

BUSHFIRE ASSESSMENT REPORT

PROPOSED CHANGE OF USE DWELLING TO OFFICE

**LOT 3 DP 549272
41 Palmdale Road, Palmdale**

Date: **13/09/2012**

Prepared for: **Palmdale Lawn Cemetery and Crematorium**

	BUSHFIRE PLANNING AND DESIGN
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TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES	4
2.0 INTRODUCTION	6
2.1 PURPOSE OF REPORT	6
2.2 PROPOSED DEVELOPMENT	7
3.0 BUSHFIRE ATTACK ASSESSMENT	9
3.1 VEGETATION CLASSIFICATION	9
3.2 EFFECTIVE SLOPE.....	11
3.3 BUSHFIRE ATTACK LEVELS.....	11
3.4 COMPLIANCE WITH AIMS AND OBJECTIVES OF PLANNING FOR BUSHFIRE PROTECTION	11
4.0 UTILITY SERVICES AND INFRASTRUCTURE	15
4.1 WATER SERVICES.....	15
4.2 ELECTRICITY SERVICES.....	15
4.3 GAS SERVICES.....	15
5.0 PROPERTY ACCESS	15
6.0 LANDSCAPING MAINTENANCE	16
7.0 RECOMMENDATIONS	16
8.0 CONCLUSION.....	17
9.0 APPENDIX 1.0 – ASSET PROTECTION ZONES SUMMARY	18
10.0 REFERENCES AND DISCLAIMER.....	19

LIST OF TABLES

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL	4
TABLE 2 – BUSHFIRE THREAT ASSESSMENT.....	4
TABLE 3 – PLANNING FOR BUSHFIRE PROTECTION (2006) 4.3.5 COMPLIANCE.....	5

LIST OF FIGURES

FIGURE 1 – SITE CONSTRAINTS MAP	8
FIGURE 2 – LOCALITY MAP.....	10
FIGURE 3 – COUNCIL’S BUSHFIRE PRONE LAND MAP	10
FIGURE 4 – MINIMUM ASSET PROTECTION ZONE MAP	14

LIST OF PHOTOGRAPHS

PHOTOGRAPH 1 – SITE PHOTO	7
PHOTOGRAPH 2 – VEGETATIVE THREAT.....	9
PHOTOGRAPH 3 – SITE ACCESS.....	13

1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES

The report has assessed the proposed change of use against the requirements of s79BA of the *Environmental Planning and Assessment Act 1979*, AS3959 (2009) Building in Bushfire Prone Areas and Planning for Bushfire Protection, 2006.

The report establishes that the change of use is capable of complying with the acceptable solutions of Planning for Bushfire Protection 2006.

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL

Applicant Name	Palmdale Lawn Cemetery and Crematoria		
Site Address	41 Palmdale Road, Palmdale	Lot/Sec/DP	Lot 3 DP 549272
Local Government Area	Wyong	FDI	100
Bushfire Prone Land	Yes – within the 100 metre buffer of a Category 1 Vegetation		
Type of development	Change of use. Dwelling to office building.	Type of Area	Rural Residential
Special Fire Protection Purpose	No	Flame Temperature	1090K
Application Complies with DTS Provisions	Yes. Relevant specifications and requirements are satisfied	Referral to RFS required	No.

TABLE 2 – BUSHFIRE THREAT ASSESSMENT

	North	East	Southeast	West
AS3959 (2009) Vegetation Structure	Remnant Vegetation	Grassland	Forest	Remnant Vegetation
Asset Protection Zone	13 metres	61 metres	54 metres	13 metres
Accurate Slope Measure	10 degrees downslope	2 degrees downslope	5 degrees downslope	10 degrees downslope
Slope Range	6 to 10 degrees downslope	1 to 5 degrees downslope	1 to 5 degrees downslope	6 to 10 degrees downslope
AS3959 (2009) Bushfire Attack Level (BAL)	BAL-40	BAL-LOW	BAL-19	BAL-40

TABLE 3 – PLANNING FOR BUSHFIRE PROTECTION (2006) 4.3.5 COMPLIANCE

Performance Criteria	Proposed Development Determinations	Method of Assessment
Asset Protection Zone	Asset Protection Zones have been determined in accordance with AS 3959-2009 Method 1 Simplified Procedure and Planning for Bushfire Protection (2006). The Asset Protection Zone will be maintained for the life of development and defensible space is provided onsite.	Acceptable Solution
Siting and Design	Buildings design is unchanged with a simple hip roof presently in place.	Acceptable Solution
Construction Standards AS3959 – 2009	Bushfire Attack Levels have been determined in accordance with AS 3959-2009 Method 1 Simplified Procedure and Planning for Bushfire Protection (2006). Non-residential Class 5 to 9 buildings require no specific level of construction in accordance with AS3959 (2009). BCA structural fire protection measures are deemed adequate if outside the flame zone.	Acceptable Solution
Private and or Public Road Infrastructure	The public road system is not affected or changed as part of this application.	Acceptable Solution
Property Access	Property access complies with Planning for Bushfire Protection (2006) S4.1.3.	Acceptable Solution
Water and Utility Services	Water, Electricity and Gas services offer compliance with section 4.1.3 for services.	Acceptable Solution
Landscaping	Landscaping to comply with Planning for Bushfire Protection (2006) Appendix 5.	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 future office building located at Lot 3 DP 549272, 41 Palmdale Road, Palmdale in order for Council to make determination of the proposed development pursuant to the requirements of s79BA of the *Environmental Planning and Assessment Act 1979*.

All development on Bush Fire Prone Land must satisfy the aim and objectives of PBP. The aim of PBP is to use the NSW development assessment system to provide for the protection of human life (including firefighters) and to minimise impacts on property from the threat of bush fire, while having due regard to development potential, onsite amenity and protection of the environment.

More specifically, the objectives are to:

- (i) afford occupants of any building adequate protection from exposure to a bush fire;
- (ii) provide for a defendable space to be located around buildings;
- (iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;
- (iv) ensure that safe operational access and egress for emergency service personnel and residents is available;
- (v) provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ); and
- (vi) ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire fighting).

The report addresses the matters identified in A4.1 of Appendix 4 of Planning for Bushfire Protection (2006) and demonstrates that the proposal satisfies the aim and objectives of Planning for Bushfire Protection (2006) by satisfying the performance criteria within section 4.3 of the document. The specific objectives for infill development are as follows:

- (i) Ensure that the bushfire risk to adjoining lands is not increased;
- (ii) Provide minimum defendable space;
- (iii) Provide better bush fire protection, on a re-development site, than the existing situation. This should not result in new works being exposed to greater risk than an existing building.
- (iv) Ensure that the footprint of the proposed building does not extend towards the hazard beyond existing building lines on neighbouring land;

- (v) Not result in an increased bush fire management and maintenance responsibility on adjoining land owners unless they have agreed to the development; and
- (vi) Ensure building design and construction enhances the chances of occupant and building survival.

The recommendations within this report address the aim and objectives of Planning for Bushfire Protection 2006 to reduce the risk of ignition of the building in a bushfire event.

2.2 PROPOSED DEVELOPMENT

The development includes the change of use from dwelling to office for the existing metal clad, tile roof building. The change of use proposes no building changes excepting upgrades for bushfire ember protection.



PHOTOGRAPH 1 – SITE PHOTO

View of the existing lightweight clad and tile roof dwelling looking Northwest. The dwelling will be used as an office and meeting rooms for the cemetery and is not expected to have significant occupant loading.



FIGURE 1 – SITE CONSTRAINTS MAP

3.0 BUSHFIRE ATTACK ASSESSMENT

3.1 VEGETATION CLASSIFICATION

Potential bushfire hazards were identified from Wyong Council bushfire prone mapping as occurring within the investigation area. Aerial mapping and inspection of the site reveals that the bushfire prone land map is reasonably accurate in respect to the current bushfire hazard.

The major vegetative threats have been determined using Keith (2004) to derive vegetation structures listed in Planning for Bushfire Protection (2006). General vegetation structures have been translated to AS3959 (2009) groupings.

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



PHOTOGRAPH 2 – VEGETATIVE THREAT

View of Forest Remnant/Weed infested riparian corridor presently located 8 metres from the building. The forest is dominated by non-eucalypts with significant exotics in the shrub layer. The vegetation is fragmented due to landscaping management on and around the cemetery grounds and will burn in the manner of a forest remnant/riparian corridor.

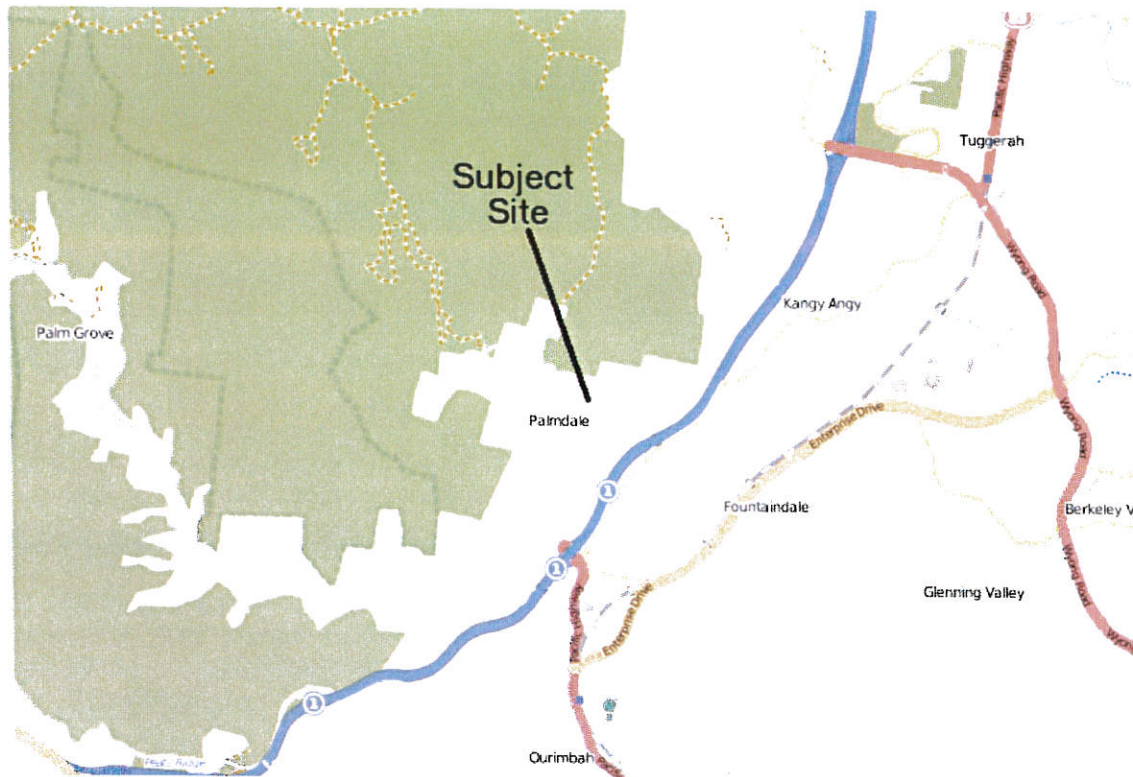


FIGURE 2 – LOCALITY MAP
Courtesy of OpenStreetMap

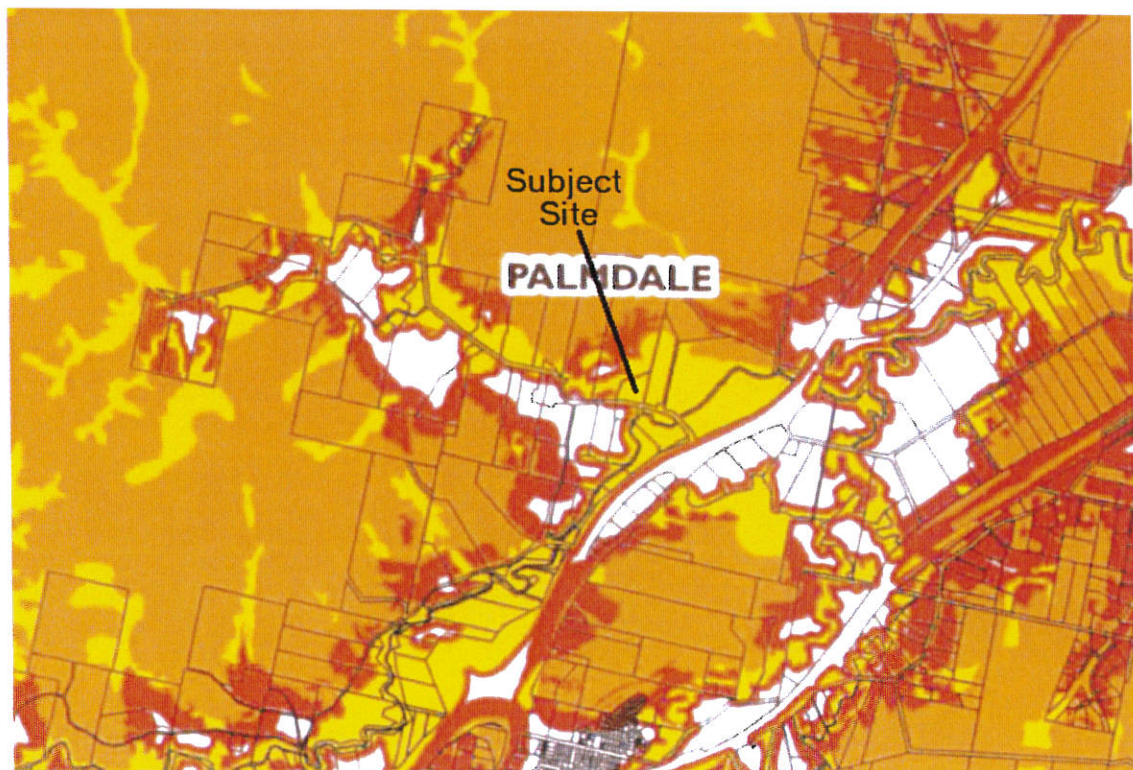


FIGURE 3 – COUNCIL'S BUSHFIRE PRONE LAND MAP

3.2 EFFECTIVE SLOPE

Methodology

Effective slope was measured using 2 metre contour data obtained from 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. Due to the small size of the vegetation the effective slope is measured along the length the vegetation. A conservative fire run of 80 metres is the measured length for slope.

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

3.3 BUSHFIRE ATTACK LEVELS

Bushfire attack levels and relevant construction levels in accordance with AS3959 (2009) have been demonstrated in Section 1 Executive Summary and Compliance Tables, Table 2 Bushfire Threat Assessment.

AS3959 (2009) construction levels are designed for residential development and the proposed development is identified as “other development” under Planning for Bushfire Protection (2006). The provisions of the BCA 2012 for fire safety are accepted for bushfire purposes where the aims and objectives of Planning for Bushfire Protection are met.

Construction of the building is to comply with BCA 2012 fire safety provisions.

3.4 COMPLIANCE WITH AIMS AND OBJECTIVES OF PLANNING FOR BUSHFIRE PROTECTION

The aims and objectives of Planning for Bushfire Protection are addressed below.

Afford occupants of any building adequate protection from exposure to a bush fire;

Multiple building exits are available, located away from the vegetative threats. Evacuation planning in the event of bushfire should clearly indicate to building occupants to evacuate in a direction away from the fire. Due to the moisture content within the vegetation and the good access to the bushland exposure from a fire is expected to be low with the BAL assessment showing the building to be outside the flame zone.

Provide for a defensible space to be located around buildings;

The building interfaces a riparian corridor. In the event of bush fire, firefighters will have direct access to the bushland via the existing driveway and good access through the adjacent lawn cemetery. In the event a fire front impacts on the building defensible space is available on the eastern façade where fire fighters can shelter whilst the fire front passes.

Asset protection zones are listed below and represent defensible space when coupled with present firefighting access:

- Maintain a minimum 13 metre inner protection area around the dwelling.

Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;

The asset protection zones listed in Defensible Space are provided to reduce direct flame contact with the building and move the building outside the flame zone.

No construction requirements are required for the building as BCA 2012 Structural Fire Resistance construction is deemed adequate for the buildings.

Ensure that safe operational access and egress for emergency service personnel and residents is available;

The primary access to the facility offers compliance with Planning for Bushfire Protection access requirements and will facilitate a medium rigid vehicle.

Provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ);

The building manager shall maintain landscaping and fuel management in accordance with Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for asset protection zones.

Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire fighting).

There is presently one street hydrant located within 70 metres of the building and they are not located within the trafficable portion of the road. Electrical supplies are located overhead with tree clearances required to be maintained.



PHOTOGRAPH 3 – SITE ACCESS

View of property access via Palmdale Road. The site has good turning area onsite however the public road is narrow and is not dual carriageway. The public road network and the internal roads within the cemetery afford good access to support firefighting efforts.



FIGURE 4 – MINIMUM ASSET PROTECTION ZONE MAP

4.0 UTILITY SERVICES AND INFRASTRUCTURE

4.1 WATER SERVICES

A reticulated water supply and street hydrant access is available. The proposed building footprint is within 70 metres of a hydrant. It is noted that hydrant pressures have not been tested as part of this report.

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 1596 -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 10m 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 2m 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.

5.0 PROPERTY ACCESS

Property access is provided by way of Palmdale Road providing access from the public road system directly to the private land giving fire fighters access to the dwelling.

Property access roads shall comply with section 4.1.3 of Planning for Bush Fire Protection 2006.

Planning for Bushfire Protection (2006) requires no specific access requirements in an urban area where a 70 metres unobstructed path can be demonstrated between the most distant external part of the proposed dwelling 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 Appendix 5 of Planning for Bushfire Protection 2006 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 6mm 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 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 shall comply with BCA structural fire resistance commitments for an office building.
2. At the commencement of building works and in perpetuity the entire property shall be managed for a minimum 13 metres as an inner protection area (IPA) as outlined within section 4.1.3 and Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for asset protection zones.
Note: Some of the riparian corridor has steep slopes with consideration of soil slip and erosion to be considered for the asset protection zone. Low flammability ground covers are recommended to retain soil.
3. Water, electricity and gas are to comply with section 4.1.3 of Planning for Bush Fire Protection 2006.
4. Landscaping is to be undertaken in accordance Appendix 5 of Planning for Bushfire Protection 2006 and managed and maintained in perpetuity.
5. It is recommended that the building manager incorporate bushfire evacuation planning for the extensions into emergency evacuation plans prepared for the workplace.

6. To assist in achieving a better bush fire protection outcome for the overall property, consideration should be given to the implementation of the New South Wales Rural Fire Service document *Best Practice Guidelines - Dwelling Upgrades* for the upgrading of existing building(s) in order to comply with the intent of Planning for Bushfire Protection (2006) and AS3959 (2009) Construction of Buildings in Bushfire Prone Areas.

8.0 CONCLUSION

The final recommendation is that the proposed development offers compliance with Planning for Bushfire Protection. 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.

9.0 APPENDIX 1.0 – ASSET PROTECTION ZONES SUMMARY

Below is a summary of Asset Protection Zones outlined in Appendix 5 of Planning for Bushfire Protection (2006) and the NSW Rural Fire Services “Standards for Asset Protection Zones”. The property owner should obtain these two documents and familiarise themselves with their content.

Generally

Asset Protection Zones (APZ) refers to the area between the bushfire threat and the asset (ie 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. Shrubs must be located away from a buildings glazing and vent openings.
2. Avoid planting around entry ways if the vegetation is flammable.
3. A maximum 30% of the Inner Protection Area may contain shrubs.
4. A minimum 1.5 metre separation of shrubby vegetation from the building shall be maintained.
5. Shrubs must not have a connection with the tree canopy layer; remove/trim shrubs or underprune trees.
6. Ensure turf is suitably mown and/or grasslands are continually slashed to restrict to max 100mm high.

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

1. Trees are allowed in the inner protection area however they should not touch or overhang buildings. No tree should be within 2 metres of the roofline.
2. Underprune branches between the shrub layer and the canopy layer.
3. Ensure branches do not overhang buildings.
4. Ensure all trees in the IPA within 3m of buildings do not provide a serious fire threat.
5. Trees should have lower limbs removed up to a height of 2 metres above the ground.

Outer Protection Area (OPA)

The Outer Protection Area (OPA) is located adjoining vegetation threat. 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. Reduce or trim large stands of shrubs

B. Trees:

1. Existing trees can be retained.
2. Ensure a separation is available between shrubs and tree canopy.
3. Reduce tree canopy so there is no interlocking canopy.

10.0 REFERENCES AND DISCLAIMER

References

Standards Australia (2009) AS3959 Construction of Buildings in Bushfire-Prone Areas

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

Environmental Planning and Assessment Act (1979)

New South Wales Rural Fire Service (2006) Planning for Bushfire Protection

New South Wales Rural Fire Service (2010) Planning for Bushfire Protection Appendix 3 Amendment

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 fire fighters.

Planning for Bushfire Protection (2006) 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 (2009) 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.