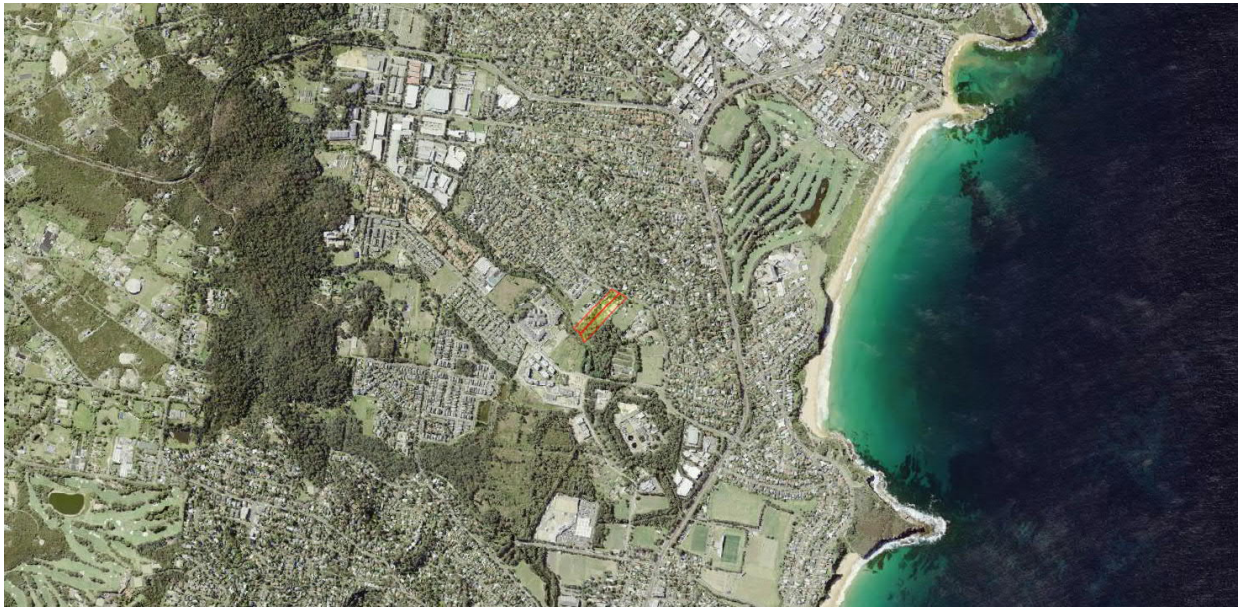


# Bush Fire Assessment Report

## s.100B 'Subdivision'

Lot 1& 2 DP 349085  
45-49 Warriewood Road Warriewood NSW

Prepared for  
**Archidrome**



Oct 2020

Prepared by **Terence O'Toole**  
B.App.Sc Environmental Health  
Grad.Dip Design in Bushfire Prone Areas

Advanced Bushfire Performance Solutions P/L  
M: 0417 483 438  
[terryo@advancedbps.com.au](mailto:terryo@advancedbps.com.au) [www.advancedbps.com.au](http://www.advancedbps.com.au)





## Terms & conditions of use

Advanced Bushfire Performance Solutions Pty Ltd retains the copyright on all reports it produces, and thus the information contained therein shall not be reproduced, in part or in whole without the prior expressed permission of the copyright holder. The information contained in this report is for the sole use of the intended recipients and is solely applicable to the specific property and development proposal assessed.

## Disclaimer

The analysis, assessment and recommendations contained in the following Bushfire Assessment Report, are the sole views of Advanced Bushfire Performance Solutions Pty Ltd. The bushfire protection assessment, recommendations and strategies contained in this report are intended to address the submission requirements for DAs on bush fire prone land as outlined in appendix 4 of *Planning for Bush Fire Protection 2006*.

While the utmost care is taken in the assessment and reporting process, Advanced Bushfire Performance Solutions Pty Ltd does not warrant that the information contained in this report will be free from error or omission. Also there is no implied assurance nor guarantee that compliance with the strategies and recommendations contained in this report will result in a development application consent being granted by a local government body; nor will Advanced Bushfire Performance Solutions Pty Ltd be liable for any financial losses incurred throughout the development planning and application process, should an application not be successful.

Because the nature of bushfires is unpredictable and in many cases immeasurable the information contained in this report, if used, in part or in whole, should reduce the risk of a bushfire hazard occurring. But in no way can the information contained in this report be used as a guarantee against any damages or losses resulting from any bushfire events.

The customer's exclusive remedy against Advanced Bushfire Performance Solutions Pty Ltd for any act or omission, including negligence, or failure in any service delivered (including under strict liability in tort) shall be, at Advanced Bushfire Performance Solutions Pty Ltd option, the return, replacement or reimbursement for credit of such services provided.

In no event shall Advanced Bushfire Performance Solutions Pty Ltd be liable to the customer or to any other person for direct or indirect, consequential, incidental or special damages beyond the limitation contained in the preceding paragraph.

## Document Control

Document Name	Project Ref	Date	Author	Status
20200828ARCH BAR 1.0	20200828ARCH	15-Oct-2020	TO	Version 1



# 1 Executive summary

Advanced Bushfire Performance Solutions Pty Ltd has been engaged by the Applicant, Archidrome, to prepare a Bush Fire Assessment Report to demonstrate how the development application conforms to the relevant specifications and requirements of *Planning for Bush Fire Protection*, or any other document prescribed by the regulations, relevant to the development.

The development application proposes the construction of a new residential subdivision and new residential apartment buildings.

The assessment within this report relies on an acceptable solution assessment as specified in Section 5 and Appendix 1 of Planning for Bush Fire Protection 2019.

The site is within 140m of unmanaged bushfire hazard vegetation to the South. This vegetation is classified as Forested Wetlands.

Two transect (T01-T02) describe the most significant fire runs to the site from the South. These runs also represent the steepest effective slopes.

Transect	Vegetation	Slope	Range	Table A1.12.2	Setback	Comment
T01	Forested Wetlands	0.3°	>0-5°	12m	>16m	Complies
T02	Forested Wetlands	0.4°	>0-5°	12m	>16m	Complies

The site directly accesses a public road (Warriewood Road and Lorikeet Grove). Lorikeet Grove will be extended through the site.

Water is available via reticulated mains water supply. Hydrants are located within road verges. The existing mains network will be extended into the proposed subdivision. All parts of the building envelopes will be within 60m of a hydrant.

The entire site will be managed to IPA standards

All proposed landscaping will be consistent with maintaining IPA standards.

This development complies with subdivision development performance criteria and acceptable solutions of Planning in Bush Fire Protection 2019.

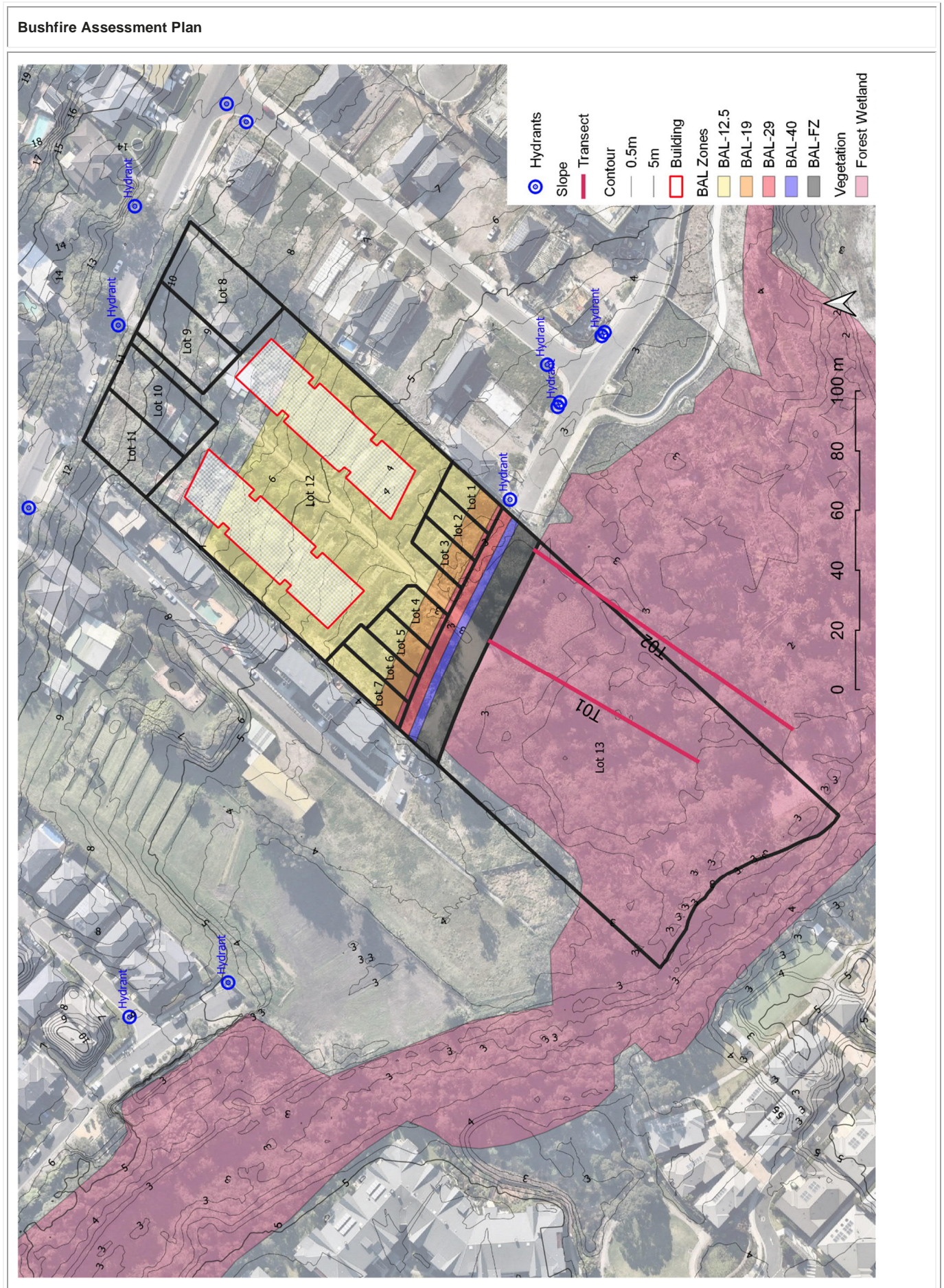


## 2 Proposed Development

<p><b>Is the proposal on bush fire prone land</b></p>	<p>At the date of this report, the site is identified as bushfire prone land on the <b>NSW Rural Fire Service</b> web-based <b>Check if you're in bush fire prone land</b> tool.</p> <p><a href="https://www.rfs.nsw.gov.au/plan-and-prepare/building-in-a-bush-fire-area/planning-for-bush-fire-protection/bush-fire-prone-land/check-bfpl">https://www.rfs.nsw.gov.au/plan-and-prepare/building-in-a-bush-fire-area/planning-for-bush-fire-protection/bush-fire-prone-land/check-bfpl</a></p>
<p><b>Does the proposal require a Bush Fire Safety Authority and referral to the RFS</b></p>	<p>YES <input checked="" type="checkbox"/> Proposal is subject to section.100B of the <i>Rural Fires Act 1997</i> A BFSAs is required from the NSW RFS for subdivision on BFPL under s.100B of the RF Act</p> <p>NO</p>
<p><b>Does the proposal rely on alternative solutions</b></p>	<p>YES <input checked="" type="checkbox"/> Compliance with AS3959-2009 Method 2</p> <p>NO <input checked="" type="checkbox"/> Compliance with Section 5 and Appendix 1 of Planning for Bush Fire Protection 2019</p>
<p><b>Description</b></p>	<p>Residential subdivision (integrated development) of 2 existing lots into 12 residential lots, a residual lot, road and 2 residential flat buildings with 34 apartments.</p>
<p><b>Plan</b></p>	
<p><b>Plan Reference</b></p>	<p>Lot Layout Plan Rev 2 Dated 16/03/2020</p>



### 3 Assessment Details





## Bushfire Assessment Report

<b>Vegetation</b>	<ul style="list-style-type: none"> <li>The site is located within 140m of significant bushfire hazard vegetation to the South.</li> <li>The site currently supports a remnant forested structure on lowland flood plains adjacent to Narrabeen Creek. This vegetation will be preserved by the development.</li> <li>The vegetation community is Coastal Freshwater Swamp Forest. Keith classifies this as Forested Wetlands.</li> <li>All vegetation with the site (excluding Lot 13) will be managed to inner protection area (IPA) standards on completion of the subdivision. All unmanaged vegetation will be restricted to Lot 13 and the riparian corridor to the South.</li> </ul>						
	<b>Aspect</b>	<b>Vegetation</b>					
	North	Managed					
	East	Managed					
	South	Forested Wetland					
	West	Managed					
<b>Slope</b>	<ul style="list-style-type: none"> <li>The slope analysis for this development was undertaken using contours derived from 1m LiDAR DEM sourced from Dept of Planning – Land Property Information (LPI).</li> <li>This elevation data has been processed to achieve 'Category 1' DEM products as described by the ICSM (Intergovernmental committee on Surveying &amp; Mapping) Guidelines for Digital Elevation Data which specifies accuracies not exceeding 30cm with 2 sigma or 95% confidence. This data has been validated by independent Register Surveyors as being accurate for the purposes of bushfire assessments.</li> <li>The slope is not relevant to aspects that do not support bushfire hazard vegetation.</li> <li>The slope to the South to Southeast presents the most significant bushfire attach to the site.</li> </ul>						
	<b>Transect</b>	<b>Near elevation</b>	<b>Far elevation</b>	<b>Run</b>	<b>US/DS</b>	<b>Slope</b>	<b>Range</b>
	T01	3.0m	2.5m	80.1m	DS	0.4°	>0-5°
	T02	3.0m	2.5m	104.5m	DS	0.3°	>0-5°
<b>Mitigating factors</b>	<ul style="list-style-type: none"> <li>None</li> </ul>						
<b>Bushfire behaviour modelling</b>	<ul style="list-style-type: none"> <li>Bushfire behaviour modelling applies the site-specific view factor calculation of radiant heat and predicted flame lengths rather than the statewide generalization of acceptable solutions.</li> <li>In many circumstances modelling can demonstrate that APZs or BALs can be improved while still achieving the minimum performance criteria.</li> <li>Modelling is based on the <i>Detailed Method for Determining the Bushfire Attack Level (BAL) – Method 2</i> detailed in Appendix B of Australian Standard AS3959-2009.</li> <li>Modelling is a performance alternative assessment methodology and has not been applied or relied upon for this assessment.</li> </ul>						



<b>Setback</b>	<ul style="list-style-type: none"> <li>Setbacks are measured from the edge of the unmanaged bushfire hazard vegetation to the nearest part of the building envelope.</li> <li>Setbacks for minimum Asset Protection Zones (APZ) to achieve a BAL-29 solution were determined using Table A1.12.2 in Appendix A of Planning for Bush Fire Protection 2019.</li> <li>A minimum 12m setback is required to satisfy Table A1.12.2. The road reserve is 16m wide. Building setbacks are an additional APZ.</li> <li>Deemed-to-Satisfy (Acceptable Solutions) BAL zones from Table A1.12.15 are described in the Bushfire Assessment Plan. <ul style="list-style-type: none"> <li>Lots 1-7 will support BAL-19 buildings.</li> <li>Lot 12 will support BAL-12.5.</li> <li>Lots 8-11 will support BAL-Low.</li> </ul> </li> <li>Setbacks are based on management to APZ standards as described in the NSW Rural Fire Service documents <i>Planning for Bush Fire Protection 2019</i> and <i>Standards for Asset Protection Zones</i> (see Appendix A).</li> <li>For all proposed residential lots, the expectation (when buildings are proposed) will be management to inner protection area (IPA) standards although this may be modified to incorporate an outer protection area (OPA) if any tree removal is not acceptable.</li> <li>Setbacks in <i>Planning for Bush Fire Protection</i> are designed to ensure that lots are created with the potential to allow a deemed-to-satisfy building construction solution under AS3959-2018.</li> <li>All proposed APZs are practical, do not compromise soil stability and negate potential crown fires within the APZ. Minimum setbacks are wholly contained within the proposed residual lots or road reserve as described by the Bushfire Assessment Plan above. No APZs are proposed beyond the boundaries of the development; however existing managed lands will be relied upon for APZs. No new or additional APZ burden will be placed on adjoining landowners.</li> </ul>							
	Trans ect	Vegetation	Slope	Slope Range	Table A1.12.2 APZ	AS3959 Method 2 Setback	Proposed APZ (m)	Status
	N	Managed						
	W	Managed						
	S	Forested Wetland	0.4°	0-<5°	12m		>16m	Complies
E	Managed							
<b>Management</b>	<ul style="list-style-type: none"> <li>All proposed residential lots are to be managed (as a minimum) to inner protection area (IPA) standards and maintained at this standard until building construction stage.</li> <li>All asset protection zones provided within the proposed residential lots lot will be the responsibility of the landowner.</li> </ul>							

<b>PBP-2019 TABLE A1.12.2</b>					
<b>Minimum distance for APZ—FFDI 100 Residential Developments</b>					
Vegetation classification	Effective Slope				
	Up slopes and flat	>0-5	>5-10	>10-15	>15-20
Distance (m) of the site from the predominant vegetation class					
Rainforest	11	14	18	23	30
Forest (wet & dry sclerophyll)	24	29	36	45	56
Grassy & Semi-Arid Woodland	12	16	20	25	32
Forested Wetland	10	12	16	20	26
Tall Heath	16	18	20	22	25
Short Heath	9	10	12	13	15
Arid Shrubland	6	7	8	9	10
Freshwater Wetlands	5	6	6	7	8
Grassland	10	12	13	15	17



**PBP-2019 TABLE A1.12.5**

**DETERMINATION OF BAL—FFDI 100 Residential Developments**

Vegetation classification	Bushfire Attack Levels (BAL)				
	BAL—FZ	BAL—40	BAL—29	BAL—19	BAL—12.5
	Distance (m) of the site from the predominant vegetation class				
	All upslopes and flat land				
Rainforest	<8	8-<11	11-<16	16-<23	23-<100
Forest (wet & dry sclerophyll)	<18	18-<24	24-<33	33-<45	45-<100
Grassy & Semi-Arid Woodland	<9	9-<12	12-<18	18-<26	26-<100
Forested Wetland	<7	7-<10	10-<14	14-<21	21-<100
Tall Heath	<12	12-<16	16-<23	23-<32	32-<100
Short Heath	<7	7-<9	9-<14	14-<20	20-<100
Arid Shrubland	<5	5-<6	6-<9	9-<14	14-<100
Freshwater Wetlands	<4	4-<5	5-<7	7-<11	11-<100
Grassland	<8	8-<10	10-<15	15-<22	22-<50
	Downslope >0 to 5 degrees				
Rainforest	<11	11-<14	14-<21	21-<29	29-<100
Forest (wet & dry sclerophyll)	<22	22-<29	29-<40	40-<54	54-<100
Grassy & Semi-Arid Woodland	<12	12-<16	16-<23	23-<32	32-<100
Forested Wetland	<9	9-<12	12-<18	18-<26	26-<100
Tall Heath	<13	13-<18	18-<26	26-<36	36-<100
Short Heath	<8	8-<10	10-<15	15-<22	22-<100
Arid Shrubland	<5	5-<7	7-<11		16-<100
Freshwater Wetlands	<4	4-<6	6-<8	8-<12	12-<100
Grassland	<9	9-<12	12-<17	17-<25	25-<50
	Downslope >5 to 10 degrees				
Rainforest	<14	14-<18	18-<26	26-<37	37-<100
Forest (wet & dry sclerophyll)	<28	28-<36	36-<49	49-<65	65-<100
Grassy & Semi-Arid Woodland	<15	15-<20	20-<28	28-<39	39-<100
Forested Wetland	<12	12-<16	16-<23	23-<33	33-<100
Tall Heath	<15	15-<20	20-<29	29-<40	40-<100
Short Heath	<9	9-<12	12-<18	18-<25	25-<100
Arid Shrubland	<6	6-<8	8-<12	12-<18	18-<100
Freshwater Wetlands	<5	5-<6	6-<10	10-<14	14-<100
Grassland	<10	10-<13	13-<20	20-<28	28-<50
	Downslope >10 to 15 degrees				
Rainforest	<17	17-<23	23-<34	34-<46	46-<100
Forest (wet & dry sclerophyll)	<36	36-<45	45-<60	60-<77	77-<100
Grassy & Semi-Arid Woodland	<19	19-<25	25-<36	36-<49	49-<100
Forested Wetland	<15	15-<20	20-<29	29-<41	41-<100
Tall Heath	<17	17-<22	22-<32	32-<44	44-<100
Short Heath	<10	10-<13	13-<20	20-<29	29-<100
Arid Shrubland	<7	7-<9	9-<14	14-<20	20-<100
Freshwater Wetlands	<5	5-<7	7-<11	11-<16	16-<100
Grassland	<11	11-<15	15-<23	23-<32	32-<50
	Downslope >15 to 20 degrees				
Rainforest	<23	23-<30	30-<42	42-<56	56-<100
Forest (wet & dry sclerophyll)	<46	46-<56	56-<73	73-<92	92-<100
Grassy & Semi-Arid Woodland	<24	24-<32	32-<44	44-<59	59-<100
Forested Wetland	<19	19-<26	26-<37	37-<50	50-<100
Tall Heath	<19	19-<25	25-<36	36-<49	49-<100
Short Heath	<11	11-<15	15-<23	23-<32	32-<100
Arid Shrubland	<7	7-<10	10-<16	16-<23	23-<100
Freshwater Wetlands	<6	6-<8	8-<13	13-<18	18-<100
Grassland	<13	13-<17	17-<26	26-<36	36-<50



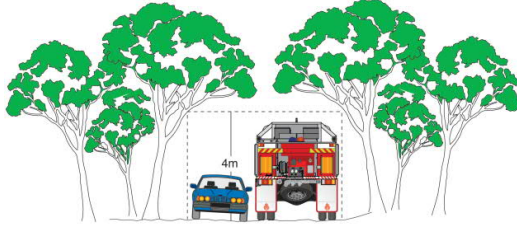


## 4 Compliance Provisions

BPM	Performance Criteria	Acceptable Solution	Comments	Status
Asset Protection Zones	Potential building footprints must not be exposed to radiant heat levels exceeding 29kWm <sup>-2</sup> on each proposed lot	APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.	The proposed APZ meet the minimum requirement determined in Table A1.12.2 (12m)	Complies
	APZs are managed and maintained to prevent the spread of a fire to the building	APZs are managed in accordance with the requirements of Appendix 4 of PBP.	All created residential lots will be managed to APZ standards as detailed in Appendix A of this report.	Complies
	APZ is provided in perpetuity	APZs are wholly within the boundaries of the development site	All APZs are within the residential lots and road reserve.	Complies
	APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised	APZ are located on lands with a slope less than 18 degrees	No APZ is located on slopes greater than 18°.	NA
Access	Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation	Property access roads are two-wheel drive, all-weather roads.	Access to lots will be via individual driveways off Warriewood Road for Lots 8-11 and Lorikeet Grove for Lots 1-7 & 12.  The driveway to Lot 12 will be a min 6m wide concrete surface between Lots 3 & 4.  Lots 1-11 are entirely within 60m of the public road and will not require any specific access design requirements.	Can comply
	The capacity of access roads is adequate for firefighting vehicles	The capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes),	The existing Warriewood Rd surface can support greater than 23t  The extension to Lorikeet Grove will be able to support greater than 23t	NA
		Bridges and causeways are to clearly indicate load rating	NA	NA
	There is appropriate access to water supply There is appropriate access to water supply There is appropriate access to water supply	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.	Existing hydrants are accessible in the public road verge. The existing public access road provides ample space for a fire fighting vehicle to access the hydrant without obstructing access to the bushfire hazard or any evacuating residents.  New hydrants should be located within the road verge and easily accessible to fire fighting vehicles	Complies
		Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005 – Fire hydrant installations system design, installation and commissioning.	Hydrants can be located within 60m of the most distant part of each potential building.  No details of the proposed hydrant network for Lot 12 have been provided. A network should ensure that all external parts of the building are within 60m of a hydrant. Alternatively, onsite water storage tanks may be required.	Can comply
		There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available	Reticulated supply is available.	NA



## Bushfire Assessment Report

<b>Perimeter Roads</b>	Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	Are two-way sealed roads	Lorikeet Grove will be extended through the site. This is a sealed two-way trafficable road.	NA
		Minimum 8m carriageway width kerb to kerb	Lorikeet Grove will be a minimum 8m wide kerb invert to kerb invert.	NA
		Parking is provided outside of the carriageway width	Parking is permitted along Lorikeet Grove within the road carriageway.  Parking restrictions have not been applied to other adjoining developments.  Compliance will require widening of the road to accommodate parking or parking restriction to ensure the full carriageway is available.	Does not comply
		Hydrants are located clear of parking areas	Existing hydrants are within the road verge.  New hydrants should be located clear of driveways, parking areas and the road carriageway.	Complies
		Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m	Lorikeet Grove will become a through road with future subdivisions.	Complies
		Curves of roads have a minimum inner radius of 6m		Complies
		The maximum grade road is 15 degrees and average grade of not more than 10 degrees		Complies
		The road crossfall does not exceed 3 degrees		Complies
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	Tree branches should not overhang the carriageway to less than 4m from the road.  	Complies
		<b>Non-Perimeter Roads</b>	Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating	Minimum 5.5m carriageway width kerb to kerb
Parking is provided outside of the carriageway width				NA
Hydrants are located clear of parking areas				NA
Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m				NA
Curves of roads have a minimum inner radius of 6m				NA
The road crossfall does not exceed 3 degrees				NA
A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.				NA



## Bushfire Assessment Report

Property Access	Firefighting vehicles can access the dwelling and exit the property safely	There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles	All potential building envelopes (excluding Lot 12) are wholly within 60m of a public road. Roads are limited to <70kph	Complies
	In circumstances where this cannot occur, the following requirements apply.			
	Minimum 4m carriageway width			NA
	In forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay			NA
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches			NA
	Provide a suitable turning area in accordance with Appendix 3			NA
	Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress			NA
	The minimum distance between inner and outer curves is 6m			NA
	The crossfall is not more than 10 degrees			NA
	Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads			NA
	A development comprising more than three dwellings has access by dedication of a road and not by right of way			NA
	Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above			



Water	An adequate water supply is provided for firefighting purposes	Reticulated water is to be provided to the development, where available	Reticulated water is provided by mains in the road reserve.  The existing reticulated network will be extended into the site.	Complies										
		A static water supply is provided where no reticulated water is available.	Static water supply requirements <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Development Type</th> <th></th> </tr> </thead> <tbody> <tr> <td>Residential lots (&lt;1000m<sup>2</sup>)</td> <td>5,000L/lot</td> </tr> <tr> <td>Rural-residential lots (1,000 -10,000m<sup>2</sup>)</td> <td>10,000L/lot</td> </tr> <tr> <td>Large Rural/Lifestyle lots (&gt;10,000m<sup>2</sup>)</td> <td>20,000L/lot</td> </tr> <tr> <td>Multi-dwelling Housing (including dual occupancies)</td> <td>5,000L/dwelling</td> </tr> </tbody> </table>	Development Type		Residential lots (<1000m <sup>2</sup> )	5,000L/lot	Rural-residential lots (1,000 -10,000m <sup>2</sup> )	10,000L/lot	Large Rural/Lifestyle lots (>10,000m <sup>2</sup> )	20,000L/lot	Multi-dwelling Housing (including dual occupancies)	5,000L/dwelling	NA
	Development Type													
	Residential lots (<1000m <sup>2</sup> )	5,000L/lot												
	Rural-residential lots (1,000 -10,000m <sup>2</sup> )	10,000L/lot												
	Large Rural/Lifestyle lots (>10,000m <sup>2</sup> )	20,000L/lot												
	Multi-dwelling Housing (including dual occupancies)	5,000L/dwelling												
	Water supplies are located at regular intervals	Fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005	Hydrants are existing along Warriewood Rd and within the adjoining subdivisions.  New hydrants may be proposed by the development  New hydrants should be located to ensure all building envelopes are wholly with 60m of a hydrant											
	The water supply is accessible and reliable for firefighting operations	Hydrants are not located within any road carriageway	Existing hydrants are located with the road verge.	Complies										
	Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads	The water mains will be an extension of the existing ring mains network	Complies											
Flows and pressure are appropriate	Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005	The existing mains is a 100mm mains along Warriewood Road and lorikeet Grove.  A suitable network will be extended into the subdivision	Can comply											
The integrity of the water supply is maintained	All above-ground water service pipes external to the building are metal, including and up to any taps	All exposed water pipes and fittings should be metal or shielded.	Can comply											
A static water supply may be required for firefighting purposes in areas where reticulated water is not available	Where no reticulated water supply is available, water for firefighting purposes is provided in accordance with Table 5.3d	NA	NA											
	A connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure	NA	NA											



## Bushfire Assessment Report

	65mm Storz outlet with a ball valve is fitted to the outlet	NA	NA
	Ball valve and pipes are adequate for water flow and are metal	NA	NA
	Supply pipes from tank to ball valve have the same bore size to ensure flow volume	NA	NA
	Underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank	NA	NA
	A hardened ground surface for truck access is supplied within 4m	NA	NA
	Above-ground tanks are manufactured from concrete or metal	NA	NA
	Raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F of AS 3959)	NA	NA
	Unobstructed access can be provided at all times	NA	NA
	Underground tanks are clearly marked	NA	NA
	Tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters	NA	NA
	All exposed water pipes external to the building are metal, including any fittings	NA	NA
	Where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bush fire attack; any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and fire hose reels are constructed in accordance with AS/NZS 1221:1997, and installed in accordance with the relevant clauses of AS 2441:2005	NA	NA



## Bushfire Assessment Report

<b>Electricity</b>	Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings	Where practicable, electrical transmission lines are underground	Existing power lines with the public road reserve for the new subdivisions are located underground.  All new powerlines servicing the lot will be located underground.	Complies
		Where overhead, electrical transmission lines are proposed as follows: lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 <i>Guideline for Managing Vegetation Near Power Lines</i> .	NA	NA

<b>Gas</b>	Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings	Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used	No details of gas have been provided	Can comply
		All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side		
		Connections to and from gas cylinders are metal		
		Polymer-sheathed flexible gas supply lines are not used		
		Above-ground gas service pipes are metal, including and up to any outlets		

<b>Construction</b>	Any proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact	BAL is determined in accordance with Tables A1.12.5 to A1.12.7; and construction provided in accordance with the NCC and as modified by section 7.5 (please see advice on construction in the flame zone).	Two (2) residential flat buildings are proposed.  The buildings on Lot 12 should be constructed to the requirements for BAL-12.5 of AS3959-2018.	NA
	Proposed fences and gates are designed to minimise the spread of bush fire	Fencing and gates are constructed in accordance with section 7.6.	No details about fencing has been submitted for review in this report.  Any fencing should be of either hardwood timber or non-combustible material.  Any fencing within 6m of the building should be non-combustible	Can comply
	Class 10a buildings are designed to minimise the spread of bush fire	Class 10a buildings are constructed in accordance with section 8.3.2.	No buildings are proposed in this DA  Class 10a structures are private garages, carports, sheds or the like.  There are no specific construction requirements if located more than 6m from the residential building.  Where the structure is within 6m then compliance with AS3959 BAL is required.	NA



<b>Additional NSW measures Ember Protection</b>	Certain provisions of AS 3959 are varied in NSW Sarking	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	Sarking should be non-combustible or comply with AS/NZS 4200.1 2017 <i>Pliable building membranes and underlays, Part 1: Materials</i> .	Note
	Subfloor	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	Only applies to compliance with AS3959-2009 and not AS3959-2018	Note
		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	Only applies to compliance with AS3959-2009 and not AS3959-2018	Note
	Fascia's and Bargeboards	Fascia's and bargeboards, in BAL-40, shall comply with: clause 8.4.1(b) of AS 3959; or clause 8.6.6 of AS 3959.	NA	NA

<b>Existing buildings</b>	<ul style="list-style-type: none"> <li>No existing dwellings will be retained by the proposed development</li> </ul>
---------------------------	--

<b>Landscaping</b>	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>Landscaping is in accordance with Appendix 4</p> <p>Fencing is constructed in accordance with section 7.6</p>	<p>Landscaping should be consistent with APZ management recommendations in Appendix A of this report.</p> <p>Any new landscaping within the development should adopt (where practical) the following principles</p> <ul style="list-style-type: none"> <li>Moisture content of leaves should be high (250-400% of dry oven weight)</li> <li>Volatile oil content of leaves should be low</li> <li>Mineral content of leaves should be high</li> <li>Leaves should be thick (broad) with low area to volume ratio</li> <li>Density of foliage should be high and less permeable to air flow</li> <li>Continuity of plant form should be broken or separated</li> <li>Height of lowest foliage above ground should be maximised</li> <li>Size of plant should be wide spread rather than tall and narrow</li> <li>Dead foliage on the plant should be minimal</li> <li>Bark texture should be tight and smooth</li> <li>Quantity of ground fuels should be minimised</li> <li>Fineness of ground fuels should be minimised</li> <li>Compaction ability of ground fuels should be maximised</li> <li>Mineral content of ground fuel should be maximised</li> <li>Shrubs should not be located within 1m of windows</li> </ul>	
--------------------	--	--	--	--



<b>Deviations</b>	The assessment does not deviate from the standards, specific objectives and performance criteria of <i>Planning for Bush Fire Protection 2019</i>
-------------------	---

## 5 Bushfire Protection Measures - recommendations

<b>Performance Criteria</b>	<b>Recommendation</b>	<b>Compliance</b>
<b>APZ</b>	1. All proposed residential lots and road reserves shall be managed to inner protection area standards as described in the RFS documents <i>Planning for Bush Fire Protection 2019</i> and <i>Standards for Asset Protection Zones</i> .	Yes
<b>Construction</b>	2. Proposed residential flat buildings on Lot 12 shall be constructed to the requirements of BAL-12.5 of AS3959-2018 <i>Construction of buildings in bushfire-prone areas</i>	Yes
<b>Access</b>	3. Public Access Roads shall comply with Section 5 and Appendix 3 of <i>Planning for Bush Fire Protection 2019</i> with the exception of no parking limitations within the 8m carriageway.	Yes
<b>Services</b>	4. All services shall comply with Section 5 and A3.7 of <i>Planning for Bush Fire Protection 2019</i>	Yes
<b>Landscaping</b>	5. A landscaping plan should be prepared consistent with APZ management outcomes.	Yes
<b>Emergency</b>	6. The developer is encouraged to make new purchasers aware of the NSW RFS Bush Fire Survival Plan	NA





## Appendix A – Asset Protection Zone Standards

Planning for Bush Fire Protection 2019

Asset Protection Zone	Inner Protection Area	Outer Protection Area
A bushfire fuel reduced area surrounding a building or structure. A broken path for bushfires limits the spread of fires towards the asset.	Closest to buildings, incorporating the defensible space and for managing heat intensities at the building surface	Located between the IPA and the unmanaged bushfire hazard vegetation. Reduces the potential length of flames by slowing the rate of spread, filtering embers and suppressing crown fire. Only effective in forests.
A defensible space is a subset of an APZ	Trees: Canopy cover should be less than 15% projected foliage cover. Canopies should be separated by 2 to 5m. Should not touch or overhang buildings. Trees (trunks) should not be within 5m of a building. Lower limbs within 2m of the ground should be pruned. Preference should be given to smooth-barked and evergreen species.	Trees: Canopy cover should be less than 30% projected foliage cover. Canopies should be separated by 2 to 5m.
Where an APZ easement is established to the benefit of Community Title it shall be maintained in accordance with a Plan of Management	Shrubs: Should not form a continuous canopy or fire path. Should not form more than 10% of ground cover. Should be clustered into distinct and isolated 'islands' away from trees. Clusters should be located a distance (twice the height of the shrubs) away from exposed windows and doors.	Shrubs: Should not form a continuous canopy. Should not form more than 20% of ground cover. Should be clustered into distinct and isolated 'islands' away from trees.
APZs are managed and maintained to prevent the spread of fire towards the building. In accordance with the requirements of Standards for Asset Protection Zones (RFS,2005)	Grass: Should be mown/maintained to less than 100mm. Leaves and debris should be regularly removed. Should be maintained in perpetuity and in particular leading up to a fire season	Grass: Should be mown/maintained to less than 100mm. Leaves and debris should be regularly removed. Should be maintained in perpetuity and in particular leading up to a fire season
Location of APZs on slopes >18 is not recommended for new development on wooded vegetation due to environmental constraints and difficulties in management. In addition, vegetation could carry a canopy fire without the support of understorey fuel		
Retention of taller trees will assist in filtering out embers		

### Standards for Asset Protection Zones

Asset Protection Zone	Inner Protection Area	Outer Protection Area
APZ is a fuel reduced area surrounding a built asset or structure		
APZ should be wholly located with your land		
Fallen ground fuels <6mm dia and bark should be removed on a regular basis		
Grasses need to be kept short and where possible green		
Separate tree crowns by 2-5m		
Canopy should not overhang within 2-5m of a dwelling		
Native trees and shrubs should be retained as clumps or islands and should maintain a covering of <20% of the area.		
Ensure there is no contiguous fuel path to the dwelling		
Fire trails, gravel paths, rows of trees, dams, creeks, swimming pools, tennis courts, and vegetable gardens are permitted in an APZ		