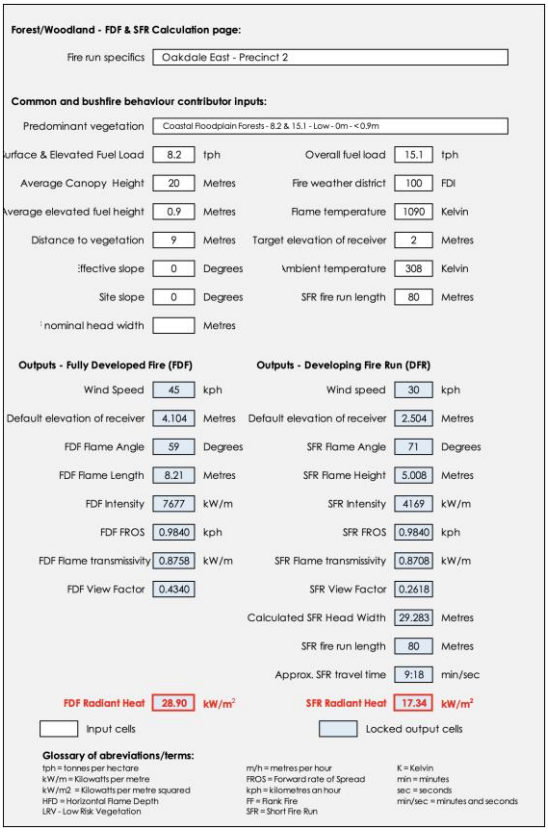
Outputs - Fully Developed Fire (FDF)			Outputs - Developing Fire Run (DFR)		
Wind Speed	45	kph	Wind speed	30	kph
Default elevation of receiver	4.104	Metres	Default elevation of receiver	2.504	Metres
FDF Flame Angle	39	Degrees	SFR Flame Angle	63	Degrees
FDF Flame Length	8.21	Metres	SFR Flame Height	5.008	Metres
FDF Intensity	7677	kW/m	SFR Intensity	4169	kW/m
FDF FROS	0.9840	kph	SFR FROS	0.9840	kph
FDF Flame transmissivity	0.8925	kW/m	SFR Flame transmissivity	0.8839	kW/m
FDF View Factor	0.6637		SFR View Factor	0.4098	
			Calculated SFR Head Width	29.283	Metres
			SFR fire run length	80	Metres
			Approx. SFR travel time	9:18	min/sec
FDF Radiant Heat	45.04	kW/m²	SFR Radiant Heat	27.54	kW/m²

Input cells | Locked output cells

Glossary of abreviations/terms:

tph = tonnes per hectare; kW/m = Kilowatts per metre; kW/m2 = Kilowatts per metre squared; HFD = Horizontal Flame Depth; LRV - Low Risk Vegetation; m/h = metres per hour; FROS = Forward rate of Spread; kph = kilometres an hour; FF = Flank Fire; SFR = Short Fire Run; K = Kelvin; min = minutes; sec = seconds; min/sec = minutes and seconds

East: BAL-29



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Wind Speed	45	kph	Wind speed	30	kph
Default elevation of receiver	4.104	Metres	Default elevation of receiver	2.504	Metres
FDF Flame Angle	59	Degrees	SFR Flame Angle	71	Degrees
FDF Flame Length	8.21	Metres	SFR Flame Height	5.008	Metres
FDF Intensity	7677	kW/m	SFR Intensity	4169	kW/m
FDF FROS	0.9840	kph	SFR FROS	0.9840	kph
FDF Flame transmissivity	0.8758	kW/m	SFR Flame transmissivity	0.8708	kW/m
FDF View Factor	0.4340		SFR View Factor	0.2618	
			Calculated SFR Head Width	29.283	Metres
			SFR fire run length	80	Metres
			Approx. SFR travel time	9:18	min/sec
FDF Radiant Heat	28.90	kW/m²	SFR Radiant Heat	17.34	kW/m²

Input cells | Locked output cells

Glossary of abreviations/terms:

tph = tonnes per hectare; kW/m = Kilowatts per metre; kW/m2 = Kilowatts per metre squared; HFD = Horizontal Flame Depth; LRV - Low Risk Vegetation; m/h = metres per hour; FROS = Forward rate of Spread; kph = kilometres an hour; FF = Flank Fire; SFR = Short Fire Run; K = Kelvin; min = minutes; sec = seconds; min/sec = minutes and seconds

East: BAL-19

Forest/Woodland - FDF & SFR Calculation page:

Fire run specifics: Oakdale East - Precinct 2

Common and bushfire behaviour contributor inputs:

Predominant vegetation	Coastal Floodplain Forests - 8.2 & 15.1 - Low - 0m - < 0.9m				
Surface & Elevated Fuel Load	8.2	tph	Overall fuel load	15.1	tph
Average Canopy Height	20	Metres	Fire weather district	100	FDI
Average elevated fuel height	0.9	Metres	Flame temperature	1090	Kelvin
Distance to vegetation	12	Metres	Target elevation of receiver	2	Metres
Effective slope	0	Degrees	Ambient temperature	308	Kelvin
Site slope	0	Degrees	SFR fire run length	80	Metres
IF nominal head width		Metres			

Outputs - Fully Developed Fire (FDF)			Outputs - Developing Fire Run (DFR)		
Wind Speed	45	kph	Wind speed	30	kph
Default elevation of receiver	4.104	Metres	Default elevation of receiver	2.504	Metres
FDF Flame Angle	68	Degrees	SFR Flame Angle	74	Degrees
FDF Flame Length	8.21	Metres	SFR Flame Height	5.008	Metres
FDF Intensity	7677	kW/m	SFR Intensity	4169	kW/m
FDF FROS	0.9840	kph	SFR FROS	0.9840	kph
FDF Flame transmissivity	0.8623	kW/m	SFR Flame transmissivity	0.8592	kW/m
FDF View Factor	0.3288		SFR View Factor	0.1844	
			Calculated SFR Head Width	29.283	Metres
			SFR fire run length	80	Metres
			Approx. SFR travel time	9:18	min/sec
FDF Radiant Heat	21.56	kW/m²	SFR Radiant Heat	12.05	kW/m²

Input cells | Locked output cells

Glossary of abreviations/terms:

tph = tonnes per hectare; kW/m = Kilowatts per metre; kW/m2 = Kilowatts per metre squared; HFD = Horizontal Flame Depth; LRV - Low Risk Vegetation; m/h = metres per hour; FROS = Forward rate of Spread; kph = kilometres an hour; FF = Flank Fire; SFR = Short Fire Run; K = Kelvin; min = minutes; sec = seconds; min/sec = minutes and seconds

East: BAL-12.5

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