

ABN 47 857 816 658

Building Construction in Bush Fire Prone Areas

Ref No. 18.02.052

Proposed Child Care Centre

Address Lot 107 DP 975322
84 Third Road,
Berkshire Park NSW 2765

For Meeks Day Care Centre

The site was inspected on 20th February 2018

Report Preparation

Craig Burley

Grad Dip Design for Bushfire Prone Areas
FPAA Certified BPAD – Level 3 Practitioner

Executive Summary

The Proposal is for the establishment of a Child Care Centre on the grounds of the subject allotment.

The proposed development **will fully conform** to the requirements of *Planning for Bush Fire Protection 2006* (PBP2006) based on the scope of works submitted for this bushfire assessment and the recommendations included within this report.

Asset Protection Zones for the proposed development are required to satisfy section 4.2.7 Asset Protection Zones of PBP2006 for a Special Fire Protection Purpose.

Compliance with the relevant requirements and will be **achieved** by the existing management practices for maintaining the grounds within the subject allotment and adjoining lands.

Access and Egress to the site is provided directly from a two lane public road with an all-weather surface. Compliance with relevant requirements is **achieved** by existing road conditions.

Levels of Construction shall be undertaken to satisfy the provisions of the Building Code of Australia (BCA). **Compliance** for construction required by PBP2006 will be **achieved** by the incorporation of the recommendations included within this report.

Water, Gas and Electricity Supplies - Compliance for service supplies as required by PBP2006 will be **achieved** by the incorporation of the recommendations included within this report.

Emergency Management will be undertaken to satisfy the acceptable solutions contained within section 4.2.7 of PBP2006. This report recommends that an emergency/evacuation plan is prepared in accordance with the NSW RFS *Guide to Develop a: Bushfire Evacuation Plan*. **Compliance** for emergency management required by PBP2006 will be **achieved** by the incorporation of the recommendations included within this report

1.0 Introduction

We have been engaged by the management of the Meeks Family Day Care to prepare a Bushfire Hazard Assessment Report with respect of compliance to regulatory bushfire protection measures for the establishment of a Child Care Centre on the grounds of the subject allotment.

Currently the premises are being used as a Family Day Care and the development application is for the enhanced use of the building to be a Child Care Centre.

The site has been identified as being bushfire prone land and therefore the legislative requirements for the proposed development are applicable.

As the development is a child care facility which is defined as being a Special Fire Protection Purpose (SFPP) within the *Rural Fires Act 1979* and according to the provisions of *Planning for Bush Fire Protection 2006* (PBP 2006) the requirements for bushfire protection measures are greater than for a normal residential development.

This Bushfire Hazard Assessment Report is intended to be submitted to the Penrith City Council as a supplement within a development application for the establishment of the child care centre within the subject site.

1.1 Purpose of Report

- To determine the vegetation type, the expected fire behaviour and the threat to the proposal
- To assess the proposal with reference to *Planning for Bushfire Protection 2006*
- To assess the proposed construction with reference to the Building Code of Australia
- To determine the level of construction with reference to AS 3959-2009 *Construction of buildings in bushfire prone areas*
- To identify any other such measures as to improve the chances of building and occupant survival during a bushfire event
- To provide information with respect to bushfire related matters for the development that would assist the Commissioner of the NSW Rural Fire Service for the issuance of a Bushfire Safety Authority
- To provide information with respect to bushfire related matters for the development that would assist the consent authority Penrith City Council in the determination of the development application subject to this proposal.

1.2 Scope of Report

The scope of this report is limited to the bushfire hazard assessment for the proposed development and only contains comments for the subject property. Where reference is made to adjacent or adjoining lands, this report does not purport to assess those lands; rather it may discuss bushfire progression on and through those lands with the possible bushfire impact to the subject property and the proposed development.

1.3 Methodology

An initial site inspection for the purpose of assessing bushfire related matters affecting this site was conducted on the 20th February 2018 and a review of the proposed development plans as prepared by Havanah Building Design has taken place.

An assessment of slope was conducted out to a distance of 100 metres and assessment of vegetation to a distance of 140 metres from the proposed development.

The findings were related and assessed with reference to *Planning for Bushfire Protection* 2006, Appendix 2, the Addendum to Appendix 3 of *Planning for Bush Fire Protection* 2006 and AS3959-2009 *Construction of buildings in bushfire prone areas* for the formulation of the Bushfire Hazard Assessment.

This report has also been prepared having consideration to the requirements of Clause 44 of the *Rural Fire Service Regulation 2008* for the purpose of satisfying the requirements of section 100b of the *Rural Fires Act 1997*.

1.4 The Proposal

The proposal as indicated by consultation with proponent and perusal of plans supplied is for the establishment of a Child Care Centre within the grounds of the subject allotment.

The Child Care Centre will operate within an existing building that has been and currently is being used a Family Day Care.

Plans supplied show that only very minor alterations are proposed for the existing building being installation of two new aluminium framed windows, relocation of existing windows with no major structural changes to be undertaken.

External works proposed are for the construction of a new child care fencing and upgrading of pedestrian/carparking facility establishment.

As discussed previously the child care centre component is defined within the *Rural Fire Act 1979* as being a Special Fire Protection Purpose (SFPP).

Further details of proposed construction are included within appendix 1 of this report.

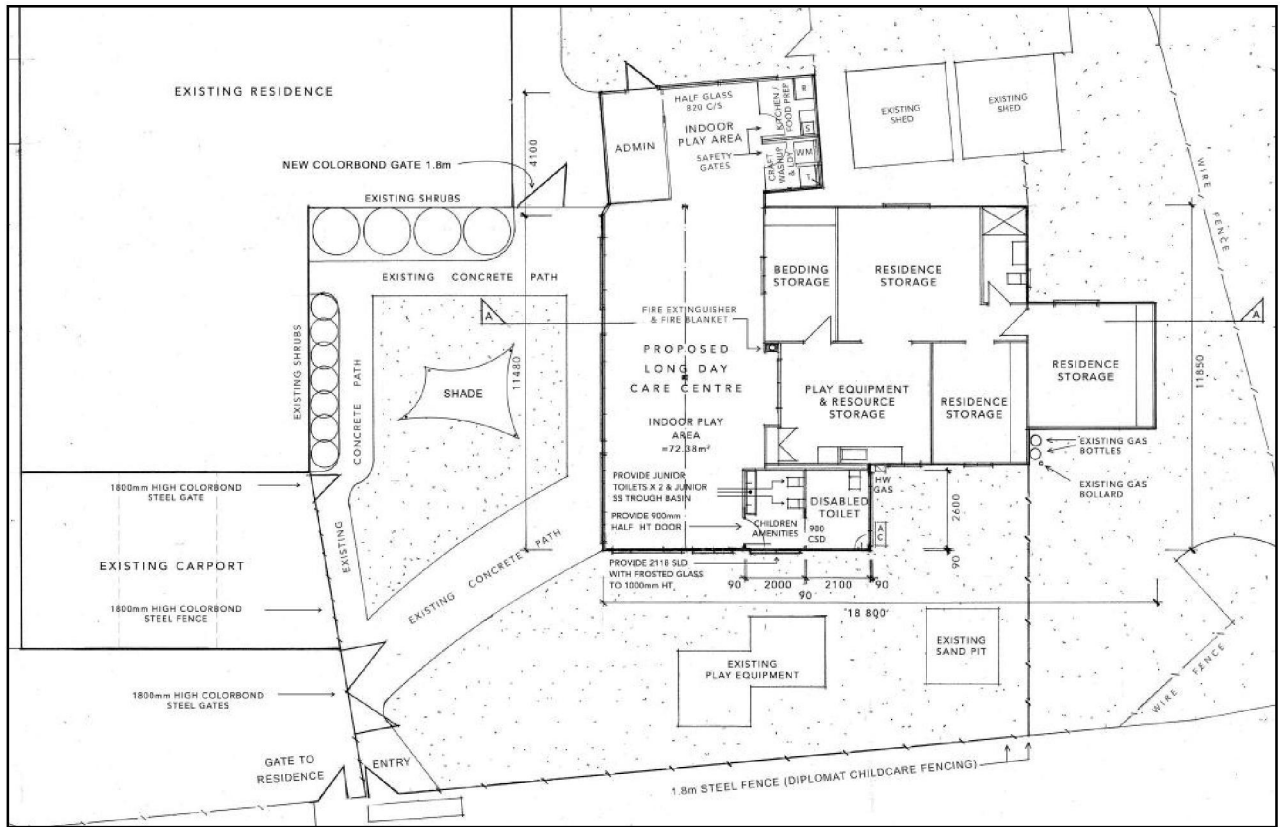


Figure 1; Extract of proposed plans ex Havanah Building Design

1.5 Regulatory Controls

The preparation of this Bushfire Hazard Assessment Report has given consideration to the various legislative and regulatory requirements including the *Environmental Planning and Assessment Act 1979*, the *Rural Fires Act 1997*, the *Building Code of Australia*, *Planning for Bush Fire Protection 2006*, AS 3959-2009 *Construction of buildings in bushfire prone areas*.

The proposal being an integrated development will require the issuance of a Bushfire Safety Authority by the Commissioner of the NSW Rural Fire Service under the provisions of *section 100b Rural Fire Act 1997*.

Development applications on bushfire prone land must be accompanied by a Bushfire Hazard Assessment within the Statement of Environmental Effects demonstrating compliance with the aims and objectives of “Planning for Bushfire Protection” and the specific objectives and performance criteria for the land use proposed.

2.0 Site and Adjacent Developments

The following seeks to describe the site, the adjoining lands and land uses effective upon the development proposal.

2.1 Site Description

The site is identified as being;

Lot 107 DP 975322
84 Third Road,
Berkshire Park NSW 2765
LGA Penrith City Council

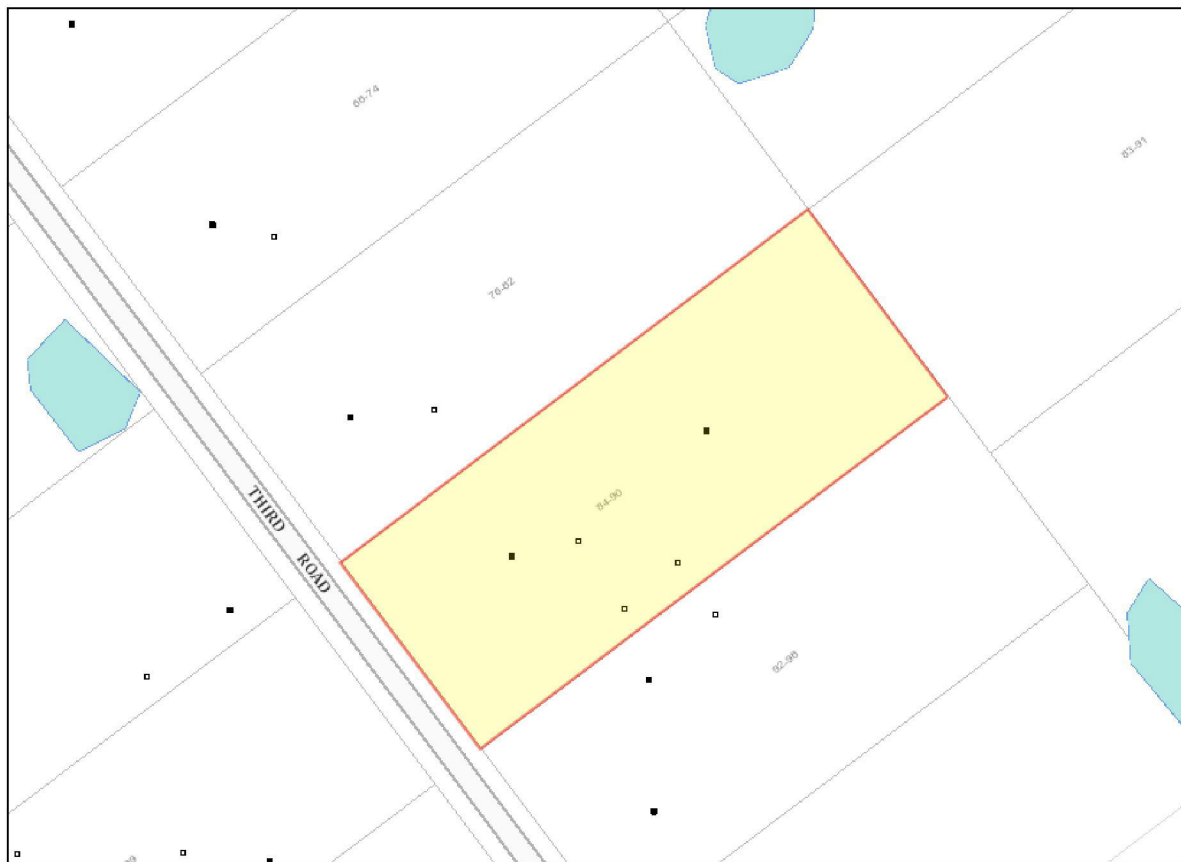


Figure 2; Locality Map (north to top of page) (Source; Dept of Lands)

The subject allotment is a parcel of land located on the north eastern side of Third Road.

The total area of the subject allotment is approximately 1.6 hectares which within itself contains no areas of bushfire hazardous vegetation.



Figure 3; Aerial photo of site (north to top of page) (Source; Nearmap)

The site has direct road frontage to Third Road and a slight modification to an existing large hard surfaced driveway will provide for carparking area.

An extract of the Penrith City Council's Bushfire Prone Land map showing the site is indicated in Figure 4 (see over) which shows the entire site is mapped as being within category 1 vegetation buffer zone (shown red)

The site inspection and interpretation of aerial photography for the subject allotment confirms that this parcel is not accurately depicted upon this image and should be actually shown as being within an area of category 1 vegetation buffer zone due to the lack of bushfire hazardous vegetation on the subject allotment.

The subject allotment has structural improvements which include to two existing Class 1a dwellings, three Class10a buildings used for storage purposes and the building used as the family day care which is the subject of this report.

The provision of water, electricity and phone is available to the proposal by existing infrastructure within the adjoining carriageway.

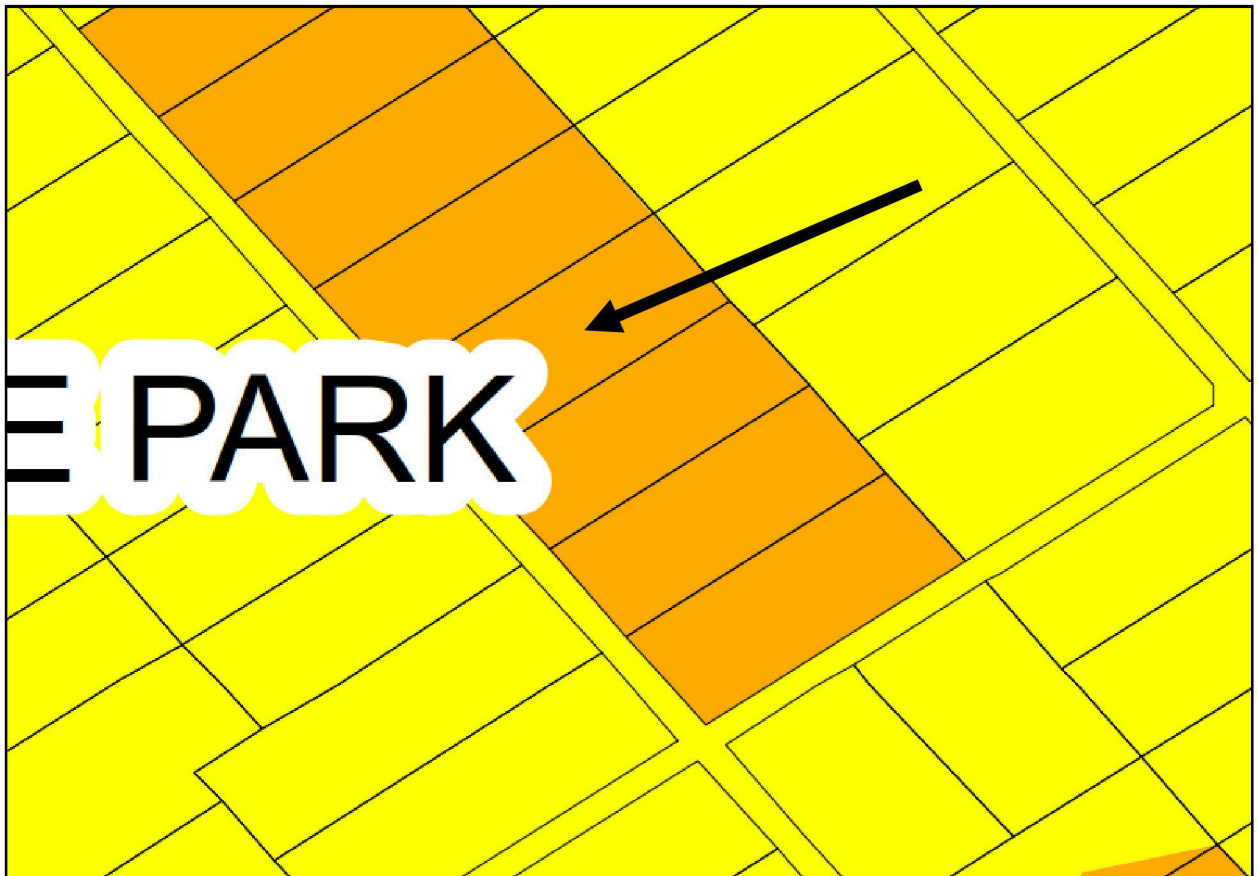


Figure 4; Extract of Bushfire Prone Land Map (source; Penrith City Council)

2.2 Any significant environmental features

The entire site is highly modified by continued land management for many years and it would be reasonable to assume that there are no significant environmental features.

2.3 Threatened species

Given the site conditions it would be reasonable to assume that there are no threatened species of flora or fauna present.

2.4 Indigenous relics

There have been no details of any archaeological assessments provided by the client to assist in the preparation of this assessment. It would be reasonable to assume that there are no known or apparent items/relics of Indigenous heritage significance known to exist on the site.

2.5 Description of Adjoining Lands

In each direction away from the subject allotment is existing rural lifestyle developments that have been established for many years that are mostly in a well-maintained condition with no significant sections of bushfire hazardous vegetation.

However to the southeast of the subject allotment are rural lifestyle allotments that does contain an occluded area of forest vegetation. This forest forms the only area of hazard effective upon the proposed development.



Figure 5; Aerial indicating subject allotment and adjoining lands ex Nearmap

2.6 Classification of Vegetation and Slope

The effective bushfire hazardous vegetation is located to the north east of the subject allotment within the adjoining allotment to the north.

This vegetation formation should be considered as being a **Forest** vegetation formation when determining the potential bushfire behaviour effective upon the proposed development.

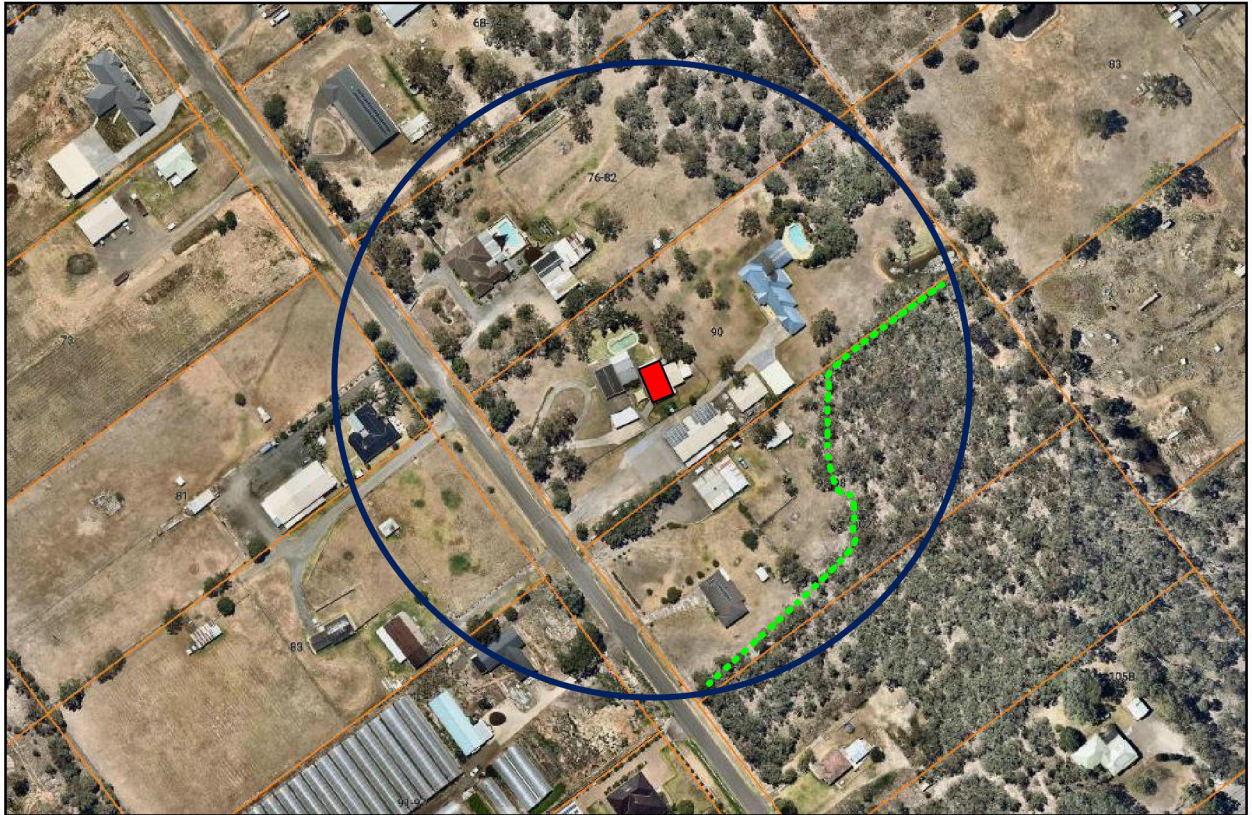


Figure 6; Aerial photo of site (north to top of page) (Source; Nearmap)

Vegetation study area 140m radius  Forest 

There is a separation distance of 68.0 metres from the closest section of forest vegetation located offsite to the east of the proposed Child Care Centre.

The effective slope of the land, out to a distance of 100 metres (that is, the slope of the land most likely to influence bushfire behaviour for the purposes of calculating Asset Protection Zones), has been assessed (using a clinometer) and desktop analysis as being **1 degrees down to the east**. (see figure 7).

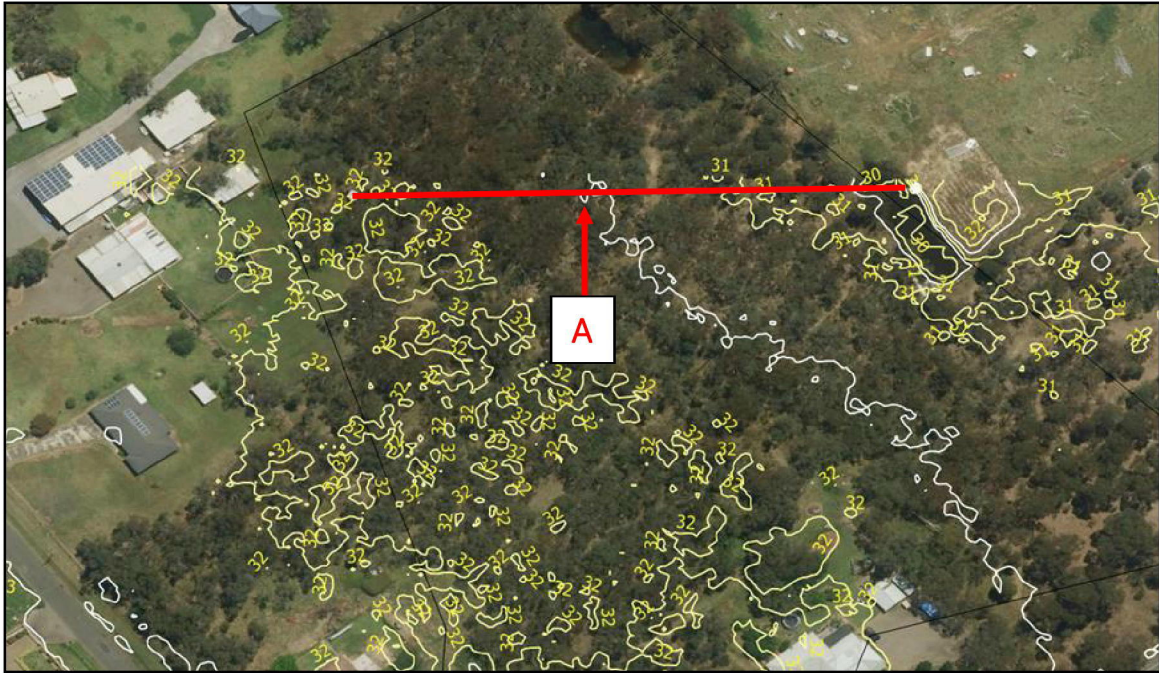


Figure 7; Slope analysis study area

Effective slope was determined by 1.0 elevation with a distance of 96 metres equals a downslope of 0.6 degrees which has been rounded to 1 degree for the purposes of this assessment.

Having consideration for the assumed vegetation being a Forest and the effective slope being a downslope of 1 degree with a separation distance of 68.0 metres this results a Low category of bushfire attack and with radiant heat levels of not greater than 10kW/m^2 .

An assessment in accordance with AS 3959-2009 *Construction of buildings in bushfire prone areas* Detailed Method for Determining the Bushfire Attack Level (BAL) – Method 2 has been undertaken taking into consideration the actual effective slope and using an assumed flame temperature of 1200 degrees (K).

This results in a maximum exposure of 8.81 kW/m^2 of radiant heat and a potential flame length of 19.71 metres.

The Method 2 results are shown within Appendix 2 of this report.

3.0 Bushfire Assessment

The effects of a bushfire event can have devastating consequences for personal safety and structures in the paths of such events. This has been recognised by the planning and fire authorities for many years and as a part of bushfire protection measures the NSW government in conjunction with the NSW Rural Fire Service instigated controls to better prepare our communities.

The recent severe bushfire events such as those in Canberra in 2003, Victoria in 2009, Blue Mountains 2013 are but a few examples of the consequences of such events and amplify the needs for creating developments that may try and better protect our community.

The document *Planning for Bush Fire Protection* 2006 sets out the required bushfire protection measures for all developments in bushfire prone areas and the following seeks to identify any requirements for the proposed development recognising that it includes a Child Care Centre.

Within *Planning for Bush Fire Protection* 2006 this document states that a Special Fire Protection Purpose (SFPP) development cannot be exposed to greater than 10kW/m² of radiant heat and therefore this report has assumed this to be a baseline requirement to achieve compliance.

3.1 The extent to which the development is to provide setbacks, including Asset Protection Zones

The entire area of the subject allotment and the southern section of the adjoining allotment are being managed in a condition which will satisfy the provisions of an asset protection zone.

This report will recommend that the management of any vegetation within the subject site shall continue to be maintained to the provisions of an inner protection area of an asset protection zone in accordance with the requirements of the NSW Rural Fire Service document entitled *Standards for Asset Protection Zones* (2005); and

The following are the requirements for asset protection zone inner protection areas as described within the documents *Planning for Bush Fire Protection* 2006 and NSW RFS *Standards for Asset Protection Zones*.

Inner Protection Area

An IPA should provide a tree canopy cover of less than 15% and should be located greater than 2.0 metres from any part of the roof line of a dwelling. Garden beds of flammable shrubs should not be located under trees and should be located not closer

than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2.0 metres above the ground.

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.

The creation and continued maintenance of the full asset protection zone is one of the primary factors in bushfire protection measures for developments in bushfire prone areas.

3.2 Fire fighting water supply

This section of Berkshire Park is serviced by a mains reticulated water system and the site inspection noted that there are a series of existing roadside hydrants located within Third Road.

3.3 Public road capacity to handle increased traffic volume during a bushfire event

Vehicular access to the site is from Third Road. This road is a public road in a well maintained condition which should be capable of handling any traffic from the subject development.

3.4 Public road links to fire trail network and two way access

The objective for provision of a dedicated fire trail system is to assist fire fighters in either offensive or defensive fire fighting. In addition a fire trail may be incorporated into a development to define the asset protection zone and to provide access for maintenance.

While there is no existing fire trail in the proximity of the subject allotment, the clear existing access along the site boundaries is considered adequate for fire fighting access purposes.

Therefore access to all areas of the new centre is achieved without the need for a fire trail system and the above noted objective is satisfied by existing site conditions.

3.5 Adequacy of access and egress from the development site for emergency response

The system of public roads to the site appears to be adequate under most conditions to allow for access and egress for the site for emergency service vehicles.

3.6 Adequacy of bushfire maintenance plans and fire emergency procedures for the development site

It is assumed that at present that there are no bushfire management plans and/or bushfire emergency procedures developed as yet for the proposed Child Care Centre.

Whilst it is not envisaged that the centre would be subjected to all mechanisms of bushfire attack it is likely that large amounts of smoke and some ember attack could still occur which may be quite upsetting and disturbing for child or staff at the centre.

Bushfire evacuation procedures should be should be prepared in accordance with the current NSW RFS document *Guide to Develop a: Bushfire Evacuation Plan*.

Management of any vegetation within the subject site should be in accordance with the requirements of the NSW Rural Fire Service document entitled *Standards for Asset Protection Zones* (2005). This will satisfy the relevant performance criteria of PBP2006.

3.7 Construction standards for building elements in the development

The Child Care Centre is to be located within an existing building that consists of Colorbond roof and external walls with aluminium framed windows and doors. The existing building is in a well-maintained condition.

Various minor new works such as installation of new aluminium framed windows and doors is to be undertaken and these must be undertaken in accordance with section 3 Construction General and section 5 BAL 12.5 of AS3959-2009 *Construction of buildings in bushfire prone areas* with the exception that the construction requirements shall be varied to comply with the requirements of the NSW Rural Fire Service Addendum to Appendix 3 Table A3.7 of *Planning for Bush Fire Protection* 2006.

To satisfy the guidance of the NSW RFS for “best practice” the existing sections of the building proposed to be used the Child Care Centre shall be upgraded where or if necessary to improve ember protection. This is to be achieved by enclosing all openings (excluding roof tile spaces) or covering of openings with a non-corrosive metal screen with a maximum aperture of 2mm. Where applicable, this includes any sub floor areas, openable windows, vents, weepholes and eaves. External doors are to be fitted with draught excluders.

3.8 Adequacy of sprinkler systems and other fire protection measures to be incorporated

No additional bushfire protection measures or external bushfire sprinkler systems are recommended for this development apart from those measures nominated in this report and listed within the recommendations section of this report.

The proposed new development is to be constructed in accordance with the *Building Code of Australia* (BCA) and services and equipment are to be provided to the development in accordance with Part E of the BCA. The precise details of the fire protection measures to be incorporated in the development as per the BCA are outside the scope of this bushfire assessment.

4.0 Assessment of the extent to which the development conforms or deviates from Chapter 4 of *Planning for Bush Fire Protection 2006*

The details provided in Section 4 of this Assessment outline the relationship between the proposed development which includes a Child Care Centre and the specifications set out in Chapter 4 (Performance Based Controls) of PBP2006.

4.1 Asset protection zones

In relation to the provision of Asset Protection Zones, Table 4.1 assesses the proposed new centre against the relevant performance criteria.

Table 4.1= Asset Protection Zones

Performance Criteria	Relationship of proposed New Centre to Performance Criteria	Meets performance criteria?
<i>Radiant heat levels of greater than 10kW/m² will not be experienced by occupants or emergency services workers entering or exiting a building.</i>	4.1.1 APZs to the standard of an inner protection area are existing in accordance with Table A2.6 of PBP2006.	Yes
<i>Applicants demonstrate that issues relating to slope are addressed: Maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.</i>	4.1.2 The APZ is located on lands with a slope <18°.	Yes
<i>APZs are managed and maintained to prevent the spread of a fire towards the building</i>	4.1.3 APZs to be maintained in accordance with the requirements of the NSW Rural Fire Service document entitled Standards for Asset Protection Zones (2005).	Yes
<i>Vegetation is managed to prevent flame contact and reduce radiant heat to buildings, minimise the potential for wind driven embers to cause ignition and reduce the effect of smoke on residents and fire-fighters.</i>	4.1.4 All above.	Yes

4.2 Access

In relation to access, Tables 4.2.1 and 4.2.2 assess the proposed new centre against the relevant performance criteria.

Table 4.2.1 – Access: Public Roads

Performance Criteria	Relationship of proposed New Centre to Performance Criteria	Meets performance criteria?
<i>Firefighters are provided with safe all weather access to structures (thus allowing more efficient use of fire fighting resources)</i>	4.2.1.1 Public roads are two-wheel drive, sealed, all-weather roads.	Yes
<i>Public road widths and design that allow safe access for firefighters while residents are evacuating an area.</i>	4.2.1.2 The adjacent public roads are two-way and allow traffic to pass in opposite directions.	Yes
<i>The capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles.</i> <i>Roads that are clearly sign-posted (with easily distinguishable names) and buildings/properties that are clearly numbered.</i>	4.2.1.3 The capacity of the existing public roads that serve the site is sufficient to carry fully loaded fire fighting vehicles	Yes
<i>There is clear access to reticulated water supply</i>	4.2.1.4 Reticulated water is available to the site.	Yes
<i>Parking does not obstruct the minimum paved width</i>	4.2.1.5 Car parking should be restricted to the main car parking areas.	Yes

Table 4.2.2 – Access: Internal Roads

Performance Criteria	Relationship of proposed New Centre to Performance Criteria	Meets performance criteria?
<i>Internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle</i>	4.2.2.1 Access to the site is from existing internal driveway and car parking which appear to be adequate	Yes

4.3 Water supply, electricity and gas

Table 4.3 assesses the proposed new centre against the relevant performance criteria for water supply, electricity and gas.

Table 4.3

Performance Criteria	Relationship of proposed New Centre to Performance Criteria	Meets performance criteria?
Water Supply <i>Water supplies are easily accessible and located at regular intervals</i>	4.3.1 Reticulated water is available to the site.	Yes
Electricity Services <i>Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings</i>	4.3.2 No external electrical works are proposed and existing cabling into building is by under ground	Yes
Gas services <i>Location of gas services will not lead to ignition of surrounding bush land or the fabric of buildings</i>	4.3.3 Any bottled gas is to be installed and maintained in accordance with AS1596 and the requirements of relevant authorities. Metal piping is to be used. 4.3.4 Any fixed gas cylinders are to be kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation. 4.3.5 If any gas cylinders need to be kept close to the building, the release valves are to be directed away from the building and at least 2 metres away from any combustible material. 4.3.6 Connections to and from any gas cylinders are to be metal.	Yes

4.4 Emergency and Evacuation Planning

Table 4.4 assesses the proposed new centre against the relevant performance criteria for emergency and evacuation planning.

Table 4.4

Performance Criteria	Relationship of proposed New Centre to Performance Criteria	Meets performance criteria?
<i>An Emergency and Evacuation Plan is approved by the relevant fire authority for the area.</i>	4.4.1 A bushfire emergency and evacuation plan shall be developed in accordance with the NSW RFS document “Guide to Develop a Bushfire Evacuation Plan	Yes with incorporation of the recommendations
<i>Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan</i>	4.4.2 Management and implementation arrangements for the plan must be incorporated into the formulated Emergency / Evacuation Plan	Yes

5.0 Recommendations

The following recommendations are made in relation to the bushfire protection measures for the proposed development and are based on the relevant provisions of the NSW Rural Fire Service guideline entitled *Planning for Bush Fire Protection 2006*:

1. That the entire area of Lot 107 DP 975322 being the subject allotment where not built upon shall continue to have the vegetation reduced where or if necessary to satisfy the requirements of *Planning for Bushfire Protection 2006* and NSW Rural Fire Service document entitled *Standards for Asset Protection Zones (2005)* for an inner protection area of an asset protection zone.
2. That no future landscaping features, planting of shrubs, trees or other vegetation shall occur in such a manner as to compromise the integrity of the asset protection zone.
3. That the proposed alterations to the existing building proposed to be a Child Care Centre shall be constructed to a minimum standard of section 3 Construction General and section 5 BAL 12.5 of AS3959-2009 *Construction of buildings in bushfire prone areas* with the exception that the construction requirements shall be varied to comply with the requirements of the NSW Rural Fire Service Addendum to Appendix 3 Table A3.7 of *Planning for Bush Fire Protection 2006*.
4. That the existing building shall be upgraded to improve ember protection. This is to be achieved by enclosing all openings (excluding roof tile spaces) or covering opening with a non-corrosive metal screen with a maximum aperture of 2mm. Where applicable, this includes any sub floor areas, openable windows, vents, weepholes and eaves. External doors are to be fitted with draught excluders and garage doors with ember penetration protection.
5. Bushfire emergency/evacuation procedures for the proposed buildings should be prepared in accordance with the NSW RFS *Guide to Develop a: Bushfire Evacuation Plan*.

6.0 Conclusion

Based upon the bushfire hazard assessment and recommendations arising for the proposed development as shown on plans prepared by Havanah Building Design this development will comply with the requirements of *Planning for Bush Fire Protection 2006* as required under section 100B of the *Rural Fires Act 1997*.



Craig Burley

Grad.Dip. Building in Bushfire Prone Areas (UWS)

FPA Australia Certified Practitioner Bushfire Planning and Design

Caveat

Quote from Planning for Bushfire Protection 2001, *'notwithstanding the precautions adopted, it should always be remembered that bushfire burn under a wide range of conditions and an element of risk, no matter how small always remains.'*

Quote from Standards Australia, *'Although the standard is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.'*

References

Planning for Bush Fire Protection 2006 Planning NSW in conjunction with NSW Rural Fire Service

Building Code of Australia Volume 2 2005 Australian Building Codes Board

AS 3959 –2009 Construction of buildings in bushfire prone areas Standards Australia & Australian Building Codes Board

Landscape and building Design for Bushfire Areas Ramsay C. & Rudolph L. CSIRO 2003

Quantifying bushfire penetration into urban areas in Australia Keping Chan & McAneny J. Geophysical Research Letters, Volume 31, L12212, doi:10.1029/2004GL020244,2004

Bushfires in Australia Luke R.H. & McArthur CSIRO 1978

Performance of Building Elements in Bushfire Prone Areas Poon S.L. & England J.P. Warrington Fire Research Australia

Address Validation Search Department of Lands www.maps.nsw.gov.au

Standards for Asset Protection Zones NSW Rural Fire Service 2005

Ocean Shores to Dessert Dunes Keith D. Department of Environment and Conservation Sydney 2004

Appendix 1 – Plans ex Havanah Building Design

all documents to be checked on or prior to the commencement of construction	all documents to be checked on or prior to the commencement of construction
use scale from drawing, use figured dimensions only	use scale from drawing, use figured dimensions only
all concrete to be used as structural member's details & specifications	all concrete to be used as structural member's details & specifications
all work to be in accordance with the National Communications Code	all work to be in accordance with the National Communications Code
all work to be in accordance with local statutory authorities	all work to be in accordance with local statutory authorities
typical receipt to set out all work	typical receipt to set out all work
validated concrete designs to engineer's details & specifications	validated concrete designs to engineer's details & specifications
will & used drawn to the National Printing Code	will & used drawn to the National Printing Code
dimensions based on standard dimensions	dimensions based on standard dimensions
collected roof roofing, gutters, downpipes, flashing & eavings	collected roof roofing, gutters, downpipes, flashing & eavings
connect developed steel external wall cladding	connect developed steel external wall cladding
connected downpipes to existing storm to the disposal system	connected downpipes to existing storm to the disposal system

interimbed internal play area	72.0m ²	
interimbed external play area	272.0m ²	
internal storage space	31.50m ²	
external storage space	6.00m ²	(including internal storage)
total floor area	159.0m ²	
music tables	2	
disposal unit	1	
proposed parking spaces	15	

Portable Fire Extinguishers	RCA Clause E1.6 & A32-444
Exit Signs	RCA Clause E4.5, E4.6, E4.8 & A32-295
Accessible Toilet	AS 1428
Fencing	AS 1926
Regulations 104 - 107	Education & Care Services National Regulation

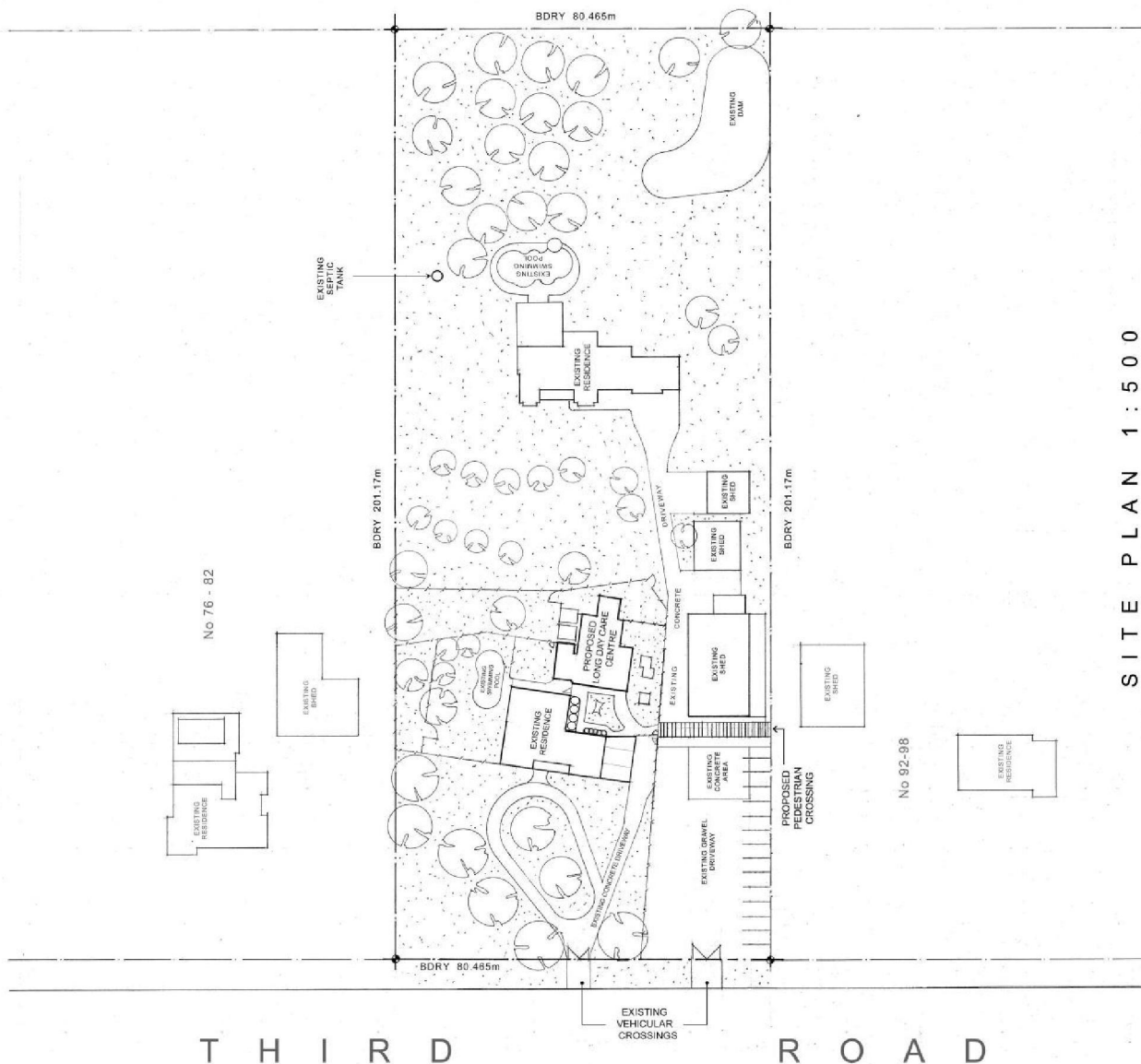
	(Component)	(Component)
existing residence 1 (8 year)	266,282	
existing residence 2 (year)	418,042	
existing deck footprint	547,002	
existing pool & surrounding paving	252,042	
existing carport	62,002	
existing concrete driveway (approximate)	1045,002	
existing concrete porch	90,002	
existing day care center	203,782	(including 100,000 (50%))

Total existing hard areas

Proposed :	Long Day Care Centre - Retrospective Use of an Existing Structure
Client :	Mindis Day Care
Site Address :	44-50 Third Road, Berkshire Park, NSW, 2765
Title :	Development Application
Drawing :	Site Plan
Sheet No. :	1 of 3
Drawing No. :	

Tel: (02) 4573 0825
 Mobile: 0403 707 760
 Email: daniel@hivonah.com.au
 PO Box 91
 Kurung NSW 2756
 www.hivonah.com.au

 ANZ 64 11 843 648
 Contractor since: 2019/06/01



Appendix 2 – Detailed Method for Determining the Bushfire Attack Level (BAL)

– Method 2

Calculated March 27, 2018, 2:53 pm (BALc v.4.8)

84 Third Road Berkshire Park

Bushfire Attack Level calculator - AS3959-2009 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	2.57 km/h
Vegetation classification	Forest	Flame length	19.71 m
Surface fuel load	20 t/ha	Flame angle	77 °
Overall fuel load	25 t/ha	Panel height	19.2 m
Vegetation height	n/a	Elevation of receiver	9.6 m
Effective slope	1 °	Fire intensity	33,214 kW/m
Site slope	0 °	Transmissivity	0.759
Distance to vegetation	68 m	Viewfactor	0.1038
Flame width	100 m	Radiant heat flux	8.81 kW/m ²
Windspeed	n/a	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,200 K		

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005