

APPENDIX K: BUSHFIRE ASSESSMENT REPORT

BUSHFIRE ASSESSMENT REPORT

PROPOSED BOWLING CLUB ADDITIONS AND HOTEL

**LOT 23 DP 1088281 and Lot 1 SEC 23 DP 758871
2 Jacaranda Avenue, Raymond Terrace**

Date: **12/10/2023**

Prepared for: **Raymond Terrace Bowling Club**

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Document Status

Revision No.	Issue	Description	Reviewed	Approved by Director
1	30/05/2023	Draft	E. Davis	P. Couch
2	12/10/2023	Final – Finalised site plans	E. Davis	P. Couch

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1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES

This report has assessed the proposed bowling club additions and hotel against the requirements of Section 100B of the Rural Fires Act 1997, AS3959 (2018) Construction of buildings in bushfire-prone areas and Planning for Bush Fire Protection (2019).

This report establishes that the development is capable of complying with the acceptable solutions of Planning for Bush Fire Protection (2019).

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL

Applicant Name	Raymond Terrace Bowling Club		
Site Address	2 Jacaranda Avenue, Raymond Terrace	Lot/Sec/DP	Lot 23 DP 1088281 and Lot 1 SEC 23 DP 758871
Local Government Area	Port Stephens	FDI	100
Bushfire Prone Land	Yes, mapped bushfire prone land		
Type of development	Bowling Club Additions and Hotel	Type of Area	Urban
Special Fire Protection Purpose	Yes	Flame Temperature	1090K
Application Complies with Acceptable Solutions	Yes	Referral to NSW Rural Fire Service (NSW RFS) required	Yes. Bushfire Safety Authority Required

TABLE 2 – BUSHFIRE THREAT ASSESSMENT

	Northeast	Southeast	Southwest	Northwest
Vegetation Structure	Maintained Lands	Maintained Lands	Grassland	Maintained Lands
Distance to vegetation	140 metres	140 metres	69 metres	140 metres
Accurate Slope Measure	N/A	N/A	Level	N/A
Slope Range	N/A	N/A	Level/Upslope	N/A
Planning for Bush Fire Protection (2019) Table A1.12.1 Minimum Setbacks	N/A	N/A	36 metres	N/A
AS3959 (2018) Bushfire Attack Level (BAL)	BAL-LOW	BAL-LOW	BAL-LOW	BAL-LOW

TABLE 3 – PLANNING FOR BUSH FIRE PROTECTION (2019) SECTION 6 COMPLIANCE

Performance Criteria	Proposed Development Determinations	Method of Assessment
Asset Protection Zone	Minimum setbacks have been determined in accordance with Planning for Bush Fire Protection (2019) Table A1.12.1 and can be achieved within the subject site and surrounding managed land.	Acceptable Solution
Landscaping	Landscaping shall be in accordance with Planning for Bush Fire Protection (2019) Appendix 4; and fencing is constructed in accordance with section Planning for Bush Fire Protection (2019) 7.6.	Acceptable Solution
Construction	The site is BAL-LOW with National Construction Code structural fire safety compliance required.	Acceptable Solution
Access – Internal Roads	The internal access roads shall comply with Planning for Bush Fire Protection (2019) Section 6 property access provisions.	Acceptable Solution
Water Supply	The fire hydrant network shall be extended in accordance with AS 2419.1.	Acceptable Solution
Electrical Supply	The existing electrical supply to the local area is via overhead electrical transmission lines. Landscaping onsite should be managed so that no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002). Electrical supply onsite is recommended to be located underground.	Acceptable Solution
Gas Supply	Any proposed gas supply will be located underground.	Acceptable Solution
Emergency and Evacuation Planning	The proposed buildings shall be included in an emergency management plan for the development which complies with AS 3745 Planning for emergencies in facilities and have specific consideration for bushfire.	Acceptable Solution

2.0 INTRODUCTION

2.1 PURPOSE OF REPORT

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed bowling club additions and hotel located at Lot 23 DP 1088281 and Lot 1 SEC 23 DP 758871, 2 Jacaranda Avenue, Raymond Terrace. The assessment acknowledges the requirements of Section 100B of the Rural Fires Act 1997 and Planning for Bush Fire Protection (2019) to protect persons, property and the environment from dangers that may arise from a bushfire.

Under the provisions of Section 100B of the Rural Fires Act 1997 as amended, a Bushfire Safety Authority (BFSA) is required from the Commissioner of the NSW Rural Fire Service.

This report complies with Rural Fires Regulation 2008 Clause 44 Application for Bushfire Safety Authority. The assessment encompasses the subject site and neighbouring areas.

The recommendations within this report address the aims and objectives of Planning for Bush Fire Protection (2019) to reduce the risk of ignition of the development in a bushfire event.

2.2 PROPOSED DEVELOPMENT

The land is zoned RE2 Private Recreation and is comprised of two allotments totalling 1.2 hectares in size. The site contains an existing bowling club and bowling greens. The development is comprised of the below three stages;

- Stage 1 entails alterations and additions to the existing bowling club, including layout changes for the internal floor plan, changes to the façade and a minor increase in the overall size of the bowling club. A new outdoor terrace is proposed on the first floor;
- Stage 2 includes the removal of the existing sail structures on the existing bowling green, fronting Jacaranda Avenue. The bowling green would be enclosed with a roof structure and a façade with a 0m setback to Jacaranda Avenue; and
- Stage 3 comprises a hotel development on top of the old bowling green at the corner of Port Stephens Street and Swan Street. The proposed hotel includes 50 rooms, a board room, two offices, function room, bar and restaurant, swimming pool, gym and car parking.

2.3 SIGNIFICANT ENVIRONMENTAL FEATURES

There are no known significant environmental features affecting the site.

2.4 ENVIRONMENTAL ASSETS

There are no known environmental assets on the subject site.

2.5 ABORIGINAL HERITAGE

Searches of NSW National Parks and Wildlife Service's database identify no known aboriginal relics or aboriginal places as defined by National Parks and Wildlife Act 1974 to exist on the site.

3.0 BUSHFIRE ATTACK ASSESSMENT

3.1 VEGETATION CLASSIFICATION

Potential bushfire hazards were identified from Port Stephens Council's bushfire prone mapping as occurring within the investigation area. Aerial mapping and inspection of the site reveals that the bushfire prone land map is somewhat inaccurate in respect to the current bushfire hazard. The property is expected to not be bushfire prone land in the future potentially, if the map is corrected to exclude the road reserve and residential properties which are currently mapped as Category 3 vegetation.

The major vegetative threats have been determined using Keith (2004) to derive vegetation structures listed in Planning for Bush Fire Protection (2019).

Primary Vegetation Structures have been identified in Figure 1 – Site Constraints Map and separation distances shown in Table 2 – Bushfire Attack Assessment.

3.2 EFFECTIVE SLOPE

Effective slope was measured using 2-metre contour data obtained from The Department of Lands and verified by a laser hypsometer on site. The laser hypsometer verified slope within the vegetation, calculating effective fire run slope from 5 separate measurements in each dominant direction.

Effective slopes have been identified in Figure 1 – Site Constraints Map and slope ranges are shown in Table 2 – Bushfire Threat Assessment.



PHOTOGRAPH 1 – SITE PHOTO

View of the existing bowling club looking southeast from Jacaranda Avenue. The site is surrounded by residential and commercial development.



PHOTOGRAPH 2 – SOUTHWESTERN GRAZING PASTURE

View of grazing pasture located southwest of the site which is presently low-cropped grass. The vegetation has conservatively been assessed as grassland in the event the cows are rotated to separate paddocks.

Bushfire Assessment: Lot 23 DP 1088281 and Lot 1 SEC 23 DP 758871, 2 Jacaranda Avenue, Raymond Terrace



FIGURE 1 – SITE CONSTRAINTS MAP

3.3 MINIMUM SETBACKS AND ASSET PROTECTION ZONES

Minimum setbacks have been determined in accordance with Planning for Bush Fire Protection (2019) Table A1.12.1. The minimum Asset Protection Zone for special fire protection purpose development has been demonstrated in Section 1.0 Executive Summary and Compliance Tables.

The required Asset Protection Zone is available within the subject site and neighbouring managed lands.

3.4 BUSHFIRE ATTACK LEVELS

BALs and relevant construction levels in accordance with Planning for Bush Fire Protection (2019) have been demonstrated in Section 1.0 Executive Summary and Compliance Tables, Table 2 Bushfire Threat Assessment.

3.5 REVIEW OF MULTI-STOREY RESIDENTIAL DEVELOPMENT

The proposed mixed-use building is five stories in height, incorporating a ground floor commercial area and four levels of residential accommodation.

The proposed development complies with Planning for Bush Fire Protection (2019) Section 8.2.2 Multi-storey residential development. The key issues have been examined below:

Issue	Specific Concern	Technical Consideration
Population	Impact on existing community and infrastructure.	What capacity does the existing infrastructure have to allow evacuation of existing and proposed residents in the event of a bush fire?
Design Compliance: The site is bounded on three sides by public roads. The site is primarily surrounded by low density residential development with traffic studies to address traffic management. There is significant opportunity to evacuate the site into the local road network away from the very modest threat of grazed pasture.		
Location of Building	Locating on ridge tops emphasises the risk of convective plume interaction and wind related impacts.	Can the building be located away from ridge tops to areas that have a reduced bush fire exposure? If unavoidable, what is the impact on the risk to the building? Is this risk appropriate for the building and occupant numbers?

Design Compliance: The building is not located on a ridgetop with relatively level topography. The grassland threat to the southwest is relatively low with the risk appropriate for the building size and occupant numbers.		
Design Fire	Different elements of the flame could have different impacts on different levels of the building; and The whole building could be impacted by ember attack and multiple floors could be alight simultaneously	What are the flame dimensions, including the flame angle? Where is the hottest part of the flame located? How would this impact on the proposed building? How would the warning and suppression systems in the building cope with this?
Design Compliance: The flame length is less than the asset protection zone with no chance of potential flame contact. It is unlikely for any grassfire flame to extend to within 50 metres of the site and the development is BAL-LOW.		
Egress	Elevations exposed to bush fire risk.	How does the emergency evacuation procedure take account of the location of bush fire prone vegetation?
Design Compliance: No emergency management plan or evacuation procedure has been prepared for the development application and this will be considered later. The site is BAL-LOW with reduced grassland threat. Bushfire risk should be considered within the evacuation plan and bushfire response, with site users recommended to close windows and doors in the event of bushfire and evacuate in the opposite direction to the fire or shelter inside.		
Building Construction	Performance of the building façade in a bush fire scenario. Balconies may contain external features which could ignite and contribute to building ignition and fuel loads.	What wall and cladding materials are proposed and what is proposed for the openings/penetrations (i.e. windows and doors)? How does the proposed building construction deal with fire spread from the vegetation to the inside of the building? Is compliance with AS 3959 sufficient to ensure that the bush fire risk is mitigated? Is this appropriate for the design fire scenario? Are there balconies proposed? What may be stored on the balconies? Can there be restrictions on what is stored on the balconies due to fire risk?

Design Compliance: Wall materials will be non-combustible for NCC compliance. Exact material not decided yet as the building system not decided yet. It is recommended that balconies do not have gas bottles or flammable liquids stored on them. Balconies are recommended to contain only non-combustible furnishings unless they are sprinklered.

Car Parking	Lower storey car park could be subject to ember attack and high radiant heat loads.	Is the warning and suppression system designed to take account of bush fire impact? Where are exits located? Are they guiding occupants away from the car park?
Design Compliance: The warning and fire suppression system is expected to be designed in the construction certificate phase. The exits are located away from the grassland with the building BAL-LOW. Site users will be able to evacuate away from grassfire into Raymond Terrace or shelter inside the building.		
Other Considerations	Access for firefighters may be restricted or challenging; and Risk implications of floor-to-floor fire spread.	What would this mean for fire suppression? How would warning and suppression systems take account of this? What would this mean for evacuation?
Design Compliance: A National Construction Code review shall be completed. This review will identify required Fire Resistance Levels and National Construction Code compliance factors, which are to be addressed as part of construction certificate documentation. This may include fire engineering solutions for evacuation routes within the building. There are multiple stairwells and lifts providing redundancy in building evacuation and access for firefighters.		

4.0 UTILITY SERVICES AND INFRASTRUCTURE

4.1 WATER SERVICES

A reticulated water supply and street hydrant access are available providing coverage throughout the site. A hydraulic engineer should be engaged to ensure compliance with AS 2419.1.

4.2 ELECTRICITY SERVICES

The existing electrical supply to the local area is via overhead electrical transmission lines. Landscaping onsite should be managed so that no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).

4.3 GAS SERVICES

- Reticulated or bottled gas installed and maintained in accordance with AS/NZ1596 (2002) and the requirements of the relevant authorities. Metal piping is to be used.
- Fixed gas cylinders to be kept clear of flammable material by a distance of 10 metres and shielded on the hazard side of the installation.
- Gas cylinders close to the dwelling are to have the release valves directed away from the building and at least 2 metres from flammable material with connections to and from the gas cylinder being of metal.
- Polymer-sheathed, flexible gas supply lines to gas meters adjacent to the buildings are not to be used.



PHOTOGRAPH 3 – SOUTHWESTERN MANAGED RESIDENTIAL PROPERTY

View of managed residential property located southwest of Swan Street. The entire property is managed land with well separated landscaped trees and mown lawn less than 10 centimetres in length. Both the Swan Street road reserve and the residential property have been incorrectly mapped as a category 3 threat.

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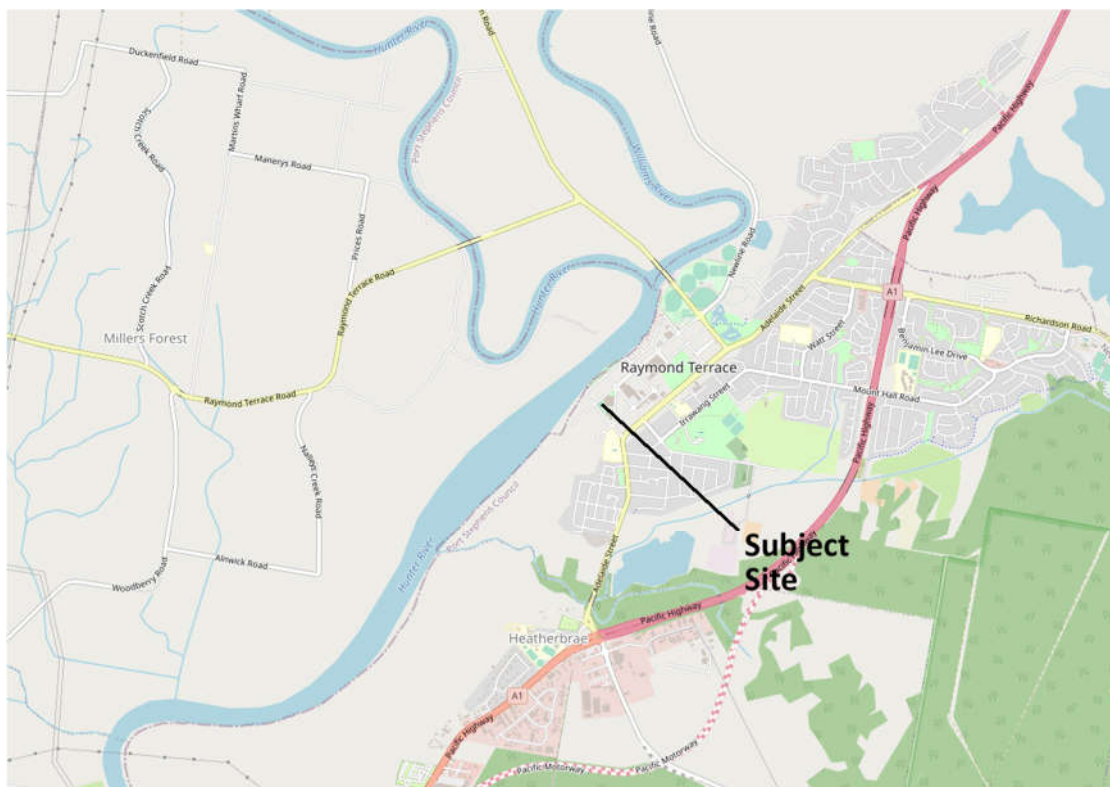


FIGURE 2 – LOCALITY MAP
Courtesy of OpenStreetMap

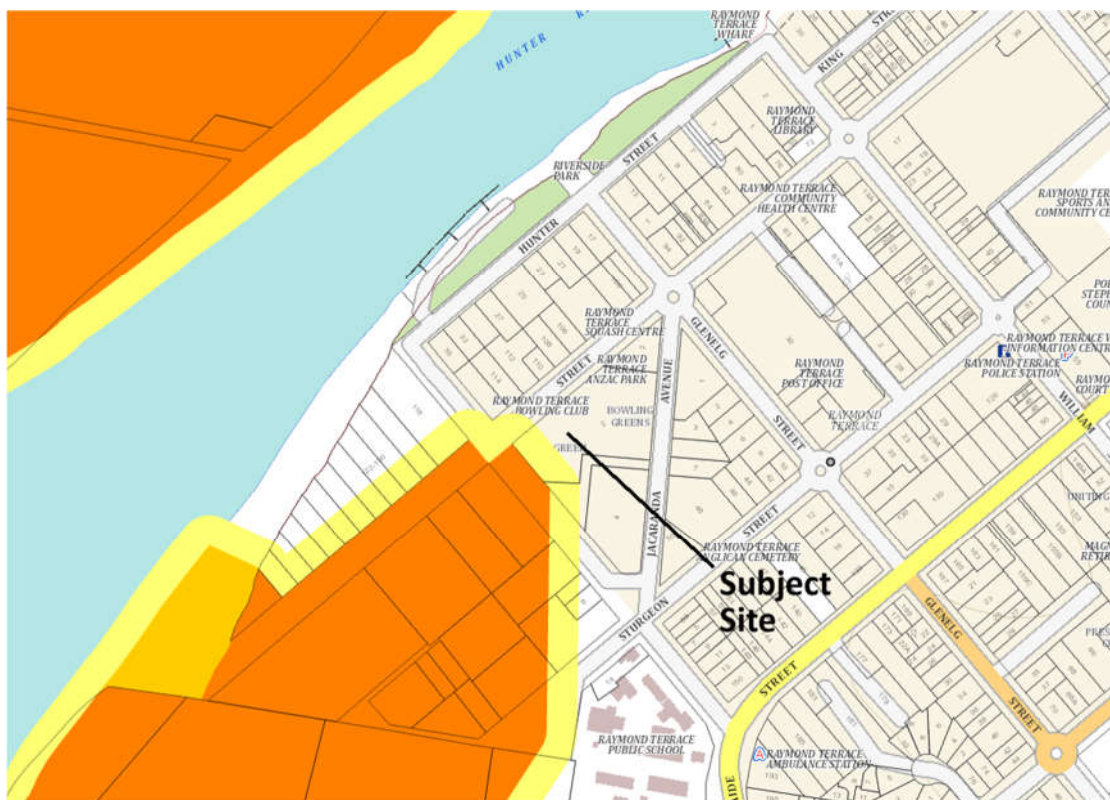
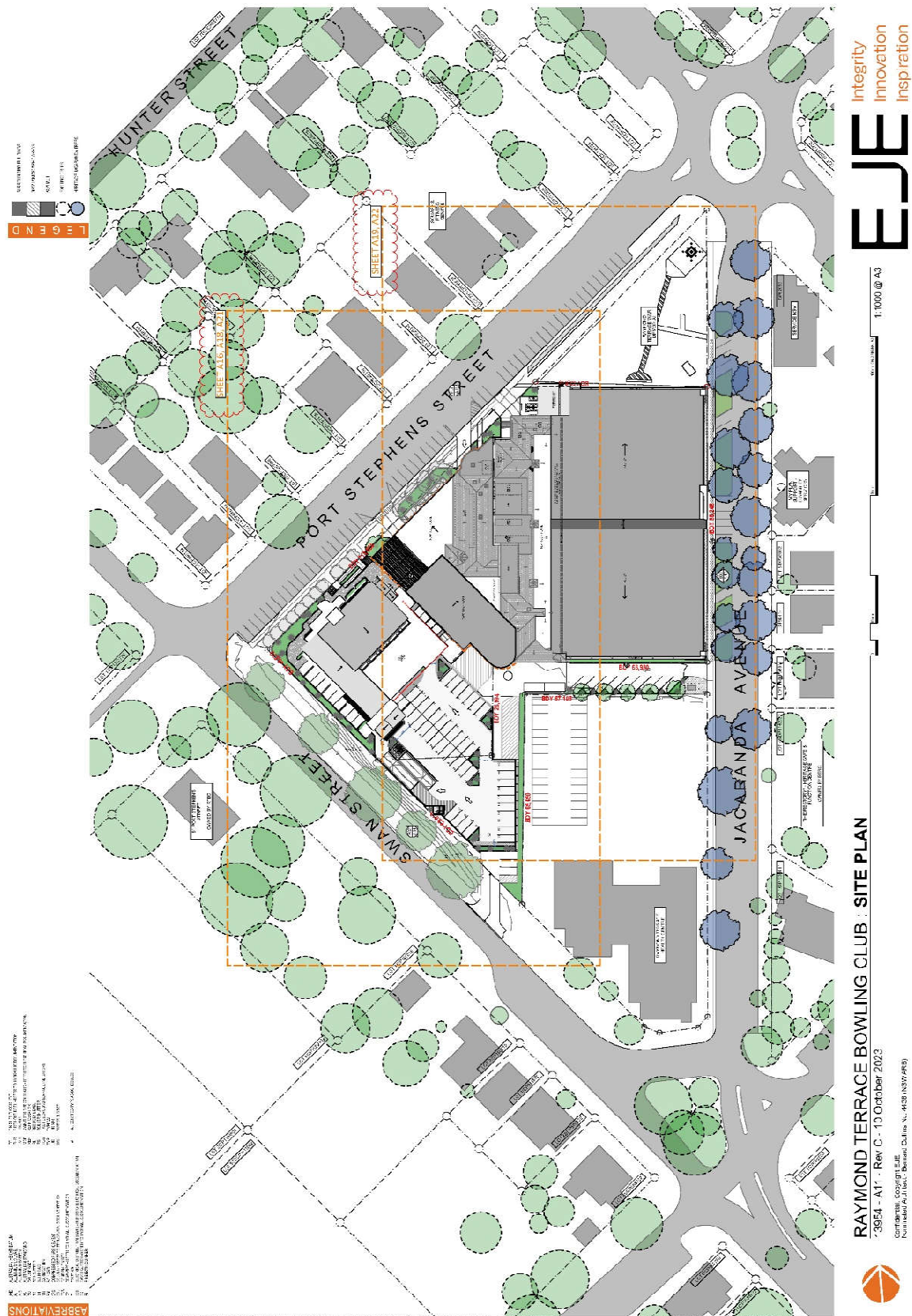


FIGURE 3 – COUNCIL'S BUSHFIRE PRONE LAND MAP

FIGURE 4 – SITE PLAN



5.0 PROPERTY ACCESS

Public Road Access

The subject site is surrounded by Port Stephens Street, Jacaranda Avenue and Swan Street, being two-lane roads interconnecting into the local road network. Emergency Services are expected to have good access to the area at most times.

The existing public road network is deemed adequate and will remain unchanged. A traffic study shall be prepared for the development.

Fire Trails

Fire trails do not intersect the vegetation in the local area. No new fire trails are proposed for this development.

Property Access

Property access is provided by way of Jacaranda Avenue providing access from the public road system directly to the private land, giving firefighters access to the building.

Property access roads shall comply with Planning for Bush Fire Protection (2019) Section 6.

Planning for Bush Fire Protection (2019) requires no specific access requirements in an urban area where a 70-metre, unobstructed path can be demonstrated between the most distant external part of the proposed building and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply). There are no formal requirements for property access.

6.0 LANDSCAPING MAINTENANCE

It is recommended that landscaping is undertaken in accordance with Planning for Bush Fire Protection (2019) Appendix 4 and maintained for the life of the development.

Trees should be located greater than 2 metres from any part of the roofline of a building. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground.

The landscaped area should be maintained free of leaf litter and debris. The gutter and roof should be maintained free of leaf litter and debris.

Landscaping should be managed so that flammable vegetation is not located directly under windows.

Ground fuels such as fallen leaves, twigs (less than 6 millimetres in diameter) and branches should be removed on a regular basis, and grass needs to be kept closely mown and, where possible, green.

7.0 EMERGENCY AND MAINTENANCE PLANS

7.1 BUSHFIRE MAINTENANCE PLANS

There is no known Bushfire Maintenance Plan for the site. A condition of development is to maintain the entire site as an Inner Protection Area which should be monitored by the site manager.

7.2 FIRE EMERGENCY PROCEDURES

An emergency management plan shall be prepared for the site with consideration of bushfire. Evacuating offsite if fires are located in the surrounding region could result in a more dangerous situation than if the building users remained onsite.

8.0 RECOMMENDATIONS

Based upon an assessment of the plans and information received for the proposal, it is recommended that development consent be granted subject to the following conditions:

1. The proposed building works shall comply with National Construction Code 2022 Structural Fire Safety requirements.
2. At the commencement of building works and in perpetuity, the entire property shall be managed as an inner protection area (IPA) as outlined within Appendix 4 of Planning for Bush Fire Protection (2019) and the NSW Rural Fire Service's document Standards for Asset Protection Zones.
3. Water, electricity and gas are to comply with Planning for Bush Fire Protection (2019) Section 6.
4. Landscaping is to be undertaken in accordance with Planning for Bush Fire Protection (2019) Appendix 4 and managed and maintained in perpetuity.
5. It is recommended that the facility manager prepare an emergency management plan for the development with consideration of bushfire.

9.0 CONCLUSION

The final recommendation is that the proposed development offers compliance with Planning for Bush Fire Protection (2019). There is potential for bushfire attack at this site and a list of recommendations has been included in the above assessment to reduce that risk.

10.0 APPENDIX 1.0 – ASSET PROTECTION ZONES SUMMARY

Below is a summary of Asset Protection Zones outlined in appendix 4 of Planning for Bush Fire Protection (2019) and the NSW Rural Fire Service's "Standards for Asset Protection Zones". The property owner(s) should obtain these two documents and familiarise themselves with their content.

Generally

Asset Protection Zones (APZ) refer to the area between the bushfire threat and the asset (i.e. building). The APZ may contain two areas; the Inner Protection Area (IPA) and the Outer Protection Area (OPA). Some areas should be managed entirely as an Inner Protection Area (IPA). Refer to the plans for locations of APZ and distances from Assets.

Inner Protection Area (IPA)

The inner protection area is located adjacent to the asset and is identified as a fuel-free zone.

A. Shrubs (consisting of plants that are not considered to be trees)

1. Large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be created;
2. Shrubs should not be located under trees;
3. Shrubs should not form more than 10% ground cover; and
4. Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

B. Trees: Maintain a minimum 2-5 metre canopy separation.

1. Tree canopy cover should be less than 15% at maturity;
2. Trees at maturity should not touch or overhang the building;
3. Lower limbs should be removed up to a height of 2m above the ground;
4. Tree canopies should be separated by 2 to 5m; and
5. Preference should be given to smooth barked and evergreen trees.

Outer Protection Area (OPA)

The Outer Protection Area (OPA) is located adjoining the vegetation. The OPA should be maintained as a fuel-reduced area. This assumes trees may remain but with a significantly reduced shrub, grass, and leaf litter layer. In many situations leaf litter and the shrub layer may not require maintenance at all.

A. Shrubs:

1. Shrubs should not form a continuous canopy;
2. Shrubs should form no more than 20% of ground cover.

B. Trees:

1. Existing trees can be retained.
2. Tree canopy cover should be less than 30%; and
3. Canopies should be separated by 2 to 5m.

Grass (throughout the entire asset protection zone)

Grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and leaves and vegetation debris should be removed.

11.0 REFERENCES AND DISCLAIMER

References

Standards Australia AS3959 (2018) Construction of buildings in bushfire-prone areas.

Keith D. "Ocean Shores to Desert Dunes", Department of Environment and Conservation, Sydney, 2004.

Environmental Planning and Assessment Act 1979.

New South Wales Rural Fire Service, Planning for Bush Fire Protection (2019).

Rural Fires Act 1997.

Rural Fires Regulation 2008.

Disclaimer

Despite the recommendations in this report, it is impossible to remove the risk of fire damage to the building entirely. This report assesses and provides recommendations to reduce that risk to a manageable level. It is of paramount importance that the recommendations are adhered to for the life of the structure and that all maintenance is performed to ensure a level of protection is provided to the building, occupants and firefighters.

Planning for Bush Fire Protection (2019) states that notwithstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small, always remains.

AS3959 (2018) Building in bushfire-prone areas states that the standard is designed to lessen the risk of damage to buildings occurring in the event of the onslaught of bushfire. There can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.