

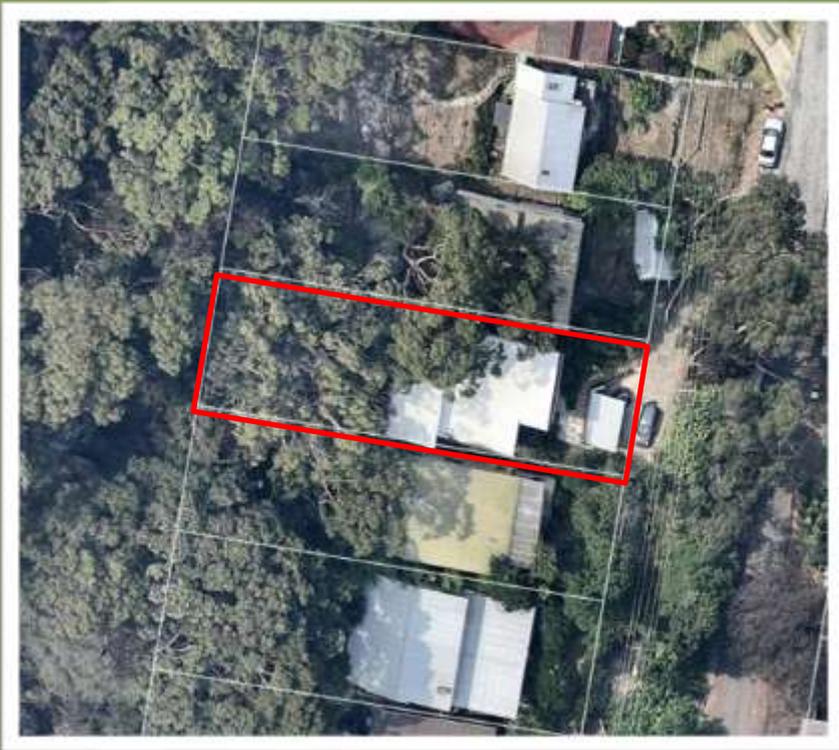


CLARKE DOWDLE & ASSOCIATES

DEVELOPMENT CONSULTANTS

SURVEYORS • PLANNERS • ECOLOGISTS • BUSHFIRE CONSULTANTS

BUSH FIRE ASSESSMENT REPORT



For the Proposed Residential Development
at

**19 HUGHES STREET,
POINT CLARE, NSW**

(LOT 42 IN DP 5851)

March 2020

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DOCUMENT TRACKING

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|-------------------------|-------------------------------|
| Project Location | 19 Hughes Street, Point Clare |
| Date | 17/03/20 |
| Prepared by | Ashley Dowdle |
| Reviewed by | Kristan Dowdle |
| Approved by | Kristan Dowdle |
| Status | FINAL |
| Version | 2 |

1.0 INTRODUCTION

We have attended the above-described property for the purpose of undertaking a Bush Fire Assessment Report (BFAR) in accordance with the guidelines outlined in Planning for Bushfire Protection, 2019 (PBP), to determine the level of bushfire threat to the site. Central Coast Council has provided mapping of Bushfire Prone Areas that identifies areas of bushfire threat. This mapping identifies properties that are in the buffer zone of 100m metres from Category 1 mapped vegetation or 30m from Category 2 & 3 mapped vegetation. All developments occurring on land mapped as bushfire prone are subject to the conditions detailed in the planning document PBP.

The subject site has been mapped as bushfire prone land (See Figure 1); therefore, the purpose of this BFAR is to provide information to Central Coast Council to ascertain compliance or otherwise with AS3959-2018 'Construction of Buildings in Bush Fire Prone Areas' and PBP.

This report will provide an independent assessment of the bushfire risk to the proposal, based upon the surrounding site conditions with reference to Section 4.14 of the Environmental Planning and Assessment Act 1979, PBP and AS3959-2018.

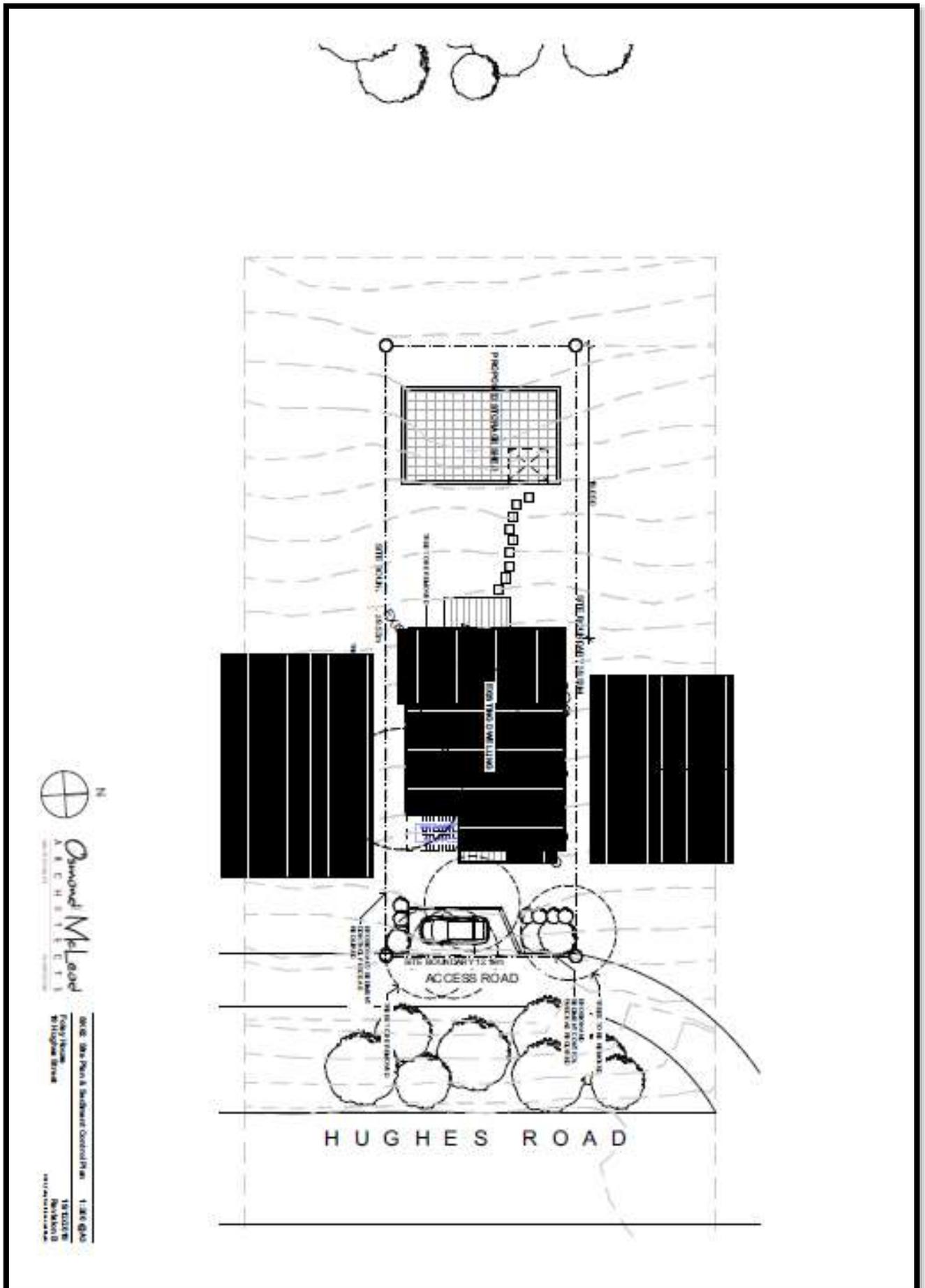


Figure 1: Bushfire Mapping (site boundary in yellow)
Source: Department of Planning, 2020

1.1 Proposed Development

The site is a residential parcel of land that contains an existing dwelling and the proposed development will involve the construction of additions and alterations to the existing dwelling and the construction of a storage shed on the western portions of the site. Figure 2 provides a site plan of the proposal.

The final building plans outlining the size and dimension of the proposed development will accompany the Development Application.



2.0 SITE IDENTIFICATION

The site is located at 19 Hughes Street, Point Clare (Lot 42 DP 5851). The site is in the Local Government Area (LGA) of Central Coast Council (Fire Danger Index-100). The site is provided access via a driveway running from Hughes Street to the east.

The site is a residential parcel of land that contains an existing dwelling on the eastern portions of the site. Land conditions within the site consist of managed lawns and landscaped gardens that extends to the east with unmanaged vegetation existing on the western portions.

The site is connected to the town-reticulated supply of water and the mains electrical grid.



Figure 3: Aerial Photograph of the site (site boundary bordered in red)
Source: Nearmap, 2020

3.0 BUSH FIRE HAZARD ASSESSMENT

3.1 Surrounding Vegetation

The surrounding land and vegetation found within 140m of the site are detailed below.

North, South & East

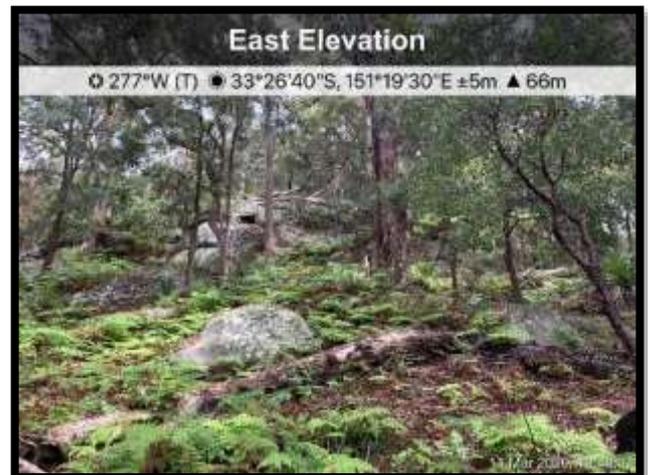
The surrounding land on these aspects is occupied by developed residential allotments containing predominately managed curtilage throughout. Whilst some trees do exist on these aspects predominately managed lands exist beneath and therefore these aspects are deemed not to contain a bushfire hazard.

West

To the west and directly adjoining the site, is vegetation existing on steep east facing land that has been mapped as containing *Sheltered Blue Gum Forest*. This vegetation meets with the Keith (2004) description of a 'wet sclerophyll forest' and therefore this vegetation will be assessed as **Forest** as per PBP.



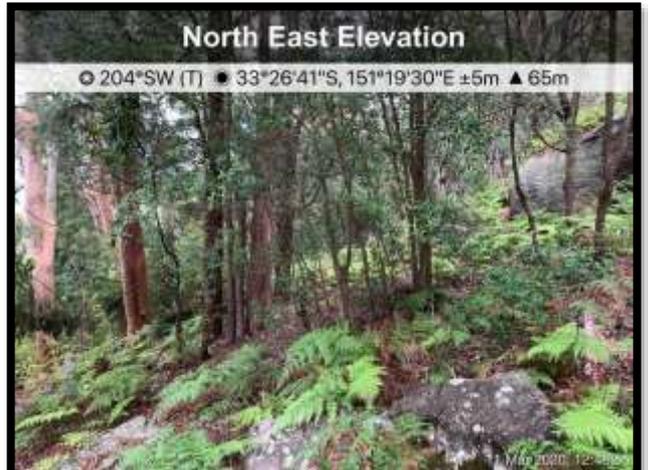
1.



2.



3.



4.

Note: See figure 5 for photograph location and direction.

3.2 Effective Slope

PBP states in A1.5 that effective slope is;

'The slope of the land under the classified vegetation has a direct influence on the rate of fire spread, the intensity of the fire and the ultimate level of radiant heat flux.

The effective slope is the slope of the ground under the hazard (vegetation). It is not the slope between the vegetation and the building (slope located between the asset and vegetation is the site slope).'

In regards to the site, the effective slopes for each hazard facing were inspected and calculated through a combination of topographic mapping from the Central Coast Council (2m contours) and ground-truthing. The effective slope measured 100m from the proposed development for the hazard facing aspects are;

West: >10° Up Slope

Figure 4 provides the topographic and vegetation mapping for the site and surrounding area.



Figure 4: Topographic Mapping surrounding the proposed development
Source: Central Coast Council, 2020

4.0 BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT

The bushfire risk to property depends on the vegetation type, slope and proximity of vegetation to the proposed development, and can be classified as BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL FZ as outlined in AS3959-2018 and PBP. The categories of bushfire attack were determined for the vegetation conditions currently existing on the site and adjacent areas. Following the identification of the bushfire attack category for each aspect, the site will be assessed according to vegetation that presents the highest level of bushfire attack risk. AS3959-2018 provides two methods to determine complying Bushfire Attack Levels, these are; the **Simplified Procedure-Method 1** (deemed-to-satisfy) and **Detailed Method for Determining the Bushfire Attack Level-Method 2** (alternate solution).

Table 1 provides an assessment through the Detailed Assessment Method 2 in AS3959-2018 for the western aspects. The following land and vegetation conditions were used in the calculations and assessment;

Western - (Proposed Additions & Alterations)

- A setback of 16m from the hazard to the west (scaled from site plan)
- Forest Vegetation (PBP 2019 fuel loads 22/36.1 t/ha);
- The effective slope of 10° Up Slope (*NSW RFS state that slopes greater than 10 degrees is beyond the known reliable output of available models*)
- An APZ/ site slope of >10° Up Slope
- A Flame Width of 100m

The level of bushfire attack then determines the construction standards necessary for the proposed development. These protective construction measures are outlined in Australian Standard AS3959-2018. The BAL required for each of the aspects/facades for the proposed development are summarised in Table 1.

Table 1: Bushfire Attack Assessment (Method 2 - AS3959-2018)

| | ASPECT | |
|---|------------------------------|---|
| | Northern, Southern & Eastern | Western |
| Vegetation ¹ within 100m of development | Managed Lands | Forest |
| Effective Slope of Land | - | >10° Up Slope |
| APZ Required/Setback Provided ² | >100m | Additions & Alterations 16m |
| Slope of Site | - | >10° Up Slope |
| Flame Width | - | 100m |
| Radiant heat flux (kW/m ²) ³ | - | 28.17 kW/m ² |
| Bushfire Attack Level (BAL) ⁴ | BAL 29/19 ⁵ | BAL 29 |

Notes for Table 1:

- (1) Refer to Keith (2004), AS 3959-2018 and PBP
- (2) Distance to vegetation
- (3) AS3959-2018 Method 2 calculator (see calculations below)
- (4) BAL's are in accordance with Table A1.12.5 in PBP

- (5) PBP states where an elevation is shielded from direct radiant heat arising from bush fire attack, then the construction requirements for that elevation can be reduced to the next lower BAL except when BAL 12.5 where all aspects shall comply with BAL 12.5. The shielding of an elevation shall apply to all the elements of the wall but shall not apply to subfloors or roofs.
- Table 1 **does not display applicable BAL Ratings** for each aspect (**See recommendations of this report**)

Proposed Additions & Alterations

As detailed in Table 1 and Table 2.4.2 in AS3959-2018, based upon the surrounding conditions and the radiant heat calculations associated with a Method 2 assessment, the proposed additions and alterations is subject to BAL 29 from the western aspects.

Proposed Storage Shed

The proposed storage shed is a class 10a non-habitable structure and is located greater than 6m from the existing dwelling or any other habitable structure. PBP 2019 states that '*there is no bush fire protection requirements for Class 10a buildings located more than 6m from a dwelling in bush fire prone areas.*'

Due to the proximity of the hazard and ability to provide radiant heat shielding to the existing dwelling, it will be recommended that the proposed storage shed be constructed to BAL 40 as per AS3959-2018 and PBP.

The National Construction Code (NCC) provides AS3959-2018 as a deemed-to-satisfy building solution for developments within bushfire prone areas. Therefore, bushfire protection measures required for the proposed development are provided within the recommendations of this report with these provisions with recognition of the surrounding site conditions.



Figure 5: Bushfire Site Plan (site boundary bordered in orange)
Source: Nearmap, 2020

5.0 RECOMMENDATIONS

This Bush Fire Assessment Report concluded that the proposed development may comply with the performance criteria for PBP if the proposed acceptable solutions and recommendations are implemented. These items are outlined below.

5.1 Asset Protection Zones

- **The entire site shall be maintained as an APZ for the lifetime of the development.**
- The APZ shall be maintained to meet with the requirements of an Inner Protection Area (IPA) as outlined within Appendix 4 in PBP which is the following;

Trees:

- *canopy cover should be less than 15% (at maturity)*
- *trees (at maturity) should not touch or overhang the building*
- *lower limbs should be removed up to a height of 2m above ground*
- *preference should be given to smooth barked and evergreen trees.*

Shrubs:

- *create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings*
- *shrubs should not be located under trees*
- *shrubs should not form more than 10% ground cover*
- *clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.*

Grass:

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

5.1.1 Environmental Considerations

Tree clearing will be required as part of the development and for bushfire protection.

5.2 Construction Standards

Proposed Additions & Alterations

- The **northern, southern and western aspects** of the **proposed additions & alterations** shall be constructed to comply with AS3959-2018 **Sections 3 & 7 (BAL 29)** and section 7.5 in PBP.
- The **eastern aspects (including the proposed underfloor areas)** of the **proposed additions & alterations** shall be constructed to comply with AS3959-2018 **Sections 3 & 6 (BAL 19)** and section 7.5 in PBP.

Proposed Storage Shed

- The **proposed storage shed** shall be constructed to comply with AS3959-2018 **Sections 3 & 8 (BAL 40)** and section 7.5 in PBP.

Fencing (if applicable)

- All new fencing shall be constructed in accordance with section 7.6 in PBP.

5.3 Property Access and Evacuation Safety

- Safe access is provided to the subject property via Hughes Street. This road will serve both as an access point for firefighters and an egress point for residents during a bushfire event.
- It is recommended that the building occupants prepare a bushfire survival plan which addresses the option to leave early prior to bushfire impacting the site. Details on how to prepare this plan are provided by the NSW RFS website (http://www.rfs.nsw.gov.au/file_system/attachments/Attachment_BushFireSurvivalPlan.pdf)

5.4 Water and Utility Services Supply

5.4.1 Water

The site is connected to the reticulated supply of water. In recognition of these, the following recommendations are made;

- Taps and fittings should be constructed of metal; and
- The number of taps and/or length of hose should be adequate in number and/or length to supply water to the dwelling;

5.4.2 Gas (if applicable)

- Any gas cylinders or gas connections should be installed and maintained in accordance with Australian Standard AS1596 - *The Storage and Handling of LP Gas* and the requirements of relevant authorities.
- If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion.

5.4.3 Electricity

- The site is connected via overhead lines

6.0 PERFORMANCE CRITERIA COMPLIANCE

The following table indicates compliance or otherwise with Section 7.4a of PBP

| PBP PERFORMANCE CRITERIA | ACCEPTABLE SOLUTION COMPLIANCE |
|--|--|
| <p>in relation to Asset Protection Zones:</p> <ul style="list-style-type: none"> APZs are provided commensurate with the construction of the building; and A defensible space is provided. APZs are managed and maintained to prevent the spread of a fire to the building. the APZ is provided in perpetuity. APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised. | <p>The proposal is provided with an APZ as outlined in Appendix 1 in PBP. Therefore, the proposal provides compliance.</p> |
| <p>in relation to construction standards:</p> <ul style="list-style-type: none"> the proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact. proposed fences and gates are designed to minimise the spread of bush fire. proposed Class 10a buildings are designed to minimise the spread of bush fire. | <p>The proposal will be constructed to Sections 3, 6, 7 & 8 (BAL 19, BAL 29 & BAL 40) of AS3959-2018 and Section 7.5 in PBP 2019. Therefore, the proposal provides compliance</p> |
| <p>in relation to access requirements:</p> <ul style="list-style-type: none"> firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation. the capacity of access roads is adequate for firefighting vehicles. there is appropriate access to water supply. firefighting vehicles can access the dwelling and exit the property safely. | <p>The proposal is provided direct access via Hughes Street. The proposal meets with the requirements of Section 7.4a of PBP and therefore the proposal is deemed to provide compliance</p> |
| <p>in relation to water and utility services:</p> <ul style="list-style-type: none"> an adequate water supply is provided for firefighting purposes. water supplies are located at regular intervals; and the water supply is accessible and reliable for firefighting operations. flows and pressure are appropriate. the integrity of the water supply is maintained. a static water supply is provided for firefighting purposes in areas where reticulated water is not available. location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings. location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings. | <p>Services are provided that meet with the requirements of section 7.4a of PBP. Therefore, the proposal provides compliance</p> |
| <p>in relation to landscaping:</p> <ul style="list-style-type: none"> landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions. | <p>The site will be maintained to meet with the requirements of an APZ. Therefore, the proposal provides compliance</p> |

7.0 CONCLUSION

Clarke Dowdle & Associates have been engaged to conduct a Bush Fire Assessment Report upon the property located at 19 Hughes Street, Point Clare, NSW. This original assessment was performed in March 2020 and was conducted in accordance with the procedures and methods recommended in the NSW Rural Fire Service published document 'Planning for Bushfire Protection' (PBP).

This report has outlined and provided recommendations demonstrating how the proposed development may comply with the performance criteria set out in PBP.

The determining authorities and Rural Fire Service may suggest additional measures to be implemented with any planning and construction upon the subject site.

We would be pleased to provide further information on any aspects of this report.

For and on behalf of

Clarke Dowdle and Associates



Ashley Dowdle
Bushfire Consultant
Planning for Bushfire Prone Areas - UTS Short Course

Disclaimer

PBP States;

Due to a range of limitations, the measures contained in this document do not guarantee that loss of life, injury and/or property damage will not occur during a bush fire event

AS 3959-2018 states;

It should be borne in mind that the measures contained in this standard cannot guarantee that the building will survive a bushfire event on every occasion. This is substantially due to the unpredictable nature and behaviour of fire and extreme weather conditions.

This report provides the required information to assist Local Council and the Rural Fire Service in determining compliance in accordance with PBP and AS 3959-2018 and as stated above, this report does not guarantee that the proposal will withstand bushfire attack on every occasion.

REFERENCES

- Keith, D. (2004), *Ocean Shores to Desert Dunes*. Department of Environment and Conservation, Sydney
- National Construction Code (2019), Building Codes Australia, *Class 1 and Class 10 Building Housing Provisions Volume 2*
- NSW Rural Fire Service and Department of Planning (2019), *Planning for Bushfire Protection, A guide for Councils, Planners, Fire Authorities and Developers*. NSW Rural Fire Service.
- Schauble, J. (2004). *The Australian Bushfire Safety Guide*. Harper Collins Publishers, Sydney, Australia.
- Standards Australia, (2018), *AS3959 Construction of Buildings in Bushfire-prone Areas*. Standards Australia International

APPENDIX A RADIANT HEAT CALCULATIONS



Calculated March 9, 2020, 3:41 pm (BALc v.4.8)

19 Hughes St, Point Clare

| Bushfire Attack Level calculator - AS3959-2009 (Method 2) | | | |
|---|--------------|-----------------------|-------------------------|
| Inputs | | Outputs | |
| Fire Danger Index | 100 | Rate of spread | 1.32 km/h |
| Vegetation classification | Forest | Flame length | 12.93 m |
| Surface fuel load | 22 t/ha | Flame angle | 56 ° |
| Overall fuel load | 36.1 t/ha | Panel height | 10.72 m |
| Vegetation height | n/a | Elevation of receiver | 8.18 m |
| Effective slope | -10 ° | Fire intensity | 24,697 kW/m |
| Site slope | -10 ° | Transmissivity | 0.855 |
| Distance to vegetation | 16 m | Viewfactor | 0.4332 |
| Flame width | 100 m | Radiant heat flux | 28.17 kW/m ² |
| Windspeed | n/a | Bushfire Attack Level | BAL-29 |
| Heat of combustion | 18,600 kJ/kg | | |
| Flame temperature | 1,090 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