Joy Hafey Environmental Consultant

417 Thirlmere Way Thirlmere 2572
Tel 02 46819106
Fax 02 46819094
Mobile 0427841112
Email: joy@joyhafey.com.au

Trading as
Wirrimbirra
Environmental
Consultants
ABN 105 535 484

Bushfire Hazard Assessment Doltone House Deepwater Park No 30 Webster Street Milperra

Doltone House

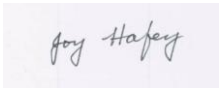
March 2014

CERTIFICATION

Fire Hazard Assessment: ***Doltone House, Deepwater Park, No 30 Webster Street, Milperra***

Prepared by :-
Name : Joy Hafey
Qualifications : B. Sc. Ecology

I hereby certify that I have prepared the contents of this assessment
And to the best of my knowledge, it is true in all material particulars
And does not, by its presentation or omission of information, materially mislead



Signature…
Name…Joy Hafey……
Date 12th March 2014……..

Summary

This Bushfire Hazard Assessment has been undertaken in support of a development application. It has been prepared in accordance with the Rural Fires Act and takes into consideration, the provisions for Planning for Bushfire Protection 2006. The following provides a summary of those requirements:

Subject Land	No 30 Webster Street Milperra
Local Govt. Area	Bankstown LGA
Proposal	Addition & alterations to existing building, restaurant, roadway construction, car park extension & landscaping,
Adjoining Development	Georges River to the west, Deepwater Park to the east, north and south
Zoning	6(b) Private Recreational
Bushfire Prone Land	Within 100m buffer zone of Category 1 vegetation to the north, south & east
Vegetation Classification	Category 1to north, south and east. Endangered ecological community of the River-flat Eucalypt Forest.
Effective Slope	flat land and 0-5°upslope
Asset Protection Zones	Relies on existing managed areas with some clearing to facilitate construction and the removal of trees for safety issues
Road Access	Sealed public road.
Water Supply	Reticulated water service plus additional reserves.
Electricity & Gas	Above ground electricity & telephone service.
Level of Construction	BAL12.5-AS3959 construction upgrade
Special Considerations	No threatened species identified on the site. No aboriginal or archaeological artifacts known. River Flat Eucalypt Forest on the perimeter of site.
Specific Recommendations	Removal and pruning of vegetation currently impinging upon the clubhouse and restaurant. Upgrade to BAL12.5AS3959 building construction Emergency Evacuation Plan for the Deepwater Motor Boat Club to be consistent with NSW RFS guidelines for emergency and evacuation planning

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A. Introduction

This Bushfire Hazard Assessment has been undertaken in support of a development application (Figure 1). The site is located within a designated Bushfire Prone Area (Bankstown City Council 2013).
The assessment has been prepared in accordance with the Rural Fires Act and takes into consideration, the provisions for the NSW Rural Fire Service (RFS) Planning for Bushfire Protection 2006 (PBP 2006) and the more recent addendum to Appendix 3 (NSW RFS 2010). Chapter 1 of Planning for Bushfire Protection 2006 states that the aim of this document is to use the NSW development system to provide for the protection of human life, including firefighters, and to minimize impacts on property from the threat of bushfire, while having due regard to the development potential, on- site amenity and protection of the environment.

The aim of this assessment is to address the following

- Review the Bushfire Prone Land Map of Bankstown City Council.
- To assess the bushfire threat to the property.
- To review the capabilities of the site to provide safe development
- To recommend mitigating measures to reduce the threat of bushfire attack.

1. The Proposal

A Development Application (DA) for the Deepwater Motor Boat Club No 30 Webster Street Milperra is to be lodged with Bankstown City Council by the proponents, Doltone House Group. In this report the property is referred to as the subject site. The proposed development entails additions and alterations to the existing club building, a restaurant on the footprint of the swimming pool complex, roadway construction, car park extensions, an emergency evacuation route and landscaping. The proposed development is outlines in Figure 1. For the purposes of RFS classification the club building falls within the category of Class 9 b) and the restaurant is a Class 6 a) building.

The Building Code of Australia (BCA) contains both performance requirements and “deemed to satisfy provisions” relating to the construction of buildings in bushfire prone areas. These provisions apply to Class 1, 2, 3, 4 and Special Fire Protection Purpose (SFPP) buildings that are proposed for

construction in bushfire prone areas.

With regard to the restaurant, a building class 5-8 and 10 of the BCA "does not provide for any bushfire specific performance requirements and as such Australian Standards 3959 (Construction Standards in Bushfire Prone Areas) does not apply as a set of deemed to satisfy provisions. The general fire safety construction provisions are taken as acceptable solutions, but the aim and objectives of PBP 2006 apply in relation to other matters such as access, water and services, emergency planning and landscaping / vegetation management."

For BCA classes 5-8, some class 9 and class10b, bushfire specific construction standards are not addressed. With regard to" Doltone House" the building comes under a Class 9b category and is considered an assembly area. As a club it is likely to attract significant numbers and may therefore fall within the SFPP building definition.

2. Description of the Subject Site (Study Site)

Historically a clubhouse has existed on the site since the early 1950's. The existing, brick club house (Doltone House), as shown on the front cover, is located adjacent to the Georges River foreshore.
The subject site is predominantly cleared with additional development surrounding the clubhouse. A small brick change room and swimming pool is located to the north, an extensive car park is located to the east and northeast, and a boating ramp to the south (see Figure 1). The overview in Figure 2 identifies the location of the site and the vegetation likely to present a bushfire hazard. The study site is identified as within bushfire prone land (Figure 3, Bankstown City Council Bushfire Prone Land Maps 2009).
The subject site comprises two parts, an area of 2.26ha in A in DP 405225 and 2.8546 ha in D in DP391154

2.1 Location –

The study site is located approximately 18km south west of Sydney CBD in the Bankstown LGA. It adjoins the foreshore bushland of the Georges River (Figure 2) and lies approximately 1km south of the M5 expressway. The location of the subject site is shown in Figure 2 and insert.

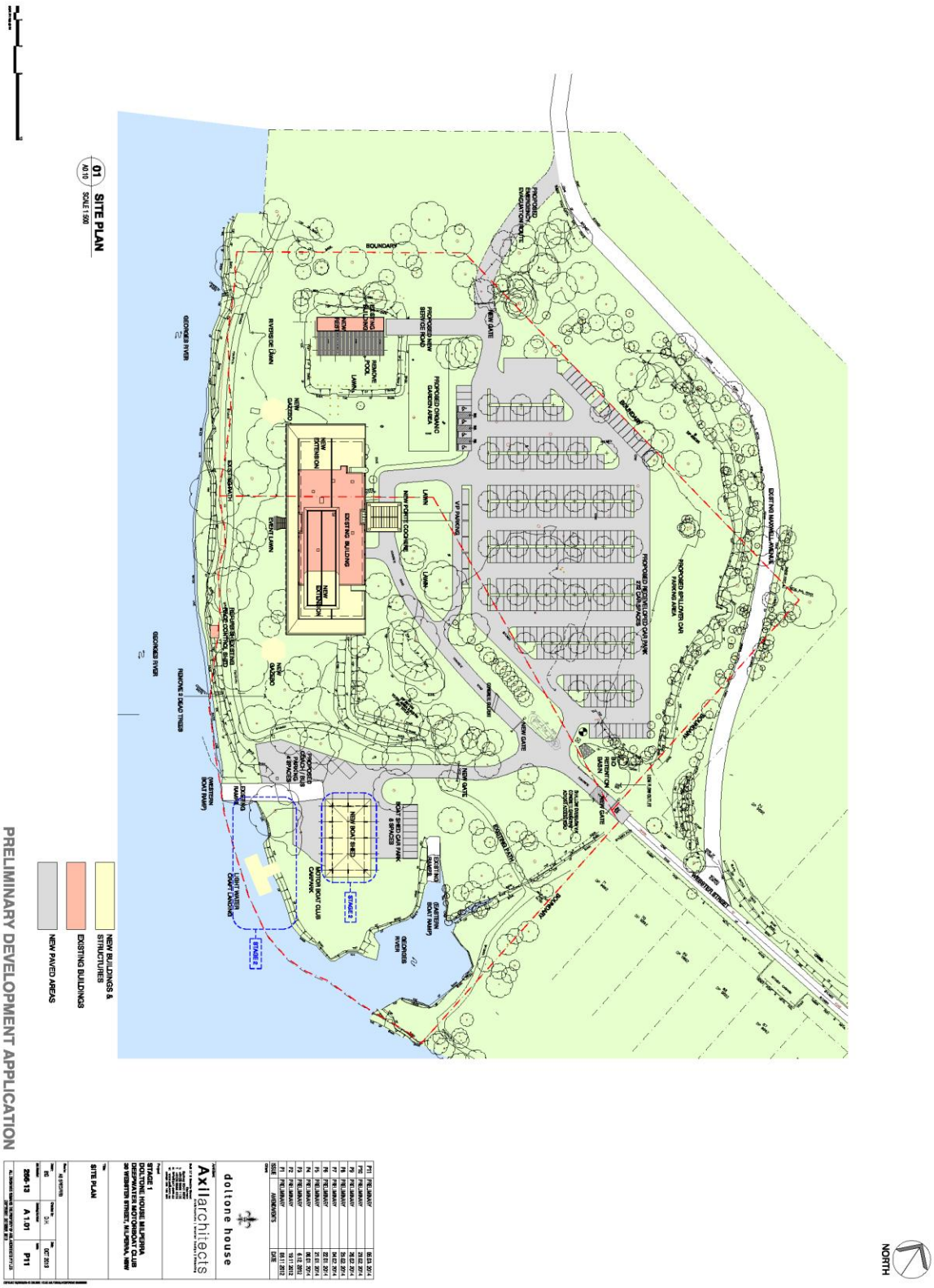
2.2 Landform-
The relatively flat site forms a part of the floodplain of the Georges River foreshore. Altitude is approximately 7m.

2.3 Soils –
Soils are alluvial sandy loams derived from Hawkesbury sandstone and Wianamatta Shales. The area forms a part of the alluvial floodplain of the Georges River.

2.4 Climate –
The climate of the area is temperate with January mean maximum 28° C and July mean minimum 5 °C . (Bureau of Meteorology 2009). The annual rainfall for the area is approximately 880 mm per annum. Strongest winds are predominantly from the west.

2.5.Biodiversity –
The study site, in the vicinity of the existing building is predominantly cleared, with a small number of scattered trees, as indicated on the front cover. Trees include *Eucalyptus maculata* (Spotted Gum), *Eucalyptus citreodora* (Lemon Scented Gum), *Eucalyptus punctata* (Grey Gum), *Allocasuarina littoralis* (Forest She Oak), *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Angophora florabunda*. A part of the endangered ecological community of the River -flat Eucalypt Forest on the Coastal Floodplains (RFEF) occurs along the foreshore and parts of the floodplain.

▼Figure 1 The Proposed Development on the Subject Site:



▼Figure 2 Aerial Overview of the Study Site & Surrounds:
The subject site (outlined in black) is located on the floodplain of the Georges River.

▼Figure 2 Insert, Detail of the Subject Site

(reference Sinclair Knight & Metz 2009)

▼**Figure 3**: **Bushfire Prone Land on the Study Site:** The proposed development site (outlined black) falls partly within the 100m vegetation buffer zone (indicated red area) of a category 1 vegetation fire hazard (indicated orange)

Doltone House site

(Reference Bankstown City Council 2009)

B. Bushfire Threat Assessment

The Aim of the Bushfire Hazard Assessment is to provide an adequate assessment of the bushfire risk posed by the new development so that it is not sited in high hazard areas. The bushfire hazard assessment is based on a number of parameters eg condition of slope, aspect, distance from the hazard, fuel type and fuel level.

Categories of Bushfire Attack Levels (BAL) have been defined and they are as set out in table 1. Building Construction Australian Standard 3959 apply to the new categories as indicated in Table 1.

Table 1 Bushfire Attack Levels (BAL) Reference NSW RFS2010

Bushfire Attack Level	**Description of predicted bushfire attack and level of exposure**	**Building construction AS3959**
BAL Low	Minimum attack from radiant heat and flame due to distance from the fire hazard vegetation. Some attack from burning debris possible.	Insufficient threat to warrant special construction standards
BAL 12.5	Burning debris attack significant with low levels of radiant heat, not greater than 12.5 KW/m². Radiant heat is unlikely to threaten unscreened glass.	Specific construction required for ember protection and accumulation of burning debris. Level 1 AS3959 required
BAL 19	Attack by burning debris is significant with increased radiant heat levels (not greater than 19 KW/m²) threaten building elements	Specific construction requirements for protection against ember and radiant heat necessary. Level 2 AS 3959 warranted.
BAL 29	Attack by burning debris is significant with increased radiant heat levels (not greater than 29 KW/m²) threaten building integrity	Specific construction requirements for protection against embers and higher radiant heat are warranted. Some flame contact is possible.
BAL 40	Increased attack by burning debris with significant radiant heat levels	Buildings must be designed and

	and potential for flame contact. The extreme radiant heat and potential flame contact could threaten building integrity.	constructed in a manner that can withstand the extreme heat and potential flame contact.
BAL FZ	Radiant heat levels with exceed 40 KW/m². Radiant heat levels and flame contact are likely to significantly threaten building integrity and result in significant risk to residents who are likely to be inadequately protected.	Flame zone is outside the scope of the Building Code of Australia and the NSW RFS may recommend protection measures

The bushfire hazard assessment is based on:

- A field survey on the 10th February 2014 , to ascertain vegetative conditions and other abiotic features which influence fire events and behaviour eg., slope and aspect.
- Interpretation of aerial photographs and bushfire prone maps of the area.
- Review of the NSW Rural Fire Service and Planning NSW literature, Planning for Bushfire Prevention. (RFS 2006) and Addendum to Chapter 3 (PBP 2006) 2010.

Vegetation Assessment

Number 30 Webster St falls partly within Bushfire Prone Land (Bankstown City Council Bushfire Map 2008 see Figure 3).
Figure 2 (Insert Aerial View) above, indicates the vegetation cover over the subject site. The vegetation category was assessed over a distance of 140m. from the proposed development site and the following conditions were noted.

- To the north, east and south, within a 140m distance of Doltone House is River -flat Eucalypt Forest on the Coastal Floodplains (RFEF). To the north the understorey of this vegetative community has been cleared along the cycle way and foreshore. It is considered to be woodland vegetation. To the northeast and east this RFEF is considered to be category 1 vegetation (Figure 3). Closer to the building, the vegetation is reduced and managed. A bitumen and gravel carpark, to the north east and east, provides a substantial APZ to fire attack from this direction.

- To the west the Georges River provides a water barrier of approximately 120m, with Mangrove Swamp further to the west.
- To the south (outside the fire prone land zoning), is managed land with a boat ramp and carpark.

Fire Danger Index of 100 is required to be used as the site falls within the Greater Sydney Region.

Slope Assessment and Aspect
The site has a west facing aspect. The effective slope between the fire hazard (RFEF) and proposed development measured over a distance of 100m. is 0-5°upslope and flat land for both the proposed restaurant and Doltone House.

Category of fire attack
Doltone House:The proximity, between 48-100m of the proposed development, to the category 1 vegetation to the north and north east, results in the Doltone House being exposed to a **BAL12.5 category of bushfire attack on the north and east facades**. A BAL 12.5 indicates that burning debris attack is significant with low levels of radiant heat, but not greater than 12.5 KW/m². Radiant heat is unlikely to threaten unscreened glass.
Restaurant: Clearing of weeds,exotic and senescent trees to the north of the restaurant area, will result in a BAL 19 category of bushfire attack on the north and BAL 12.5 on the eastern façade of this building.

C Bushfire Assessment Protection
Asset Protection Zone (APZ)
If a bushfire hazard exists on or adjacent to the proposed development site, an Asset Protection Zone (APZ) must be established on the hazard side of the proposed development. The APZ will then act as a buffer zone between the proposed development and the hazard. The APZ consists of an Inner

Protection Zone (IPZ) and an Outer Protection Zone (OPZ).

- The OPZ is located adjacent to the fire hazard and it is an area where fuel loads must be reduced. The outer protection zone may contain a few trees as long as they are free standing and do not form a continuous canopy.
- The IPZ is located next to the property to be protected and is an area that should be kept free of vegetation and other combustible vegetation that is likely to catch alight from flames, heat or a spark. The inner protection zone may contain a few shrubs and trees as long

as they do not form a continuous canopy, overhang the building or are located far enough away from the building so as not to ignite the building by way of direct flame contact or radiant heat emission.

The Asset Protection zone is calculated using the following equation, APZ = IPZ + OPZ

On the study site there is sufficient area to achieve an APZ within the boundary of the property. Given the existing nature of the site the APZ should be managed as a OPZ.

The level of radiant heat on the north and north east elevations of the main building is not likely to exceed 12.5kWm², a level which is met by the construction materials of the building. The building is constructed of masonary external walls which will withstand the potential levels of radiant heat generated by the RFEF vegetation in the public reserve.

Table 2 Minimum APZ Requirements for Doltone House Development with AS 3959 Level 1construction, 30 Webster Street, Milperra

Direction	**Vegetation & Group**	**Slope**	**APZ**	**BAL**
North	RFEF Category 1	0-5° upslope	48m	12.5
East	RFEF Category 1	0-5° upslope	48m	12.5
South	Managed land	Flat	Nil	Low
West	Managed land & river	Flat	Nil	Low

Future landscaping within the APZ and other areas adjacent to the clubhouse, should aim to achieve

- A vegetative cover that has a low fuel load and is relatively inflammable.
- Maximum tree cover must not be allowed to cover more than 30%.
- Max shrub cover must not be allowed to cover more than 20%
- Avoid planting trees or shrubs that will touch the walls, overhang the

building or be planted closer to the building than their full height. Any trees that do touch or overhang must be pruned.
- Incorporation of non flammable structures eg., paths, within the area adjacent to the building.
- The regular removal of leaves and litter.
- The maintenance of grassed areas at less than 10cm.
- Avoidance of woodchips or other flammable material within this zone.

Note: Any existing trees overhanging the buildings must be pruned to provide a physical separation between the building and an ignition source.

Specific building constructions

Specific building constructions, under the Building Code of Australia (BCA) and Australian Standards (AS) 3959 are required if a building is subjected to a certain level of radiant heat flux.
The restaurant is a BCA Class 6 building and as such, specific BCA building construction does not apply . However the restaurant construction of non flammable external walls (masonry) with an iron roof are designed to withstand a BAL19 and BAL 12.5 level of radiant heat. Additional measures to maximize building protection are as follows.

- Windows and doors of the building are to be fitted with metal screens with a maximum aperture of 2mm square to prevent the entry of embers through the openings.
- Similarly any grills or vents on the buildings shall be screened with steel mesh with maximum aperture of 2mm square to prevent the entry of embers.
- Roof gutters are to be fitted with protection devices which prevent the accumulation of combustible litter in the gutters. Such devices must have a flammability rating <5 as defined in accordance with testing procedures AS 1503.2
- External doors to the service shed are to be fitted with threshold stile and head seals to prevent the entry of embers.

Doltone House:
The proximity (between 48-100m) of the proposed development to the category 1 vegetation, results in the Doltone House building being exposed to **a BAL12.5 category of bushfire attack and AS 3959 BAL12.5 (Level**

1) construction standards are appropriate.
Note: BAL construction is mandatory on all elevations if any one side is deemed to have specific AS3959 construction standards.

D Water Supply
The proposed development must have access to an adequate supply of water with which to protect property and lives.
The club and restaurant buildings have a range of water sources to utilize in time of a fire attack.
The subject site has a reticulated town water supply with fire hydrant provision at the south east corner of the clubhouse. The buildings are to comply with AS 2419.1 which governs fire hydrant spacing, size and pressure.
The Georges River provides a significant water source which is readily accessed.

E. Electricity and Gas
Electricity service on the site is above ground. Reticulated gas is not available to the site however bottled gas is available. AS 1596"Storage and Handling of LP Gas" specifies the requirements for, location, design, construction and commissioning and operation for storage and handling of natural LPG.

F. Public and Property Access Roads
The subject site is accessed by Webster Street, a bitumen two way carriageway. There is also an emergency egress route to the north east. The Georges River is a trafficable waterway which could provide egress.

G. Special Considerations. There are no known aboriginal relics or sites, no threatened species or endangered ecological communities within the proposed development site. The endangered ecological community of the River Flat Eucalypt Forest surrounds the development site but will not be impinged upon.

H. Photographs

Photographs below provide views of the vegetation and features on the site.

▼**Plate 1 View to the West:** The substantial water barrier of the Georges River adjoins the western boundary of the subject site.

▼**Plate 2 View to the Northeast & East:** The car park adjoins the clubhouse to the east and north east. RFEF occurs beyond the car park.

▼**Plate 3 View to the South:** Managed land adjoins the clubhouse to the south.

▼**Plate 4 View to the North:** the clubhouse (Doltone House) is surrounded by open managed land.

▼Plate 5 View of the Area to the West and North of the Clubhouse:
Open managed land lies adjacent to the north and west of the clubhouse

◄Plate 6 View to the South: Open managed land with scattered trees lies to the south of the clubhouse. Within this area are several senescent trees which for safety reasons will be removed.

As part of the development process further trees will be removed eg on the footprint of the evacuation route to Maxwell Street.

I. Deemed to Satisfy Provisions Compliance Check (PBP 2006)

31 Webster Street Millperra

Intent of Measures	Performance Criteria- Intent may be achieved where:	Acceptable Solutions	Compliance Issues
Asset Protection Zones			
to provide sufficient space and maintain reduced fuel loads, so as to ensure radiant heat levels at buildings are below critical limits and to prevent direct flame contact with a building	*Radiant heat levels at any point on a proposed building will not exceed 29KW/m²	*an APZ is provided in accordance with the relevant tables / figures in Appendix 2 of this document *the APZ is wholly within the boundaries of the development site. Exceptional circumstances may apply (see section 3.3)	APZ on the hazard side of Group 1 vegetation is able to be met within the boundary of the property.
	*APZ are managed and maintained to prevent the spread of a fire towards the building	*in accordance with the requirements of Standards for Asset Protection Zones (RFS 2005) Note:A Monitoring and Fuel Management Program may be required as a condition of development consent.	Existing development and managed land is located between the fire hazard and proposed development
	*APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is negated	*the APZ is located on lands with a slope less than 18°	Development and the APZ occurs on flat land

Intent of Measures	Performance Criteria- Intent may be achieved where:	Acceptable Solutions	Compliance Issues
Public Roads			
To provide safe operational structures and water	*Firefighters are provided with safe all weather access	*Public roads are two-wheel drive, all weather roads.	Public road access is bitumen sealed in the vicinity of

supply for emergency service, while residents are seeking to evacuate from an area.	to structures (thus allowing more efficient use of firefighting resources.		the site,
	*Public road widths and design that allow safe access for firefighters while residents are evacuating the area.	*Urban perimeter roads are two-way, ie at least two traffic lane widths (carriageway 8m minimum kerb to kerb). Allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1- Road widths for Category 1 Tanker (Medium Rigid Vehicle). *The perimeter road is linked to the internal road system at an interval of no greater than 500m in urban areas. *Traffic management devices are constructed to facilitate access by emergency service vehicles. *Public roads have a cross fall not exceeding 3° *All roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200m in length, incorporate a minimum 12 m outer radius turning circle, and are clearly sign posted as dead end and direct traffic away from the hazard. *Curves of roads (other than perimeter roads) are a minimum inner radius of six m and minimum in number, to allow for rapid access and egress. * The maximum grades for sealed roads do not exceed 15° and an average grade of not more than 10° or other gradient specified by road design standards, whichever is the	Road construction meets performance criteria.

		lesser gradient. *There is a minimum vertical clearance to a height of 4m above the road at all times.	
	*The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.	*The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15tonnes for areas with reticulated water, 28tonnes or 9tonnes per axle for all other areas). Bridges clearly indicate loading.	There are no bridges within the road reserves or property.
	*Roads that are clearly signposted (with easily distinguishable names) and buildings/properties that are clearly numbered.	* Public roads greater than 6.5m wide to locate fire hydrants outside the parking reserves to ensure accessibility to reticulated water for fire suppression. *Public roads between 6.5m and 8m wide are No Parking on one side with the services (hydrant) located on this side to ensure accessibility to reticulated water for fire suppression.	Roads are clearly signposted
	*There is clear access to reticulated water supply.	*Public roads up to 6.5m wide provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression. *One way only public access roads are no less than 3.5m wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.	The site is serviced by reticulated water. Access to firefighting water is clear. A fire hydrant is located at the south east corner of the clubhouse
	*Parking does not obstruct the minimum paved width	*Parking bays are a minimum of 2.6m wide from kerb edge to road pavement. No services or hydrants are located within the parking bays.	No parking bays are provided or required in this development proposal.

Intent of Measures	**Performance Criteria- Intent may be achieved where:**	**Acceptable Solutions**	**Compliance Issues**

Property Access			
To provide safe access to/from the public road system for firefighters providing property protection during a bushfire and for occupants facing evacuation.	* Access to properties is provided in recognition of the risk to firefighters and/or evacuating occupants	* At least one alternative property access road is provided for individual dwellings (or groups of dwellings) that are located more than 200m from a public through road.	The existing buildings is located within 200m of a public through road. There is no requirement for secondary egress although a fire trail links the site to Maxell Ave to the north east. Construction of an emergency evacuation route is part of the DA.
	*The capacity for road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles. *All weather access is provided	* Bridges clearly indicate load rating and pavements and bridges are capable of carrying a load of 15 tonnes. *Roads do not traverse a wetland or other land potentially subject to periodic inundation (other than a flood or storm surge).	There are no bridges and the road access is all weather (Bitumen). It does not traverse a wetland or other unsuitable land.
	*Road widths and design enable safe access for vehicles.	* A minimum carriageway width of 4 m for rural residential areas, rural landholdings or urban areas with a distance of greater than 70m from the nearest hydrant point to the most external part of a proposed building or footprint. * In forest, woodland and heath situation, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m of the passing bay. *A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches. * Internal roads for rural properties provide a loop road around any dwelling or	Access road to meet performance standards. Passing bays are not required as internal access is less than 200m.

		incorporate a turning circle with a minimum 12m outer radius. * Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress. * The minimum distance between inner and outer curves is 6m. * The crossfall is not more than 10° * The minimum grades for sealed roads do not exceed 15° and no more than 10° in unsealed roads. *Access to a development compromising more than 3 dwellings have formalised access by dedication of a road and not by a right of way.	

Intent of Measures	**Performance Criteria- Intent may be achieved where:**	**Acceptable Solutions**	**Compliance Issues**
Services- Water, electricity, gas			
To provide adequate services of water for the protection of buildings during and after the passage of fire and to locate gas and electricity so as not to contribute to the risk of fire to a building	*Reticulated water supplies-* Water supplies are easily accessible and located at regular intevals	Reticulated water supply to urban subdivisions uses a main system for areas with perimeter roads. *Fire hydrant spacing, sizing and pressures comply with AS 2419.1-2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles. *Hydrants are not located within any road carriageway. *All above ground water and gas service pipes external to the building are metal, including and	Water, gas and electricity services will be upgraded to meet current standards. The site supports a reticulated water supply. Provision has been made for fire hydrant installation to comply with AS 2419.1-2005

		up to any taps. *The provision of parking on public roads is met.	
	Non-reticulated water supply areas- *rural residential and rural developments (or settlements) in bushfire areas, a water supply reserve dedicated to firefighting purposes is installed and maintained. The supply of water can be on amalgam of minimum quantities for each lot in the subdivision (community titled subdivision), or held individually for each lot.	*The minimum dedicated water supply required for firefighting purposes for each occupied building excluding drenching systems, is provided in accordance with Table 4.2. * A suitable connection for firefighting purposes is made available and is located within the IPA and away from the structure.A 65mm Storz outlet with a Gate or Ball valve is provided. *Gate or Ball valve and pipes are adequate for water flow and are metal rather than plastic * Underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank. A hardened ground surface for truck access is supplied within 4m of the access hole. * Above ground tanks are manufactured of concrete or metal and raised tanks have their stands protected. Plastic tanks are not used. Tanks on the hazard side of a building are protected with adequate shielding for the protection of firefighters. * All above ground water pipes external to the building are metal including and up to taps. Pumps are shielded.	The site is able to access a reticulated water supply. Fire hydrant installation to AS 2419.1-2005 The Georges River adjacent to the west of the building would provide an unlimited supply of water.
	Electricity Services Location of the electricity service limits the ignition of surrounding bushland or the fabric of the buildings *Regular inspection	* Where practicable, electricity transmission lines are underground. *Where overhead electrical transmission lines are proposed -lines are installed with short pole spacing (30m) unless crossing gullies, gorges or riparian areas. -no part of a tree is closer to a power line than the distance set	Transmission lines to service the building is provided above ground.

	of lines is undertaken to ensure they are not fouled by branches.	out in accordance with the specifications in "Vegetation Safety Clearance" issued by Energy Australia (NS179, April 2002)	
	Gas Services * Location 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 1596 and the requirements of relative authorities. Metal piping is to be used. * All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side of the installation. * I f gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2m away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal. * Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.	Determination of the use of bottled gas in buildings is not known. However sufficient separation space from the gas bottles to the bushfire hazard can be provided.

Conclusion:

It is considered that any protection measured employed will only be effective if the property is managed in an appropriate way eg., regular maintenance and inspection prior to commencement of the fire season. Overhanging vegetation currently impinging on the clubhouse needs to be removed.

Emergency Evacuation Plan for the Doltone House at Deepwater Park must be consistent with NSW RFS guidelines for emergency and evacuation planning.

The development site adjoins a public reserve that contains River-flat Eucalypt Forest an endangered ecological community. The proposed development will not adversely impact on this community. However this vegetation is designated Bushfire Prone Vegetation Category 1.

It is considered that the determination of category of bush fire attack on the northern and north eastern facades of the Doltone House building is BAL12.5. On the proposed restaurant BAL 19 operates on the northern façade and BAL 12.5 on the eastern façade.
Note: "A building with any façade identified as requiring a construction level must build all facades to at least BAL 12.5 (2010 Addendum to Appendix 3 Rural Fire Service Planning for Bushfire Protection 2006)
It is recommended that building construction be upgraded to AS 3959 BAL 12.5 (Level 1) on both buildings.

It is considered that as both buildings are constructed from materials that will likely withstand fire attack from the vegetation to the north and east, minimal fire protection upgrades will be necessary.
Additional measures to maximize building protection are as follows.

- Windows and doors of the building are to be fitted with metal screens with a maximum aperture of 2mm square to prevent the entry of embers through the openings.
- Similarly any grills or vents on the buildings shall be screened with steel mesh with maximum aperture of 2mm square to prevent the entry of embers.
- Roof gutters are to be fitted with protection devices which prevent the accumulation of combustible litter in the gutters. Such devices must have a flammability rating <5 as defined in accordance with testing procedures AS 1503.2
- External doors to the service shed are to be fitted with threshold stile and head seals to prevent the entry of embers.
- It is recommended that landscape management, as set out above and in PBP 2006 be followed.

While the above measures will not guarantee that a building will not burn, they will increase the probability that it will survive a fire attack and that the safety to residents and fire fighters will experience a lower level of risk.

The proposed development accords with legislative guidelines as outlined in PBP2006 and the addendum to Appendix 3.

Appendix 1 References

Australian Standards 3959. 1999 Construction of Buildings in Bushfire Prone Areas, Standards Australia, Sydney.

Australian Standards 2419.1-1994 Provision of Fire Hydrants, Standards Australia, Sydney.

Gill.A.M.et al 1981, Fire and the Australian Biota, Academy of Science, Canberra

NSW Rural Fire Service 2006, Planning for Bushfire Protection: a Guide for Councils, Planners, Fire Authorities, Developers and Home Owners, NSW Rural Fire Services, Sydney

Bankstown City Council Bushfire Maps