BUSHFIRE ATTACK LEVEL

FOR
FUTURE DWELLINGS
AT
STAGE 10
BILLY'S LOOKOUT
TERALBA NSW 2284
PERFORMANCE-BASED ASSESSMENT

Prepared by:

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Site Details:	Stage 10 at Billy's Lookout, Teralba NSW 2284
Prepared by:	***Sarah Jones B.Env.Sc.,G.Dip.DBPA (Design in Bushfire Prone Areas)*** ***Firebird ecoSultants Pty Ltd*** **A**BN – 16 105 985 993 PO Box 354, Newcastle NSW 2300 M: 0414 465 990 Email: sarah@firebirdeco.com.au T: 02 4910 3939 Fax: 02 4929 2727
Prepared for:	McCloy Group
Reference No.	Teralba – McCloy Group – September 2024
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Disclaimer

Not withstanding the precautions adopted within this report, it should always be remembered that bushfires burn under a wide range of conditions. An element of risk, no matter how small always remains, and 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.

Executive Summary

This report provides an assessment of the Bushfire Attack Level (BAL) at Stage 10 within Billy's Lookout, Teralba in accordance with AS3959 (2018) *Construction of Buildings in Bushfire Prone Areas* Appendix B – Detailed Method 2. This report and mapping are not to be used to place wholesale restrictions on lots reflecting the resulting BAL mapping presented within. Future development of surrounding stages may result in lower BALs than detailed in this report.

This BAL report has shown that any future dwellings within the site will be able to meet the requirements of both AS3959-2018 and the PBP 2019 (NSW Rural Fire Service NSW).

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

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Disclaimer:

The BALs as depicted within this report and mapping have been determined by management of vegetation to the East where land will be cleared for future stages. It should be noted that conditions may change over time that may result in different BALs for the lots.

Although every care has been taken in the preparation of this BAL Report, McCloy Group and the author accept no responsibility in errors in this report or damaged resulting from the information. It should be noted that upon lodgement of a Development Application (DA) with Council or Rural Fires Service they may recommend additional construction requirements (BALs).

Terms & Abbreviations

Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419-2017	Australian Standard – Fire Hydrant Installations
AS3959-2018	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BAL	Bushfire Attack Level
BCA	Building Code of Australia
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BPL Map	Bush Fire Prone Land Map
BPMs	Bush Fire Protection Measures
EPA Act	*NSW Environmental Planning and Assessment Act 1979*
FFDI	Forest Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LGA	Local Government Area
LMC	Lake Macquarie City Council
OPA	Outer Protection Area
PBP	Planning for Bushfire Protection 2019
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation

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TABLES

FIGURES

1 INTRODUCTION

Firebird ecoSultants Pty Ltd has been engaged by McCloy Group Pty Ltd to undertake a Bushfire Attack Level (BAL) report for Stage 10 within Billy's Lookout, Teralba, hereafter referred to as the "site". Refer to Appendix A for Sales Plan.

This BAL report assesses the application of Australian Standard AS3959-2018 'Construction of Buildings on Bushfire Prone Land' and Appendix 1 of Planning for Bushfire Protection 2019 (PBP, 2019). AS3959 (2018) Appendix B – Detailed Method 2 has been used in this assessment.

This report has been prepared to provide guidance to prospective purchasers of what Bushfire Attack Levels (BALs) may be required for future dwellings within the site.

1.1 Site Particulars

Locality:	Stage 10, Billy's Lookout, Teralba NSW 2284
LGA:	Lake Macquarie City Council (LMCC)
Forest Danger Index:	100
Current Land Use:	Approved subdivision

2 METHODOLOGY

The Australian Standard for assessing the BAL and providing the detailed requirements for construction has been reviewed and amended with the latest version being adopted for use in bushfire prone areas of NSW in March 2020. This version is titled AS 3959-2018 'Construction of Buildings in Bushfire Prone Areas' (Standards Australia 2018, was used in this assessment.

In addition, the NSW method of determining the bushfire attack level, found in Appendix 1 of the document 'Planning for Bushfire Protection 2019' (NSW Rural Fire Service 2019) has also been reviewed and amended to come into line with the process within AS 3959. Therefore, in NSW the methodology with AS 3959 is to be used to determine the bushfire attack level. AS3959 (2018) Appendix B – Detailed Method 2 has been used in this BAL assessment.

2.1 Vegetation Assessment

Vegetation surveys and vegetation mapping carried out on the site has been undertaken as follows:

- Aerial Photograph Interpretation to map vegetation cover and extent.
- Confirmation of the vegetation assemblage typology present via a site inspection.

2.2 Slope Assessment

Slope assessment has been undertaken as follows:

- Aerial Photograph Interpretation in conjunction with analysis of electronic contour maps with a contour interval of 2m.
- On site confirmation of slope measurements.

3 SITE ASSESSMENT

A site inspection was undertaken on the site. The following assessment has been undertaken in accordance with the requirements of PBP (RFS, 2019) and AS3959-2018.

3.1 Vegetation and Slope Assessment

An assessment of the slope affecting the bushfire behaviour was undertaken for a distance of 100m from the edge of the lot boundaries in the direction of the bushfire hazard. The slopes leading away from the site have been evaluated to identify both the average slope and by identifying the maximum slope present. These values help determine the level of gradient which will most significantly influence the fire behaviour of the site. Refer to Table 1 for Vegetation and Slope Assessment.

Table 3-1: Vegetation & Slope Assessment

Direction from Site	Vegetation Classification	Effective Slope
North	Managed Land – Teralba Cemetery	N/A
East	Managed Land – Cleared for future development	N/A
South	Sydney Coastal Dry Sclerophyll Forest (refer to Appendix D for Radiant Heat Calculations)	Downslope 3.43° (Refer to Appendix D for Radiant Heat Calculations)
West	Managed Land – Residential Development	N/A

4 BUSHFIRE ATTACK ASSESSMENT

4.1 Bushfire Attack Assessment

To determine the bush fire attack and required Bushfire Attack Level (BAL) for the proposed subdivision the following steps were followed:

1. Determination of the vegetation types within 100m of the site, as assessed in section 3 of this report.
2. Determination of the distance between the vegetation and future dwellings has been assessed in section 4.2 of this report.
3. Determination of the effective slope as assessed in section 3 of this report.
4. A FFDI of 100 was determined for LMC LGA.

4.2 Determination of Bushfire Attack Levels

The results from the above steps were used to calculate the required BAL in accordance with Detailed Method 2 of AS 3959 – 2018.

The results from this bush fire attack assessment are detailed below in Table 4-1– Bushfire Attack Level (BAL) Assessment and Figure 4-1 Bushfire Attack Level Map.

Table 4-1: Bushfire Attack Level Assessment

Lot Number	Vegetation Type within 100m & Direction from future dwellings	Average Slope of Land (degrees)	Separation Distance from Identified Vegetation	Bushfire Attack Level (BAL)	Construction Section
1001	Sydney Coastal DSF to the South	Downslope 3.43°	26-<37m	BAL-29	Sect 3 & 7 of AS3959 and Sect 7.5 of PBP
			37-<49m	BAL-19	Sect 3 & 6 of AS3959 and Sect 7.5 of PBP
			49-<100m	BAL-12.5	Sect 3 & 5 of A3959 and Sect 7.5 of PBP
1002	Sydney Coastal DSF to the South	Downslope 3.43°	49-<100m	BAL-12.5	Sect 3 & 5 of A3959 and Sect 7.5 of PBP
1003	Sydney Coastal DSF to the South	Downslope 3.43°	49-<100m	BAL-12.5	Sect 3 & 5 of AS3959 and Sect 7.5 of PBP

Lot Number	Vegetation Type within 100m & Direction from future dwellings	Average Slope of Land (degrees)	Separation Distance from Identified Vegetation	Bushfire Attack Level (BAL)	Construction Section
1004	Sydney Coastal DSF to the South	Downslope 3.43°	49-<100m	BAL-12.5	Sect 3 & 5 of AS3959 and Sect 7.5 of PBP
1005	Sydney Coastal DSF to the South	Downslope 3.43°	>100m	BAL-LOW	No Requirements
1006	Sydney Coastal DSF to the South	Downslope 3.43°	>100m	BAL-LOW	No Requirements
1007	Sydney Coastal DSF to the South	Downslope 3.43°	>100m	BAL-LOW	No Requirements
1008	Sydney Coastal DSF to the South	Downslope 3.43°	>100m	BAL-LOW	No Requirements
1009	Sydney Coastal DSF to the South	Downslope 3.43°	>100m	BAL-LOW	No Requirements
1010	Sydney Coastal DSF to the South	Downslope 3.43°	49-<100m	BAL-12.5	Sect 3 & 5 of A3959 and Sect 7.5 of PBP
			>100m	BAL-LOW	No Requirements
1011	Sydney Coastal DSF to the South	Downslope 3.43°	49-<100m	BAL-12.5	Sect 3 & 5 of A3959 and Sect 7.5 of PBP
1012	Sydney Coastal DSF to the South	Downslope 3.43°	49-<100m	BAL-12.5	Sect 3 & 5 of A3959 and Sect 7.5 of PBP
1013	Sydney Coastal DSF to the South	Downslope 3.43°	49-<100m	BAL-12.5	Sect 3 & 5 of A3959 and Sect 7.5 of PBP
1014	Sydney Coastal DSF to the South	Downslope 3.43°	26-<37m	BAL-29	Sect 3 & 7 of AS3959 and Sect 7.5 of PBP
			37-<49m	BAL-19	Sect 3 & 6 of AS3959 and Sect 7.5 of PBP

Lot Number	Vegetation Type within 100m & Direction from future dwellings	Average Slope of Land (degrees)	Separation Distance from Identified Vegetation	Bushfire Attack Level (BAL)	Construction Section
			49-<100m	BAL-12.5	Sect 3 & 5 of A3959 and Sect 7.5 of PBP
1015	Sydney Coastal DSF to the South	Downslope 3.43°	26-<37m	BAL-29	Sect 3 & 7 of AS3959 and Sect 7.5 of PBP
			37-<49m	BAL-19	Sect 3 & 6 of AS3959 and Sect 7.5 of PBP
			49-<100m	BAL-12.5	Sect 3 & 5 of A3959 and Sect 7.5 of PBP
1016	Sydney Coastal DSF to the South	Downslope 3.43°	26-<37m	BAL-29	Sect 3 & 7 of AS3959 and Sect 7.5 of PBP
			37-<49m	BAL-19	Sect 3 & 6 of AS3959 and Sect 7.5 of PBP
			49-<100m	BAL-12.5	Sect 3 & 5 of A3959 and Sect 7.5 of PBP

*To Note: The construction requirements for the next lower BAL than that determined for the site may be applied to an elevation of the building where the elevation is not exposed to the source of the bushfire attack. An elevation is deemed to be not exposed to the source of bushfire attack if all the straight lines between that elevation and the source of bushfire attack are obstructed by another part of the building. However, this does not apply to BAL-12.5.

This report and mapping are not to be used to place wholesale restrictions on lots reflecting the resulting BAL mapping presented within. Building location and design will influence the application of the required BALs. For example, a lot indicated as being affected by BAL-29 may have those facades that are not exposed to the bushfire threat constructed to a lower BAL (i.e. BAL-19), reducing the costs of construction and providing more flexibility in choice of external building materials. Refer to Appendix B for Summary of AS3959-2018 Construction Standards and Appendix C for Additional Building Requirements. Refer to Appendix D for Radiant Heat Calculations. Please note, the above BAL ratings are based on the management of the road reserve to the south.

Legend

- Subject Site
- 100m Buffer
- Land managed by council as drainage reserve
- Managed as part of the Road Reserve
- Open Forest
- Managed Land
- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5

Disclaimer
The BALS as depicted on this map have been determined by vegetation within 100m of Stage 10 at the time of the assessment in May 2024. It should be noted that conditions may change over time, that may result in different BALs for the site.
Although every care has been taken in the preparation of this map the author accepts no responsibility for any misprints, errors, omissions, inaccuracies in these maps or damages resulting from the use of this information.

Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

FIGURE 5-1: BUSHFIRE ATTACK LEVELS

Ref No 3056 D

CLIENT	McCloys Pty Ltd
SITE DETAILS	Stage 10 Teralba
DATE	16 September 2024

NORTH

0 25 50 100

SCALE 2000 @ A3

Firebird ecoSultants Pty Ltd
ABN - 16 105 985 993
Level 1, 146 Hunter Street, Newcastle NSW 2300
P O Box 354 Newcastle NSW 2300

5 CONCLUSION

This report provides an assessment of the Bushfire Attack Level (BAL) in accordance with AS3959-2018 Construction of Buildings in Bushfire Prone Areas for Stage 10, Billy's Lookout, Teralba.

This BAL report assesses the application of Australian Standard AS3959-2018 'Construction of Buildings in Bushfire Prone Land' and Appendix 1 of Planning for Bushfire Protection 2019 (PBP, 2019).

This report and mapping are not to be used to place wholesale restrictions on lots reflecting the resulting BAL mapping presented within. Future development of surrounding stages may result in lower BALs than detailed in this report.

This BAL report has shown that any future dwellings within the site will be able to meet the requirements of both AS3959-2018.

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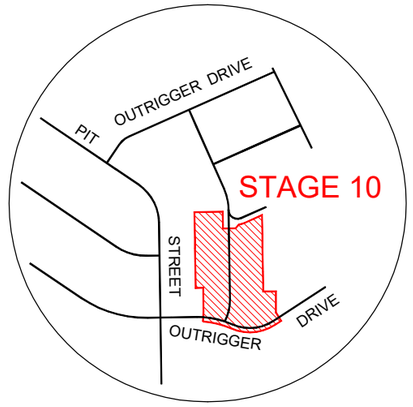
Disclaimer:
The BALs as depicted within this report and mapping have been determined by vegetation within 100m of Stage 10 at the time of the assessment May 2024. It should be noted that conditions may change over time that may result in different BALs for the lots.

6 BIBLIOGRAPHY

NSW Rural Fire Service (RFS) 2019. Planning for Bushfire Protection: A guide for Councils, Planners, Fire Authorities, Developers and Home Owners. Australian Government Publishing Service, Canberra.

Standards Australia. 2018. Construction of buildings in bushfire-prone Ares, AS3959, Fourth Edition 2018, Standards Australia International Ltd Sydney

APPENDIX A SALE PLAN



LOCALITY PLAN

(EA) - EASEMENT TO DRAIN WATER 2 WIDE
(EB) - RESTRICTION ON THE USE OF LAND 0.7 WIDE
(EC) - EASEMENT FOR SIGNAGE 3 WIDE

(GENERAL RESTRICTIONS ON THE USE OF LAND EFFECTS ALL LOTS. ALL AREAS, DIMENSIONS & EASEMENTS ARE SUBJECT TO FINAL SURVEY)

PROPOSED SEWER LINE

SALE PLAN FOR BILLY'S LOOKOUT STAGE 10

McCLOYGROUP

BILLY'S LOOKOUT EST. 2015 LAKE MACQUARIE

200
DP 1254623

1706

SIDELIGHT STREET

CORDAGE WAY

OUTRIGGER DRIVE

MGA

1808

1807

1806

1816

431 DP 1228495

432 DP 1228495

433 DP 1228495

434 DP 1228495

435 DP 1228495

436 DP 1228495

438 DP 1228495

1 DP 1241721

2 DP 1241721

1007 597.6 m²

1006 558 m²

1005 504 m²

1004 594 m²

1003 576 m²

1002 648 m²

1001 822.4 m²

1008 599.8 m²

1009 524.8 m²

1010 550.8 m²

1011 533.8 m²

1012 544 m²

1013 527 m²

1016 707.3 m²

1015 608.2 m²

1014 506.5 m²

APPENDIX B SECT 7.5 PBP 2019 – ADDITIONAL BUILDING REQUIREMENTS

7.5 Additional construction requirements

To ensure the performance criteria for construction standards given in section 7.4 can be met, PBP adopts additional measures over and above AS 3959 and NASH Standard as follows:

- construction measures for ember protection at BAL-12.5 and BAL-19 provided by AS 3959;
- construction measures for development in BAL-FZ; and
- requirements over and above the performance criteria contained within AS 1530.8.1 and AS 1530.8.2 apply in regards to flaming.

7.5.1 Ember protection

Based on the findings from the 2009 Victorian Bush Fires Royal Commission, PBP aims to maintain the safety levels previously provided by AS 3959:1999 in relation to ember protection at lower Bush Fire Attack Levels.

In particular, the areas addressed are in relation to:

- sarking;
- subfloor screening;
- floors;
- verandas, decks, steps, ramps and landings;
- timber support posts and beams; and
- fascias and bargeboards.

7.5.2 NSW State Variations under G5.2(a) (i) and 3.10.5.0(c)(i) of the NCC

Certain provisions of AS 3959 are varied in NSW based on the findings of the Victorian Bush Fires Royal Commission and bush fire industry research.

The following variations to AS 3959 apply in NSW for the purposes of NSW G5.2(a)(i) of Volume One and NSW 3.10.5.0(c)(i) of Volume Two of the NCC;

- clause 3.10 of AS 3959 is deleted and any sarking used for BAL-12.5, BAL-19, BAL-29 or BAL-40 shall:
  - be non-combustible; or
  - comply with AS/NZS 4200.1, be installed on the outside of the frame and have a flammability index of not more than 5 as determined by AS 1530.2; and
- clause 5.2 and 6.2 of AS 3959 is replaced by clause 7.2 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and
- clause 5.7 and 6.7 of AS 3959 is replaced by clause 7.7 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and
- fascias and bargeboards, in BAL-40, shall comply with:
  - clause 8.4.1(b) of AS 3959; or
  - clause 8.6.6 of AS 3959.

7.5.3 Construction in the flame zone

The flame zone is the area that has significant potential for sustained flame contact during a bush fire. The flame zone is determined by the calculated distance at which the radiant heat of the design fire exceeds 40kW/m².

The NCC references AS 3959 and the NASH Standard. The NSW variation to the NCC excludes both AS 3959 and the NASH Standard as a Deemed to Satisfy solution for buildings that are required to be constructed to BAL-FZ as defined in AS 3959.

Although Chapter 9 of AS 3959 and the NASH Standard has not been adopted, they should still be used as a basis for a performance-based solution demonstrating compliance with the performance

requirements of the NCC and PBP for construction in the flame zone.

All flame zone developments should be sited and designed to minimise the risk of bush fire attack. Buildings should be designed and sited in accordance with appropriate siting and design principles to ensure the safest protection from bush fire impacts.

7.5.4 Flaming

Materials that allow flaming can be problematic and are not supported by the NSW RFS for the following reasons:

- flaming materials increase the exposure of other elements of construction and the adjoining structure to flame contact after a bush fire front has passed; and
- flaming materials will potentially increase the exposure of occupants of the building to radiant heat, direct flame contact, smoke after a bush fire front has passed.

This increase in exposure can contribute to the risk of loss of life and compromise the ability of residents to defend their property and egress from the building once the bush fire front has passed.

In addition, it can reduce the ability of occupants to make safe and effective decisions about their safety.

Where there is potential for materials of construction to ignite as a result of bush fire attack, the proposed building solution generally fails the construction performance criteria for residential infill development.

For development which may be subject to flame contact (BAL-40 and BAL-FZ), systems tested in accordance with AS 1530.8.1 and AS 1530.8.2 respectively will be considered, except that there is to be no flaming of the specimen except for:

- window frames that have passed the criteria of AS 1530.8.1 and AS 1530.8.2, may be approved provided their flaming is not considered to compromise the safety of other elements of the building; and
- use of other minor elements which allow flaming may be considered provided they do not compromise the integrity of the fire safety of the building (examples include address numbers, house names, decorative artwork, etc).

Flaming of other more significant elements of the building (such as aesthetic wall cladding) is considered to pose an unacceptable risk and will not be supported.

APPENDIX C RADIANT HEAT CALCULATIONS

NBC Bushfire Attack Assessment Report V4.0

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 9/05/2024 **Assessment Date:** 27/03/2024

Site Street Address: Stage 19, Billy's Lookout, Teralba

Assessor: Sarah Jones; Firebird Eco

Local Government Area: Lake Macquarie **Alpine Area:** No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001/Vesta/Catchpole
Rate of Fire Spread: Noble et al., 1980
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005
Peak Elevation of Receiver: Tan et al., 2005
Peak Flame Angle: Tan et al., 2005

Run Description: veg to the east

Vegetation Information

Vegetation Type:	Sydney Coastal DSF		
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)		
Vegetation Slope:	3.43 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	21.3	**Overall Fuel Load(t/ha):**	27.3
Vegetation Height(m):	1.4	Only Applicable to Shrub/Scrub and Vesta	

Site Information

Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	49

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K):**	1090

Calculation Parameters

Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100

Program Outputs

Level of Construction:	BAL 12.5	**Peak Elevation of Receiver(m):**	11.5
Radiant Heat(kW/m2):	12.35	**Flame Angle (degrees):**	71
Flame Length(m):	24.33	**Maximum View Factor:**	0.209
Rate Of Spread (km/h):	3.24	**Inner Protection Area(m):**	30
Transmissivity:	0.776	**Outer Protection Area(m):**	19
Fire Intensity(kW/m):	45679		

Run Description:	veg to the east		
Vegetation Information			
Vegetation Type:	Sydney Coastal DSF		
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)		
Vegetation Slope:	3.43 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	21.3	**Overall Fuel Load(t/ha):**	27.3
Vegetation Height(m):	1.4	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	37
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K):**	1090
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100
Program Outputs			
Level of Construction:	BAL 19	**Peak Elevation of Receiver(m):**	11.2
Radiant Heat(kW/m2):	18.39	**Flame Angle (degrees):**	67
Flame Length(m):	24.33	**Maximum View Factor:**	0.302
Rate Of Spread (km/h):	3.24	**Inner Protection Area(m):**	22
Transmissivity:	0.8	**Outer Protection Area(m):**	15
Fire Intensity(kW/m):	45679		

Run Description:	veg to the east		
Vegetation Information			
Vegetation Type:	Sydney Coastal DSF		
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)		
Vegetation Slope:	3.43 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	21.3	**Overall Fuel Load(t/ha):**	27.3
Vegetation Height(m):	1.4	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	26
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K):**	1090
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100
Program Outputs			
Level of Construction:	BAL 29	**Peak Elevation of Receiver(m):**	10.53
Radiant Heat(kW/m2):	28.81	**Flame Angle (degrees):**	60
Flame Length(m):	24.33	**Maximum View Factor:**	0.456
Rate Of Spread (km/h):	3.24	**Inner Protection Area(m):**	14
Transmissivity:	0.831	**Outer Protection Area(m):**	12
Fire Intensity(kW/m):	45679		

Run Description:	Vegetation to the east		
Vegetation Information			
Vegetation Type:	Sydney Coastal DSF		
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)		
Vegetation Slope:	3.43 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	21.3	**Overall Fuel Load(t/ha):**	27.3
Vegetation Height(m):	1.4	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	26
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K):**	1090
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100
Program Outputs			
Level of Construction:	BAL 29	**Peak Elevation of Receiver(m):**	10.53
Radiant Heat(kW/m2):	28.81	**Flame Angle (degrees):**	60
Flame Length(m):	24.33	**Maximum View Factor:**	0.456
Rate Of Spread (km/h):	3.24	**Inner Protection Area(m):**	14
Transmissivity:	0.831	**Outer Protection Area(m):**	12
Fire Intensity(kW/m):	45679		