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Harrisenvironmental CONSULTING

BUSHFIRE HAZARD ASSESSMENT

FOR EXISTING HOME OFFICE FOR WHOLESALE NURSERY AT 3654 REMEMBRANCE DRIVE, BARGO, NSW

LGA: WOLLONDILLY

Lot 19 DP 12084

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BUSHFIRE HAZARD ASSESSMENT

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DISCLAIMER

The recommendations provided in the summary of this report are a result of the analysis of the proposal in relation to the requirements of Planning for Bushfire Protection 2006 and the PBP Addendum Appendix 3 (2010). Utmost care has been taken in the preparation of this report however there is no guarantee of human error. The intention of this report is to address the submission requirements for Development Applications on bushfire prone land. There is no implied assurance or guarantee the summary conditions will be accepted in the final consent and there is no way Harris Environmental Consulting is liable for any financial losses incurred should the recommendations in this report not be accepted in the final conditions of consent.

This bushfire assessment provides a risk assessment of the bushfire hazard as outlined in the PBP 2006 and AS3959 2009. It does not provide protection against any damages or losses resulting from a bushfire event.

TABLE OF CONTENTS

FIGURES

APPENDIX

EXECUTIVE SUMMARY

This report provides a Bushfire Hazard Assessment for an existing structure composed of two demountables at 3654 Remembrance Drive, Bargo, NSW. This structure is proposed to be used as a Home Office in association with the wholesale nursery. The assessment confirms the subject lot is in land identified as bushfire prone.

This proposal has been assessed under the PBP 2006 category of 4.3.6 "PBP and other development:"(f) Buildings of Class 5-8 and 10 of the Building Code Australia (BCA).

In cases such as this, the general fire safety construction provisions are taken as acceptable solutions, but the aim and objectives of PBP apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management.

This bushfire assessment identifies the main bushfire threat to be downslope 0-5 ° Forest located 44 m away on the eastern elevation;

The proposed structure is proposed to be upgraded to meet the fowling BALS as specified by AS3959 -2009 Construction for Buildings in Bushfire Prone Areas:

- BAL 19 on the eastern elevation;
- BAL 12.5 on the southern, western and northern elevations.

An APZ should be established from the commencement of building work and maintained for perpetuity for the following distances:

- North- to the subject lot boundary
- East, West and North for 14 m from the structure.

Reticulated water is supplied to the site and a hydrant is located within 70 m.

Any above ground electrical transmission lines should be regularly inspected to insure no branches are within proximity of it.

If gas cylinders need to be kept close to the buildings, the release valves must be directed away from the building and away from any combustible material. Polymer sheather flexible gas supply lines to gas meters adjacent to buildings are not to be used.

1. PROPOSAL

The owners of 3654 Remembrance Drive, Bargo, NSW, are seeking consent for an existing structure to be used as a Home Office in association with a whole nursey enterprise on Lot 19 DP 12084. Harris Environmental Consulting was commissioned to provide this bushfire assessment.

This proposal has also been assessed under the PBP 2006 category of 4.3.6 "PBP and other development:"(f) Buildings of Class 5-8 and 10 of the Building Code Australia (BCA).

In cases such as this, the general fire safety construction provisions are taken as acceptable solutions, but the aim and objectives of PBP apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management.

Figure 1 shows the subject lot location. Figure 2 provides a broadscale aerial view of the subject site. Figure 3 shows a close up view of the subject lot.

FIGURE 1 SITE LOCATION (SOURCE: NSW SIX MAPS)

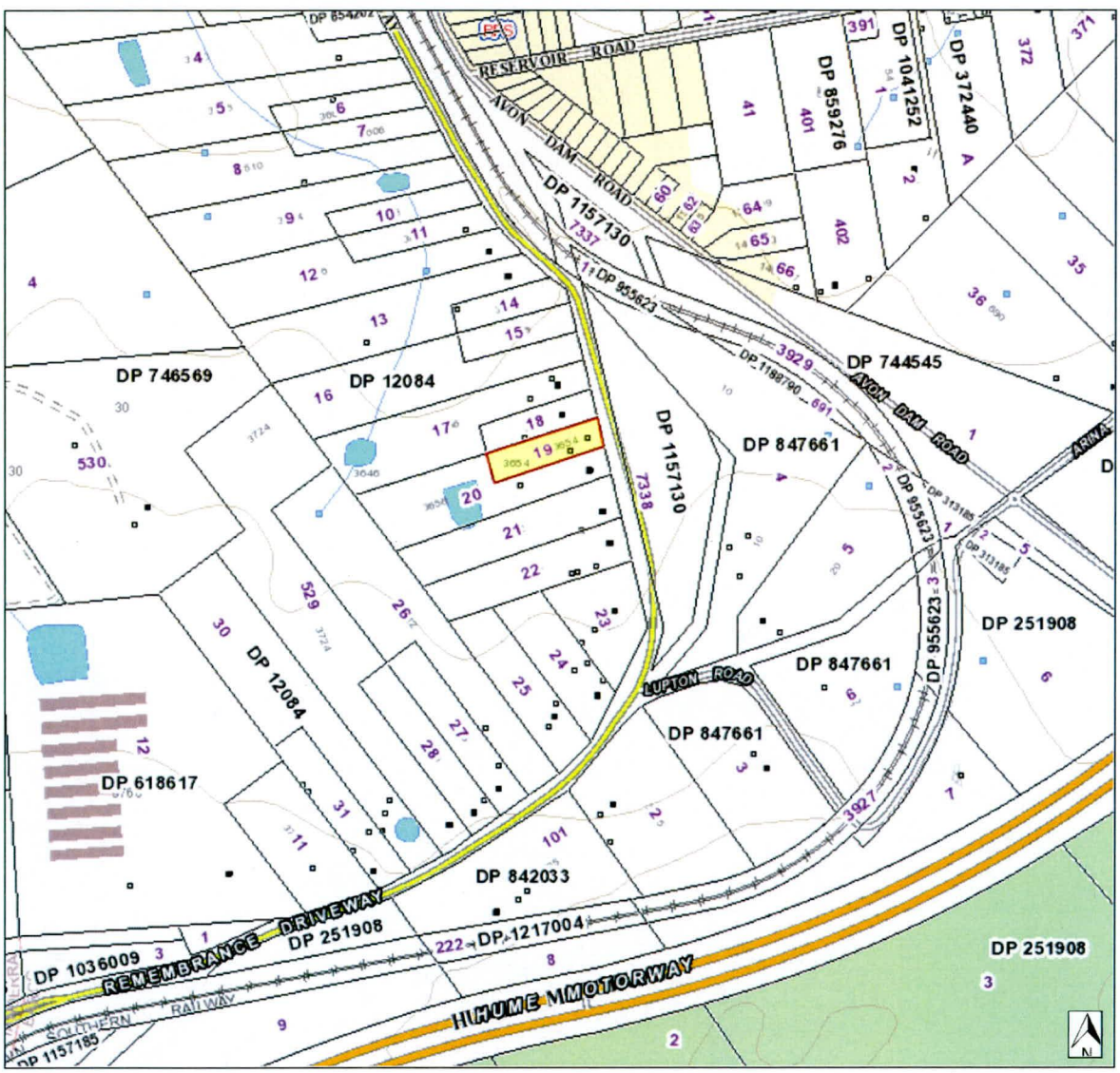


FIGURE 2 **BROADSCALE AERIAL VIEW OF THE SUBJECT SITE**

FIGURE 3 CLOSE UP VIEW OF SUBJECT LOT

2. CONFIRMATION OF BUSHFIRE PRONE LAND

Figure 4 shows the Bushfire prone Land Map and classifies the subject lot as "Vegetation Buffer" . It should be noted that the subject building is located in the Vegetation Buffer. The LEP Zone Map shows the lot is mapped "RU1 Primary Production" as shown in Figure 5.

FIGURE 4 BUSHFIRE PRONE MAP

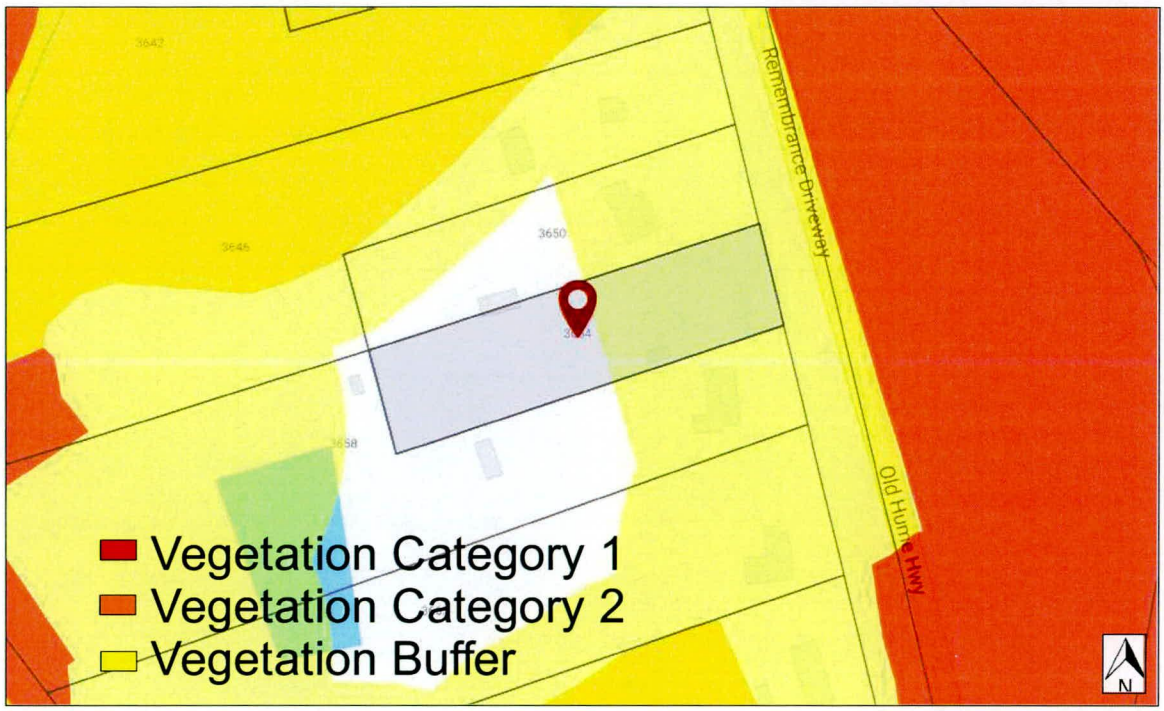
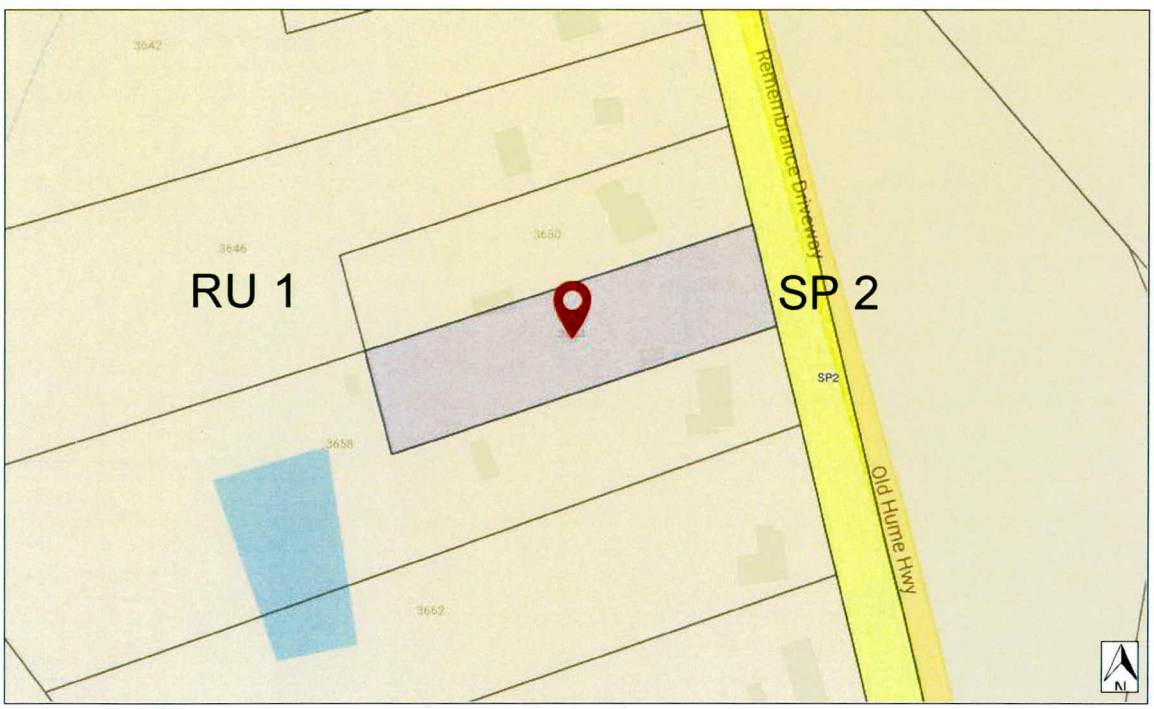


FIGURE 5 LAND ZONING



3. SITE DESCRIPTION

3.1. Vegetation formation within 140 m of existing secondary dwelling

Figure 6 shows the managed and unmanaged land within a 100 m of the subject site.
This assessment was undertaken by field inspection by Kate Harris and confirmed by *Tozer et al.* (2010) vegetation mapping (Appendix ii).

The vegetation formations are described below:

Eastern Elevation
The land on the eastern elevation is managed for 44 m from the existing proposed Home Office. The land located 44 m away is considered downslope 0-5° and classified as "Forest". This is shown in Photo 1.

Northern, Western and Southern Elevations
The land on the northern, southern and western elevations is managed for 100 m from the existing secondary dwelling as residential lots. This is shown in Photos 2 and 3.

Photo 1 View of managed land on the eastern elevation

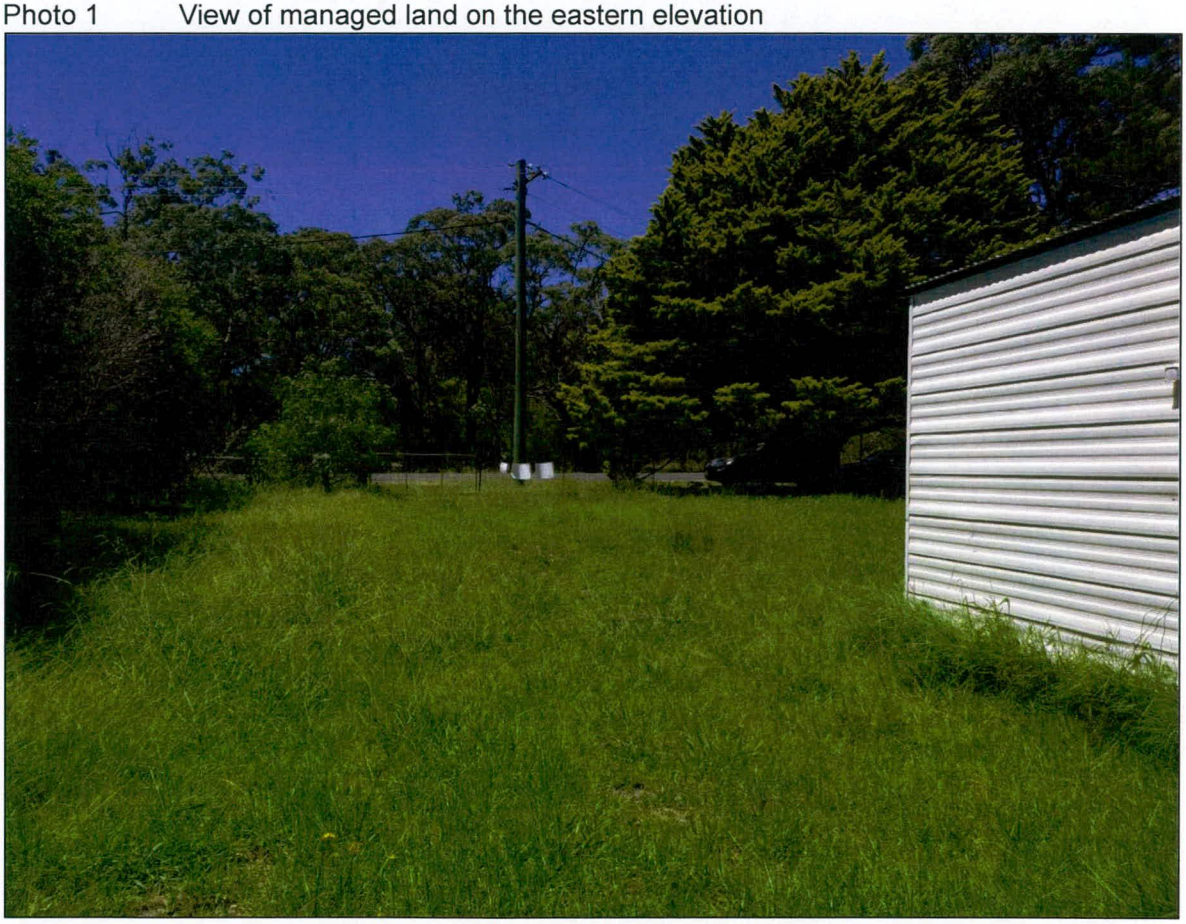


FIGURE 6 BUSHFIRE PRONE VEGETATION WITHIN 140M OF PROPOSED DWELLING

Photo 2 View of Grassland on the western elevation

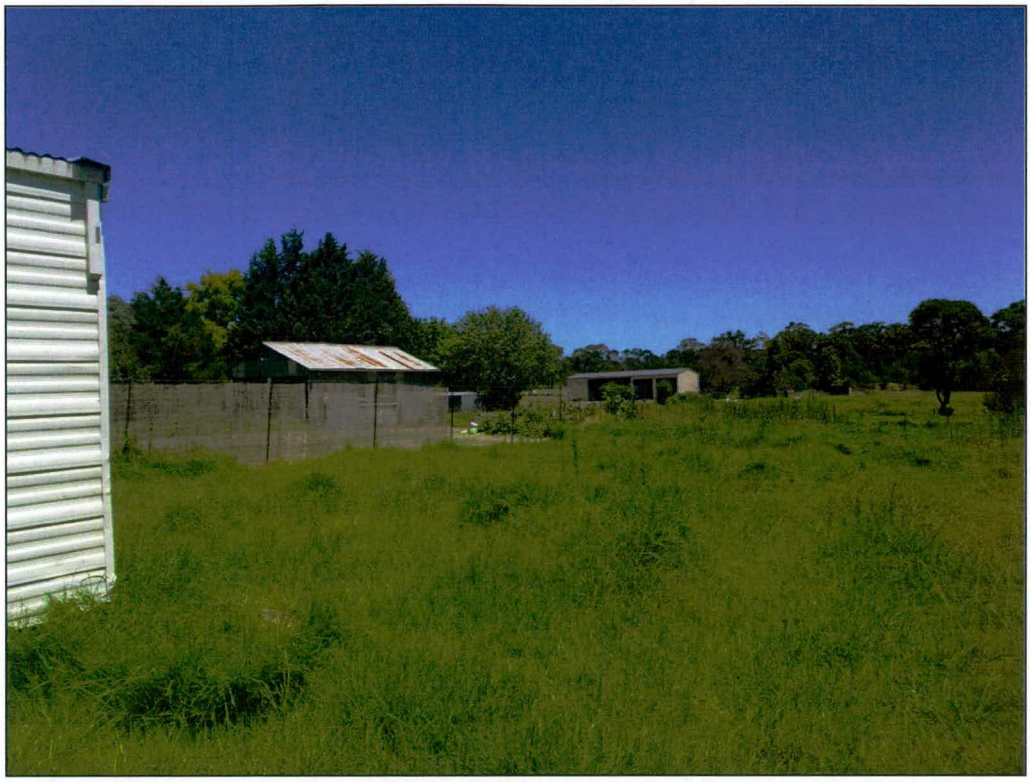


Photo 3 View of Grassland on Southern elevation

3.3. Slope and aspect of the site within 100 m of the site

This assessment was made with SIX MAPS using the 10 metre contour intervals.

The Australian Standard AS3959-2009 identifies that the slope of the land under the classified vegetation is much more important than the slope between the site and the edge of the classified vegetation.

The subject site exhibits a slope that runs towards the north east and northwest as shown in Figure 7.

FIGURE 7 SLOPE

3.4. Identification of significant environmental features

The owner has not provided any studies of environmental significance. No vegetation requires to be cleared for APZ for this proposal.

4. BUSHFIRE THREAT ASSESSMENT

4.1. Asset Protection Zones (APZ)

Table 2.4.2 of the AS 3959 2009 has been used to determine the width of the required APZ for the proposed development using the vegetation and slope data identified. An FDI of 100 was used for this location.

Table 1 below shows the APZ and BAL Determination for the proposed dwelling. The Asset Protection Zone is shown in Figure 8.

An APZ should be established from the commencement of building work and maintained for perpetuity for the dwelling for the following distances:

- 19 m on the south western elevation;
- 25 m on the north western and south eastern elevation;
- 28 m on the north eastern elevation.

TABLE 1 APZ AND BAL DETERMINATION FOR PROPOSED HOME OFFICE

	WEST	***SOUTH***	***-EAST***	***NORTH***
GRADIENT	Downslope 0-5 °	-	-	-
VEG	Forest	Managed	Managed	Managed
Distance between envelope and vegetation	44 m	-	-	-
AS 3959 BAL 19 required APZ	43-<57 m	-	-	-
BAL Required	**BAL 19**	**BAL 12.5**	**BAL 12.5**	**BAL 12.5**

FIGURE 8 APZ AND BAL REQUIREMENTS FOR EXISTING STRUCTURE

4.2. Relevant Construction Standard

The Australian Standard AS3939 – 2009 is the enabling standard that addresses the performance requirements of both parts 2.3.4 and Part GF5.1 of the Building Code of Australia for the construction of the Class 1, 2 and Class 3 buildings within a designated Bushfire Prone Area.

The following was determined for this site:

Relevant fire danger index..... FD1 100
Flame temperature .....1090 K

The proposed structure should be upgraded to meet BAL 19 on the western elevation and BAL 12.5 on the northern, southern and eastern elevations.

The following will be required:

- A flame-resistant sealant to seal any gaps greater than 3mm in the building This includes gaps that have formed due to settlement and those around penetrations. The object of this measure is to remove the gaps.
- Openable window assemblies protected with external screens;
- All vents and weepholes in external walls require screens with mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminum;
- Weather strips, draught excluders or draught seals installed at the base of side-hung external doors;
- Roof ventilation openings such as gables and roof vents fitted with ember guards made of non-combustible material or mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze of aluminum;
- All pipes or conduit that penetrates the roof covering non-combustible.

Figure 9 provides an extract from the NSW RFS Fact Fast regarding ugrading. Photos 4,5,6 and 7 provide photos with recommendations.

FIGURE 9 EMBER PROTECTION UPGRADE MEASURES (EXTRACT FROM NSW RFS FACT FAST: UPGRADING OF EXISTING BUILDINGS)

BUILDING ELEMENT	MINIMAL PROTECTION MEASURES	ADDITIONAL PROTECTION MEASURES
GENERAL	Seal all gaps (>3mm) around the house (excluding subfloor) with: • appropriate joining strips; • flexible silicon based sealant; or • mesh with a maximum aperture of 2mm, made from corrosion resistant steel, bronze or aluminium.	• Install a bush fire sprayer system. (Please contact a bush fire consultant or relevant industry expert to discuss options) Seal all gaps (>3mm) around the house (excluding subfloor) with: • appropriate joining strips • flexible silicon based sealant; or mesh with a maximum aperture of 2mm, made from corrosion resistant steel, bronze or aluminium.
WALLS	Install sarking with a flammability index of not more than 5 behind weatherboards or other external cladding when they are being replaced for maintenance or other reasons.	• Replace wall materials with non-combustible materials • Install sarking with a flammability index of not more than 5 behind weatherboards or other external cladding.
SUBFLOOR	Removal of combustible materials and keeping areas clear and accessible.	• Enclose subfloor with non-combustible material.
DOORS	Install weather strips, draught excluders or draught seals at the base of side-hung doors.	• Replace external doors with non-combustible or solid timber doors with minimum thickness of 35mm. • Replace or over-clad parts of door frames less than 400mm above the ground, decks and similar elements or fittings with non-combustible material. • Install weather strips, draught excluders or draught seals at the base of side-hung doors.
VENTS & WEEPHOLES	Seal vents and weepholes in external walls with mesh (with an aperture size of 2 mm) of corrosion resistant steel, bronze or aluminium.	• Seal vents and weepholes in external walls with mesh (with an aperture size of 2 mm) of corrosion resistant steel, bronze or aluminium.
ROOFS	Seal around roofing and roof penetrations with a non-combustible material. Install sarking with a flammability index of not more than 5 beneath existing roofing when it is being replaced for maintenance or other reasons. If installed, gutter and valley leaf guards shall be non-combustible.	• Replace fascia and roof materials with non-combustible materials. • Seal around roofing and roof penetrations with a non-combustible material. • Install sarking with a flammability index of not more than 5 beneath existing roofing. • If installed, gutter and valley leaf guards shall be non-combustible.
WINDOWS	Install mesh with a maximum aperture of 2mm, made from corrosion resistant steel, bronze or aluminium to all external doors and openable windows	• Installing appropriately tested shutters to doors and windows • Install mesh with a maximum aperture of 2mm, made from corrosion resistant steel, bronze or aluminium to all external doors and windows • Replacing glass with toughened or laminated safety glass • Replace overhead glazing with 'grade a' safety glass
EXTERNAL STRUCTURES		• External structures to be located >10 metres from the main dwelling.
DECKING		• Replace decking with non-combustible material

Photos 4, 5, 6, and 7 show the existing structure and describe how the structure can be upgraded

Photo 4: openable windows will require metal screens that comply with AS 3959-2009 or have a mesh with a maximum aperture of 2mm and made of corrosion resistant steel, bronze, or aluminum. There must be NO gaps greater than 3mm. The frame supporting the mesh should be metal, and, or a timber specified in AS 3959-2009

Photo 5:

The door requires to be of a minimum thickness of 35 mm with external hardware made of metal. Weather strips, draught excluders or draught seals should be installed at its base.

Photo 6: Evaporative cooling units should be fitted with butterfly closers at or near ceiling level or the unit should be fitted with non-combustible covers with a mesh or perforated sheet, having a maximum aperture of 2mm and made of corrosion resistant steel, bronze or aluminum.

Photo 7 seal the roof and wall junction to fill gaps greater than 3mm.: This can be done using a mesh of perforated sheet with a maximum aperture of 2mm and made of corrosion -resistant steel, bronze, or aluminum or mineral wool or some other non-combustible material.

4.3. Safe Operational Access

The PBP (2006) requires the provision of safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area.

The subject lot is located on Remembrance Drive. This is a two-wheel drive, all weather road. The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.

FIGURE 10 ACCESS

4.4. Emergency Management

The owners are advised to obtain the *NSW Rural Fire Service – "Guidelines for the Preparation of Bush Fire Evacuation Plans"* & *'Bush Fire Survival Plan'* In the event of emergency, the owners should ensure they are familiar with the RFS Bush Fire Alert Levels and use their Bush Fire Survival Plan.

4.5. Adequate Water and Utility Services

Reticulated water is supplied and a hydrant was sighted close to the entrance of the property.

Any bottled gas will be installed and maintained in accordance with AS1596 and the requirements of the relevant authority. If gas cylinders need to be kept close to the buildings, the release valves must be directed away from the building and away from any combustible material. Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used. Electrical transmission lines, if above ground, will be managed in accordance with specifications issued by Energy Australia.

5. LANDSCAPING

An APZ is required to be established and should be maintained for perpetuity.

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

Appendix 5 (PBP) provides guidelines for landscaping and Bushfire Provisions within the APZ. To incorporate bushfire protection measures into future development, the owner is advised to consider the following:

- Avoid planting trees species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopy.
- Avoid planting deciduous species that may increase fuel at surface/ground level by the fall of leaves.
- Avoid climbing species to walls and pergolas.
- Locate combustible materials such as woodchips/mulch, flammable fuel stores (LPG gas bottles) away from the building.
- Locate combustible structures such as garden sheds, pergolas and materials such as timber furniture away from the building.
- Ensure any vegetation planted around the house is a suitable distance away so these plants do not come into physical contact with the house as they mature.
- The property should be developed to incorporate suitable impervious area surrounding the house, including courtyards, paths and driveways.

6. SUMMARY

The proposed Home Office can meet BAL 19 on the western elevation and BAL 12.5 on the southern, eastern and northern elevations as specified by AS3959 - 2009 Construction for Buildings in Bushfire Prone Areas;

The following will be required:

- A flame-resistant sealant to seal any gaps greater than 3mm in the building This includes gaps that have formed due to settlement and those around penetrations. The object of this measure is to remove the gaps.
- Openable window assemblies protected with external screens;
- All vents and weepholes in external walls require screens with mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminum;
- Weather strips, draught excluders or draught seals installed at the base of side-hung external doors;
- Roof ventilation openings such as gables and roof vents fitted with ember guards made of non-combustible material or mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze of aluminum;
- All pipes or conduit that penetrates the roof covering non-combustible.

An APZ should be established from the commencement of building work and maintained for perpetuity for the following distances

- North- to the subject lot boundary
- East, West and North for 14 m from the structure.

- Any above ground electrical transmission lines should be regularly inspected to insure no branches are within proximity of it;

- If gas cylinders need to be kept close to the buildings, the release valves must be directed away from the building and away from any combustible material. Polymer sheather flexible gas supply lines to gas meters adjacent to buildings are not to be used.

7. REFERENCES

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

NSW Rural Fire Service (2006) *Planning for Bushfire Protection. A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners*.

NSW Rural Fire Service (2010) *Appendix 3: Planning for Bushfire Protection. A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners.*

Standards Australia (2009) *AS3959, Construction of buildings in bushfire-prone areas.*

APPENDIX I DEFINITION OF ASSET PROTECTION ZONES

Vegetation within the APZ should be managed in accordance with APZ specifications for the purposes of limiting the travel of a fire, reducing the likelihood of direct flame contact and removing additional hazards or ignition sources. The following outlines some general vegetation management principles for APZs:

1) Discontinuous shrub layer (clumps or islands of shrubs not rows);

2) Vertical separation between vegetation stratums;

3) Tree canopies not overhanging structures;

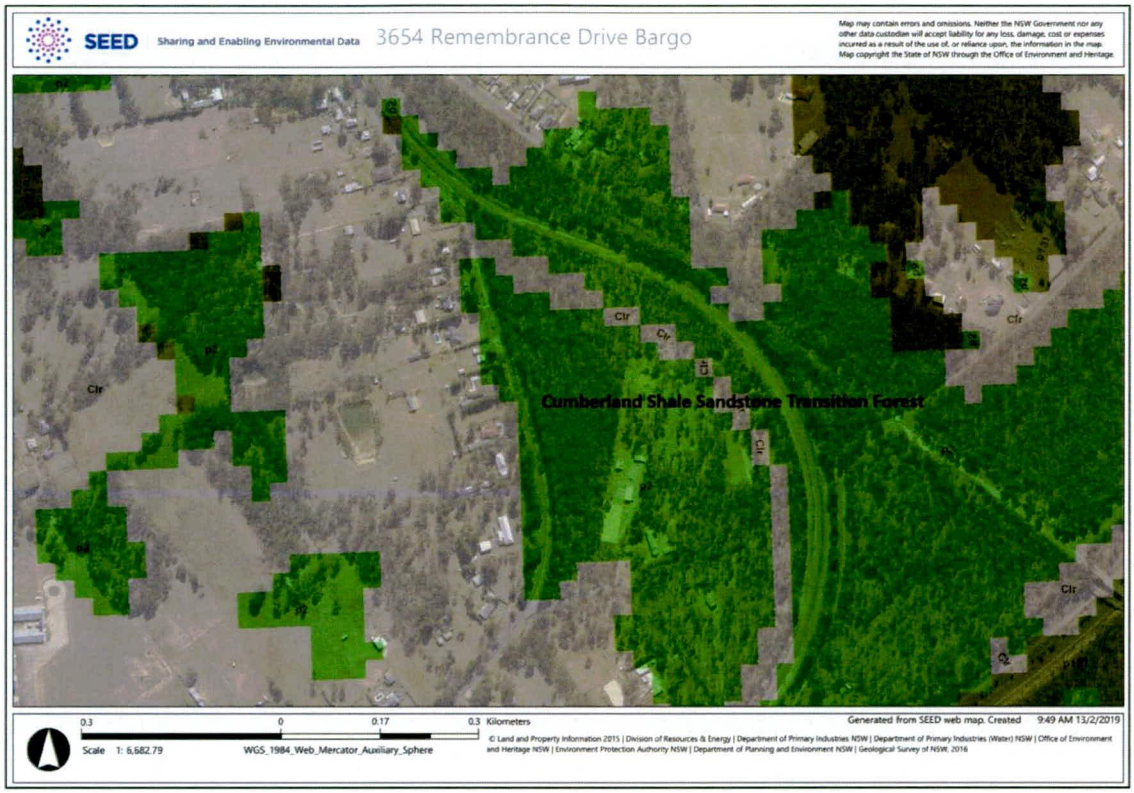
4) Management and trimming of trees and other vegetation in the vicinity of power lines and tower lines in accordance with the specifications in "Vegetation Safety Clearances" issued by Energy Australia (NS179, April 2002);

5) Maintain low ground covers by mowing / whipper snipper / slashing; and

6) Non combustible mulch e.g. stones and removing stores of combustible materials;

7) Vegetation to be planted should consist of fire retardant/ less flammable species strategically located to reduce attack from embers (i.e. as ember traps when in small clumps and short wind breaks).

APPENDIX III SOUTHEAST NSW NATIVE VEGETATION CLASSIFICATION AND MAPPING SCIVI. VIS_ID 2230



APPENDIX III BIODIVERSITY VALUES MAP