BUSHFIRE ASSESSMENT REPORT

PROPOSED REZONING &
RESIDENTIAL SUBDIVISION
"PARKSIDE"
KINGS AVENUE
TERRIGAL

NOVEMBER 2010
(REF:10134)

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PREFACE

A Bushfire Protection Assessment Report has been prepared by *Conacher Environmental Group* at the request of Crighton Properties Pty Ltd to assist in consideration of the rezoning of land and subsequently for the proposed residential subdivision of 'Parkside' in Kings Avenue, Terrigal.

This report provides an assessment of the bushfire protection measures required for the draft proposed development and proposed environmental protection measure to guard against the potential impact of bushfires. Recommendations have been made in respect of fuel management, construction standards / building protection, access, bushfire education and land ownership responsibility.

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SECTION 1

BACKGROUND

1.1 INTRODUCTION

Conacher Environmental Group has been engaged by *Crighton Properties Pty Ltd* to provide analysis in respect of the proposed rezone of land from rural to urban uses in Kings Avenue at Terrigal and to provide a Bushfire Protection Assessment for the proposed draft future residential subdivision of that land.

The proposed layout of the residential area has been subject to detailed consideration of ecological, visual, servicing and road access issues in conjunction with the constraints and opportunities for addressing bushfire management requirements paramount in the design process, and represents a possible development scenario for the site, following a successful rezone.

While the current application is for rezoning of the land from a rural-residential zone to residential and commercial zone the configuration and orientation of roads, fire trails and allotments have been developed to specifically address bushfire issues.

This report provides details of the characteristics of the site and adjoining areas in relation to existing bushfire hazard, proposed measures to reduce the bushfire hazard and how the proposed residential layout has been developed with due consideration to the requirements of *'Planning for Bushfire Protection (RFS 2006)'.*

The objectives of this Report are to:

i) Address the relevant requirements of Planning for Bushfire Protection (Rural Fire Service, 2006);
ii) Identify if the development complies with the aims and objectives of Planning for Bushfire Protection (RFS, 2006);
iii) Prepare a Report that supplies the relevant information for the Rural Fire Service and Council to consider the rezoning proposal;
iv) Provide advice on mitigation measures including the provision of asset protection zones and construction standards in accordance with 'Planning for Bushfire Protection' (RFS 2006);
v) Advice on specific fire management issues.

1.2 PROPOSED DEVELOPMENT

The subject site is proposed to be rezoned and developed for the purpose of a home based business park. The form of development proposed consists of:

- Subdivision of lots, (residential and commercial) within a community title scheme;
- Development of residential / home office structures for the purposes of business and residential occupation;
- Development of communal amenity and home office support services in commonly held land within the development area;
- Public roads, infrastructure and services to service the development;
- A reclaimed water reticulation system and plant;
- Transfer of land to Council as Public Reserve;

- A communal management structure and a revenue raising mechanism responsible for ongoing upkeep and maintenance in according with the various management plans.

1.3 SITE DETAILS

Location and Surrounding Landuse

The subject site is located to the south of Kings Avenue, Terrigal with Belar Avenue forming part of the eastern boundary of the site. Undeveloped land zoned 7(a) Conservation and 7(c2) Scenic Protection is located in the south, south-east and south-west of the site.

Topography and Drainage

The site and adjoining areas are situated on the undulating to hilly terrain associated with the Erina Hills.

The site is dominated by a central ridgeline running in a general north-south direction. Rolling to hilly land is located to the south of the ridgeline while to the east and west two broad drainage lines run through the site. The western drainage line is joined by two smaller drainage lines which convey runoff from the steeper, open forest land located to the south of the site. These drainage lines, along with a vegetated riparian corridor each side of the drainage line, are proposed to be retained as part of future development.

Slope gradients on the site range between 5-15% for the ridgeline and drainage line with side slopes associated with the central ridgeline having gradients generally between 15-25%.

Further to the south and south-west of the site is located the Kincumba Mountain Reserve. This area of open forest is managed as a natural bushland reserve. As part of this rezoning proposal it is proposed to transfer ownership of areas of land in the south of the site to Council for extension of the Kincumba Mountain Reserve.

Residential development is located to the south-east and west of the site. An area of 7(a) zoned land is also located to the west. This parcel of land is in private ownership and a dwelling house, with bushfire asset protection zones has been approved for the site.

Future development following rezoning will provide for a residential 'infill' between adjoining residential areas to the north, east and west. The proposed rural and large residential allotments in the south-west and south-east will provide for a decreasing density of development, and increased protection from bushfires, for the land adjoining the Kincumba Mountain Reserve.

Vegetation

The vegetation within the site is predominately grouped and scattered trees with an improved pasture groundcover. Riparian vegetation along the drainage lines (Gully Forest) contains a mixture of eucalypts, rainforest species and ferns. Open forest dominated by Blackbutt (*Eucalyptus pilularis)* is located on the southern parts of the site and extends continuously into Kincumba Mountain Reserve to the south.

An area of Closed Forest in the central eastern part of the site is proposed to be retained and managed as a community reserve area. The vegetation is dominated by Turpentine (*Syncarpia glomulifera*) with some emergent eucalypts. In the north-east part of the site this Closed Forest is dominated by Melaleuca species within the low lying areas.

In relation to bushfire hazard the principal areas of bushfire hazard requiring consideration of implementation and of building line setbacks and asset protection zones are:

- The established riparian areas in the western and central parts of the site;
- The forest areas in the southern part of the site;
- The proposed rehabilitation of the central watercourse and the watercourse in the eastern part of the site.

SECTION 2

BUSHFIRE ATTACK ASSESSMENT

2.1 BUSHFIRE ASSESSMENT CRITERIA

Bushfire Prone Land Map
The majority of the site is mapped as Category 1 Vegetation with the moist forests of the drainage lines mapped as Category 2 Vegetation. The areas of cleared land with scattered trees are mapped as buffer areas between Category 1 Vegetation.

Forest Fire Danger Index
The subject site is located within the Gosford City Council Local Government Area in the Greater Sydney Region. The Forest Fire Danger Index for the Greater Sydney Region is rated at 100 for use in determining asset protection zone requirements and categories for bushfire attack.

Vegetation Classification
The adjoining lands to the north, east and west to a distance of 140 metres from the site boundary contains mostly Managed Lands in the form of existing urban development. Within the subject site are scattered remnant trees over a disturbed and sparse ground layer that is also managed by regular slashing. The western and central creeklines contains riparian vegetation consisting of tall trees with a mesic shrub and ground layer. The creekline vegetation has been assessed as Rainforest as defined in PBP (RFS, 2006). This vegetation consists of tall trees with a moist and mesic shrubby understorey typical of local creekline vegetation.

Development Category
The proposal is for subdivision (Community Title) of residential and commercial land. This is classified as a 'residential subdivision' under Chapter 4 of Planning for Bushfire Protection (RFS, 2006). Ultimately, following rezoning, development consent is required from the council for subdivision and a Bushfire Safety Authority is required from the Rural Fire Service. Ultimately, following rezoning Development Consent, or a Complying Development Certificate is then required for individual dwellings.

This development is not being assessed as 'infill development' within the meanings and requirements of Section 4.3.5 of Planning for Bushfire Protection (RFS, 2006).

Planning for Bushfire Protection (RFS, 2006)
Due to the presence of a bush fire threat from remnant vegetation within the site and forest vegetation beyond the boundary of the site and site being mapped within a buffer area on the Bushfire Prone Land Map, any development or rezoning application is required to include a Bushfire Assessment Report prepared in accordance with the requirements of *Planning for Bushfire Protection* (RFS, 2006).

State Legislation
At this stage the proposal is not subject to Section 79 BA of the Environmental Planning and Assessment Act which requires the consent authority (Council) to consider the requirements of Planning for Bushfire Protection (RFS, 2006).

In relation to the Rural Fires Act Section 100 of this Act will apply to the proposed development following rezoning as the proposed is for a subdivision of land. This will require an application to the RFS for a Bushfire Safety Authority.

Adjoining and Surrounding Development

The site is situated within an area where residential developments are located on adjoining land to the north, east and west. None of the existing urban development adjoining the subject site provides a bushfire risk to the subject site. Areas of grassed paddocks (rural residential development, adjoins the south west and south east while forested lands adjoin the south of the site.

An assessment of the bushfire attack and required Asset Protection Zones and building construction levels (BAL) for each of these areas is provided in Tables 2.1 to 2.5.

2.2 BUSHFIRE ATTACK ASSESSMENT

As part of this assessment the subject site has been separated into various areas for bushfire attack assessment purposes. The hilly nature of the site, presence of several vegetated riparian areas and presence of areas of intact and riparian forest vegetation has resulted in areas of remnant vegetation proposed to be retained within the developed urban landscape. These vegetated areas will retain some level of bushfire hazard to adjoining development. These areas do not represent development stages or progressive developments and are only assessment areas.

A description of these assessment areas are provided below while the location of these areas is shown in Figure 1.

Area A

- Area of future commercial centre located in north west part of site;
- Adjoined to south by patch of rainforest and to the east by riparian forest with water quality control measures to be upgraded;
- Adjoined by existing residential areas to the north and west;
- No residential dwellings are proposed within Area A.

Area B

- Future residential lots facing riparian vegetation along central drainage line. Riparian vegetation to be retained and managed for weed control natural regeneration and biodiversity values.

Area C

- Future residential lots facing future public reserve to the south. Separated from Area D by drainage reserve which will incorporate water quality control measures and managed land with a shared cycleway/pathway running through the site.

Area D

- Future residential lots with public reserve to the south. Areas of this part of the public reserve will be managed to regenerate to a forest vegetation which will provide a bushfire threat to future lots in Area D.

Area E

- Future residential lots to the west of the existing drainage reserve. This drainage reserve contains Melaleuca forest with managed grass areas and covers less than one hectare in area.

An assessment of the bushfire attack and required Asset Protection Zones and building construction levels (BAL) for each of these areas is provided in Tables 2.1 to 2.5.

TABLE 2.1
BUSHFIRE ATTACK LEVEL ASSESSMENT – AREA A
(from Table 2.4.2 of AS3959-2009)

Direction	Vegetation Classification (greatest threat within 140m)	Effective Slope (within 100m)	Recommended Distance from Bushfire Hazard (metres)				
			BAL Flame Zone	BAL-40	BAL-29	BAL-19	BAL-12.5
North	Reduced Vegetation Residential Land	Upslope	NA	NA	NA	NA	NA
South	Rainforest	0-5^{o} downslope	<10	10-14	14-20	20-29	29-100
East	Remnant Forest (Rainforest)	0-5^{o} downslope	<10	10-14	14-20	20-29	29-100
West	Reduced Vegetation Residential Land	upslope	NA	NA	NA	NA	NA

NA – Building levels not applicable as no bushfire hazard present from this direction after development
BAL – Bushfire Attack Levels

TABLE 2.2
BUSHFIRE ATTACK LEVEL ASSESSMENT – AREA B
(from Table 2.4.2 of AS3959-2009)

Direction	Vegetation Classification (greatest threat within 140m)	Effective Slope (within 100m)	Recommended Distance from Bushfire Hazard (metres)				
			BAL Flame Zone	BAL-40	BAL-29	BAL-19	BAL-12.5
North	Reduced Vegetation Residential Land	Upslope	NA	NA	NA	NA	NA
South	Future Residential (Reduced vegetation)	0-5^{o} downslope	NA	NA	NA	NA	NA
East	Future Residential (Reduced vegetation)	upslope	NA	NA	NA	NA	NA
West	Riparian Forest	0-5^{o} downslope	<24	24-32	32-43	43-57	57-100

NA – Building levels not applicable as no bushfire hazard present from this direction after development
BAL – Bushfire Attack Levels

TABLE 2.3
BUSHFIRE ATTACK LEVEL ASSESSMENT – AREA C
(from Table 2.4.2 of AS3959-2009)

Direction	Vegetation Classification (greatest threat within 140m)	Effective Slope (within 100m)	Recommended Distance from Bushfire Hazard (metres)				
			BAL Flame Zone	BAL-40	BAL-29	BAL-19	BAL-12.5
North	Future Residential (Reduced vegetation)	0-5^{o} downslope	NA	NA	NA	NA	NA
South	Forest	5-10^{o} downslope	<31	31-39	39-53	53-69	69-100
East	Future Residential (Reduced vegetation)	0-5^{o} downslope	NA	NA	NA	NA	NA
West	Forest	5-10^{o} downslope	<31	31-39	39-53	53-69	69-100

NA – Building levels not applicable as no bushfire hazard present from this direction after development
BAL – Bushfire Attack Levels

TABLE 2.4
BUSHFIRE ATTACK LEVEL ASSESSMENT – AREA D
(from Table 2.4.2 of AS3959-2009)

Direction	Vegetation Classification (greatest threat within 140m)	Effective Slope (within 100m)	Recommended Distance from Bushfire Hazard (metres)				
			BAL Flame Zone	BAL-40	BAL-29	BAL-19	BAL-12.5
North	Future Residential (Reduced vegetation)	0-5^{o} downslope	NA	NA	NA	NA	NA
South	Forest	upslope	<19	19-25	25-35	35-48	48-100
East	Reduced Vegetation Lawns/ Pasture (Managed Land)	upslope	NA	NA	NA	NA	NA
West	Future Residential (Reduced vegetation)	5-10^{o} downslope	NA	NA	NA	NA	NA

NA – Building levels not applicable as no bushfire hazard present from this direction after development
BAL – Bushfire Attack Levels

TABLE 2.5 BUSHFIRE ATTACK LEVEL ASSESSMENT – AREA E (from Table 2.4.2 of AS3959-2009)							
Direction	**Vegetation Classification (greatest threat within 140m)**	**Effective Slope (within 100m)**	**Recommended Distance from Bushfire Hazard (metres)**				
			BAL Flame Zone	**BAL-40**	**BAL-29**	**BAL-19**	**BAL-12.5**
North	Existing Residential (Reduced vegetation)	Cross slope	NA	NA	NA	NA	NA
South	Reduced Vegetation Managed Land	upslope	NA	NA	NA	NA	NA
East	Remnant Vegetation (Rainforest)	0-5^{o} downslope	<10	10-14	14-20	20-29	29-100
West	Future Residential (Reduced vegetation)	upslope	NA	NA	NA	NA	NA
NA – Building levels not applicable as no bushfire hazard present from this direction after development BAL – Bushfire Attack Levels							

SECTION 3

BUSHFIRE PROTECTION MATTERS

3.1 BUSHFIRE ATTACK LEVELS AND BUILDING CONSTRUCTION REQUIREMENTS

The bushfire attack assessments (Tables 2.1 to 2.5) have identified that the site is exposed to bushfire hazards generally occurring from the vegetation retained in the forested areas to the south and vegetated riparian areas. Development areas affected by each vegetated area have been identified in Figure 2 along with corresponding area requiring dwellings to be constructed to various Bushfire Attack Levels (BAL) depending on the distance from the bushfire hazard.

Due to the presence of the bushfire hazards within and adjoining the site, it is considered that additional safeguards against ember attack are warranted. Some specific measures to reduce the potential for damage from ember attack during a bushfire event include:

i) Provision of non-flammable leaf barriers on gutters and roof valleys within the future subdivision;
ii) Maintenance of the areas of Managed Lands or household gardens within the development as an inner Asset Protection Zone in accordance with PBP (RFS 2006).
iii) Regular maintenance of garden / courtyard areas and community lands to reduce fuel loads and removal or replacement of vegetation likely to promote the transmission of fire.
iv) Limit the use of surface mulching such as fine peaty material or wood chips around dwellings within 100 metres of the bushfire hazard area.

3.2 ASSET PROTECTION ZONE AND BUSHFIRE HAZARD MANAGEMENT

Asset Protection Zones are required between future dwellings and those areas of vegetation assessed as having a bushfire threat. The width of the Asset Protection Zones (Tables 2.1 to 2.5) identifies that APZ ranging between 10 metres to 31 metres are required for the areas identified in Figure 2. These APZ's can be accommodated into the current site layout.

The Asset Protection Zones shall be maintained as an Inner Protection Area (IPA) in accordance with the standards described in Section 4.1.3 of PBP (RFS, 2006). The responsible party for the inspection and maintenance of the APZ's will be the owners of the land. The provision of a shared pathway/cycleway with grassed surrounds within the asset protection zone through areas B & C would provide an appropriate management area within this APZ area.

3.3 ACCESS

The internal road network has been designed to provide direct road access to most of the allotments. The road system provides for a perimeter road between the future lots and bushfire hazard areas and provides for access/egress to both Kings Avenue and Belar Avenue. Several allotments in the north east part of the site may be accessed by battle-axe if direct access to Kings Avenue is not available.

The proposed road designs will be required to meet the performance criteria for public roads identified on pages 20 and 21 of *Planning for Bushfire Protection* (RFS 2006).

3.4 WATER SERVICES

The existing urban development in the local area has reticulated water mains. It is expected that the proposed development will use the existing water reticulation from the surrounding infrastructure therefore a supplementary form of water supply will not be necessary for fire fighting purposes. This water supply arrangement is to be in compliance with *'Planning for Bushfire Protection, 2006'* in respect of water supply. This will require fire hydrant spacing, sizing and pressure to comply with AS2419.1 2005 (Standards Australia 2005).

3.5 ENVIRONMENT AND HERITAGE ISSUES

No aboriginal heritage items are known to have been identified during previous surveys of the area or development of the adjoining subdivisions.

The existing drainage lines are proposed to be retained. These drainage lines will be subject to a weed removal and vegetation restoration program identified in a separate Riparian and Buffer Zone Vegetation Management Plan prepared by *Conacher Environmental Group* (2008).

A detailed Flora and Fauna Survey and Assessment Report has been completed for the site (*Conacher Environmental Group* 2009). This report concluded that the proposed development is not likely to have a significant effect on threatened species, populations, endangered ecological communities or their habitats.

The subject site has no known geological features of significance.

SECTION 4

CONCLUSION AND RECOMMENDATIONS

4.1 AIM AND OBJECTIVES OF PLANNING FOR BUSHFIRE PROTECTION

"*The aim of Planning for Bushfire Protection is to use the NSW development assessment system to provide for the protection of human life and to minimise impacts on property form the threat of bushfire, while having due regard to development potential, on site amenity and protection of the environment" (PBP pg 1).*

The preparation of this Bushfire Assessment Report and subsequent assessment by Council and the Rural Fire Service ensures compliance with the aim of Planning for Bushfire Protection.

The following comments are provided in relation to satisfying the objectives of PBP.

Objective 1
(i) afford occupants of any building adequate protection from exposure to a bush fire;

Measures have been identified which can be implemented within the proposed development in regard to separation distance (APZ) and building construction to comply with required construction standards for the relevant bushfire attack levels(see Tables 2.1 to 2.5 and Figure 1). Some additional measures for the dwellings (gutter guards, fuel free gardens and external areas etc – see Section 3.1.2) are recommended to provide additional protection from the bushfire hazards within and adjoining the site.

Objective 2
(ii) provide for a defendable space to be located around buildings;

A permanent APZ of minimum width as shown in Tables 2.1 to 2.5 and Figure 1 will allow BAL 40 to 12.5 construction standards for the dwellings within 100 metres of vegetation posing a fire hazard throughout the development. This minimum width Asset Protection Zone is to be established as shown in Figure 1. These APZs are expected to be managed as an Inner Protection Area (IPA) in accordance with PBP (RFS, 2006).

Objective 3
(iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;

The required separation distance between the proposed dwellings and the bushfire hazard has been determined using 2.4.2 of AS3959-2009. These separation distances (see Tables 2.1 to 2.5 in this document) will allow various construction standards for the proposed dwellings (AS3959-2009) depending on the slope gradient and the vegetation classification of the bushfire threat. These factors combined will provide appropriate separation between the hazard and buildings which will prevent direct flame contact and material ignition.

Objective 4
(iv) ensure that safe operational access and egress for emergency service personnel and residents is available;

It is noted that multiple ingress / egress routes to the existing through roads are incorporated into the existing urban design. There is an entry / exit point located on Kings Avenue on the

northern boundary of the proposed development. There is also an entry / exit point proposed to connect to Belar Avenue on the eastern boundary of the subject site. This will ensure multi-path safe operational ingress for emergency services and also simultaneous safe egress for residents during an emergency. Roads within the proposed development will be constructed to meet the performance criteria for public roads identified on pages 20 and 21 of *Planning for Bushfire Protection* (RFS 2006)

Objective 5

(v) provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ);

The owners / managers of the community association (or their agents) will undertake regular inspections and undertake management of any Asset Protection Zone within property under their care. This will include maintenance of the vegetation and fuel loads within the minimum APZ areas as an Inner Protection Area (IPA) in accordance with PBP (RFS, 2006). A Management and Funding Mechanism through the Community Association will allow this to occur.

Objective 6

(vi) ensure that utility services are adequate to meet the needs of fire fighters (and others assisting in bush fire fighting)

All lots are to be provided with urban utility services which will provide adequate requirements for fire fighters. The water supply arrangements including fire hydrant spacing, sizing and pressure are to be in compliance with AS2419.1 2005 (Standards Australia 2005).

4.2 CONCLUDING COMMENTS

The proposed development has a vegetated bushfire threat located at various aspects and slope gradients as identified in Figure 1 and Tables 2.1 to 2.5. These vegetated bushfire threats are located within creeklines, creekline buffers and adjoining bushland reserves.

Minimum separation distances as well as BAL construction requirements (AS3959-2009) have been determined from PBP (RFS 2006) (see Tables 2.1 to 2.5 and Figure 1 in this document).

With the implementation of the measures recommended, and outlined in Section 3 of this Report, the overall aims and objectives of Planning for Bushfire Protection (RFS 2006) can be achieved for the proposed development.

REFERENCES

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