

Appendix E

Bushfire

**BUSH FIRE ASSESSMENT
FOR A PROPOSED RESIDENTIAL
SUBDIVISION
FRASER DRIVE, SOUTH TWEED**

December 2007

tel +61 2 6625 1704
fax +61 2 6625 2376
mob 0414 527070
email brad@boskae.com.au

PO Box 7240
Lismore NSW 2480

ABN 23558219895

**Bush Fire Assessment
Proposed residential subdivision
Fraser Drive, South Tweed
Lot 2 DP1000385 and Lot 9 DP 1039569**

December 2007

Prepared by:

BOSKAE Environmental Planning
PO Box 7240 Lismore Heights NSW 2480
T: (02) 6625 1704 F (02) 6625 2376

ABN: 23 558 219 895

Prepared for:

MFS Diversified Developments Pty Ltd
PO Box 7720 GCMC Bundall QLD 9726

The expression of our views about this Bush Fire Assessment, our acceptance of the client's instructions, and our understanding of this assessment do not constitute any representation or warranty as to the ability of the development to withstand bush fire.

Due to the unpredictable nature of wild fires and associated extreme weather conditions, Boskae Environmental Planning, in its preparation of this Bush Fire Assessment and the recommendations contained herein, do not express or imply a guarantee or warranty to protect persons or property against the identified bush fire threat. The owner of the property accepts the risks associated with knowingly developing a site within a designated bush fire prone area, where a potential bush fire threat exists.

EXECUTIVE SUMMARY

BOSKAE Environmental Planning has undertaken a Bush Fire Assessment to support the development application for the proposed Fraser Drive residential subdivision.

The site comprises 33.8 hectares of land on the eastern side of Terranora Creek, South Tweed, and is described as Lot 2 DP1000385 and Lot 9 DP 1039569.

The site is located on the western side of Fraser Drive, approximately 1km south of the coastal town of Tweed Heads in Northern New South Wales.

The site is currently vacant land, however at times it is used for cattle grazing. The site has been used previously for banana farming and other agricultural uses.

The land surrounding the site includes residential land to the north, south and west, and tourist, residential and grazing land to the east.

The proposed development is a residential subdivision comprising 168 lots and an integrated housing precinct.

This Bush Fire Assessment provides an assessment of the potential level of bush fire risk to the proposed future development and provides recommendations on the implementation of Asset Protection Zones, the provision of water supplies, access requirements and fuel management practices necessary to mitigate the potential bush fire threat.

Asset Protection Zones ensure that a progressive reduction of bush fire fuels occurs between the bush fire hazard and future dwellings within the development.

Water supplies are essential for firefighting purposes and the subdivision will be serviced by a reticulated water supply and associated fire hydrants.

Access requirements include construction of the internal road system in accordance with Planning for Bush Fire Protection (2006).

The features of the site as discussed in this report, together with these strategies, provide that the site is suitable in terms of its intended use.

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1 Introduction

BOSKAE Environmental Planning has been engaged by MFS Diversified Developments to prepare a Bush Fire Assessment for a proposed residential subdivision of the Fraser Drive site at South Tweed. The aim of the report is to provide an indication of bush fire hazard and necessary bush fire management practices.

1.1 Aims

We have perused the Concept Plan and completed a detailed inspection of the site. This report serves to:

- identify statutory requirements;
- identify the site and proposed development;
- identify fire management responsibilities;
- detail information relating to bush fire risk including vegetation, slope, and fire history;
- determine the bush fire threat;
- recommend alleviation measures, such as the provision of Asset Protection Zones, to provide an adequate level of protection to life on the site; and
- identify work required, if necessary, in order to improve the chances of building survival in the event of a bush fire.

This report provides bush fire risk mitigation recommendations and concludes by providing a future development consent authority with a degree of confidence that the chances of building survival in a bush fire situation will be significantly improved.

1.2 Statutory Requirements

This report has been prepared having regard to the following legislative and planning requirements.

1.2.1 Legislation

Environmental Planning and Assessment Act (EPA Act)

- Section 91(1) defines residential subdivision and special protection development as integrated development which requires authorisation under Section 100B of the *Rural Fires Act 1997*.

Rural Fires Act 1997 (Amended)

- Section 100B provides for the issue by the Commissioner of the NSW Rural Fire Service of bush fire safety authorities for subdivision of bush fire prone land that could lawfully be used for residential or rural residential purposes.
- Sections 63(1) and 63(2) require public authorities and owners/occupiers of land to take all practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires.

1.2.2 Planning Policies

Planning for Bush Fire Protection 2006

This document was prepared by the Rural Fire Service and provides guidance on the planning and development control processes in relation to bush fire protection measures for subdivision and residential developments in bush fire prone areas.

1.3 Documentation reviewed

- Concept Plan prepared by PMM Sydney (2006)
- Preliminary Environmental Assessment Report prepared by PMM Sydney (2006)
- Ecological Assessment prepared by Cardno (2006)
- Aerial photo 2006
- Tweed Bush Fire Risk Management Plan prepared by the Tweed Shire Bush Fire Management Committee (2002)
- Tweed Shire Council Bush Fire Prone Lane Map
- *Planning for Bush Fire Protection 2006* prepared by NSW Rural Fire

1.4 Site Inspection

Bridget Aulton of BOSKAE Environmental Planning inspected the development property on the 1st of September 2006 to assess the topography, vegetation classification and land use within and adjoining the development site.

2 The Site and Proposed Development

2.1 Site Description

The Fraser Drive development is located south of the coastal town of Tweed Heads in Northern New South Wales. Fraser Drive is identified as Lot 2 DP1000385 and Lot 9 DP 1039569 and comprises approximately 33.8 hectares. The site is of a roughly rectangular shape with a frontage of approximately 800 metres to Fraser Drive. Under the Tweed Local Environmental Plan 2000 the land is zoned 2(c) Urban Expansion.

The site has been identified as bush fire prone land in accordance with Section 146(2) of the *Environmental Planning and Assessment Act 1979*. Tweed Shire Council's Bush Fire Prone Land Map indicates the site to comprise or be located in close proximity to vegetation considered bush fire prone. Areas affected within the proposed development are the northern end and very small areas in the south-east of the site. Refer to Appendix A for Bush Fire Prone Land Map.

The site is accessed from Fraser Drive and several other access roads are proposed.

Refer to Appendix B for photographs of the site.

2.2 Existing Land Use

The site is currently vacant land, however at times it is used for cattle grazing. The site has been used previously for banana farming and other agricultural uses.

In more recent times, Tweed Shire Council issued a consent for filling in October 2002.

2.3 Surrounding Land Use

The land surrounding the site includes residential land to the north, south and west, and tourist, residential and grazing land to the east.

The following Zones surround the site:-

6(a) Open Space and 2(c) Urban Expansion – north

2(e) Residential Tourist – east

6(a) Open Space and 2(c) Urban Expansion – south

2(c) Urban Expansion – west

2.4 Proposed Development

This assessment is based upon the Concept Plan prepared by PMM Sydney for a 168 residential lot subdivision and integrated housing precinct.

Primary access to the site will be gained from Fraser Drive. It is proposed the northern portion of the site be accessed from two access points via a single T-intersection in both instances. Access to the steeper parts of the site will be facilitated by minor access points along the western boundary at Ocean Avenue and Hillcrest Avenue. Further it is proposed to provide access to the southern portion of the site from Merlot Street at the southern boundary.

3 Fire Management Responsibilities

Fire management responsibilities within the proposed development site are the responsibility of the following organisations.

3.1 Tweed Shire Council

Tweed Shire Council has the responsibility, under Section 66 of the Rural Fires Act, to issue a notice in writing requiring an owner/occupier of any land within the Shire to carry out bush fire hazard reduction works on that land. Section 100E of the Rural Fires Act requires Council to issue bush fire hazard reduction certificates for hazard reduction to be undertaken on private lands.

3.2 New South Wales Rural Fire Service

The NSW Rural Fire Service (RFS) has the responsibility for undertaking fire suppression activities, hazard management activities and other functions relative to emergency management, within its areas of operation.

Section 73 of the Rural Fires Act (1997) enables the Commissioner to carry out bush fire hazard reduction works on any land as required by a bush fire risk management plan if the work has not been carried out satisfactorily. Incurred costs can be recovered as a debt owed to the Crown.

3.3 New South Wales Fire Brigade

The NSW Fire Brigade has the responsibility for undertaking fire suppression activities, and other functions relative to emergency management, within its area of operation and through Mutual Aid Agreements, provide assistance to the NSW Rural Fire Service, particularly for structural fire operations within the NSW Rural Fire Brigade Districts. Hazmat management within NSW is the responsibility of the NSW Fire Brigade.

3.4 Tweed Shire Bush Fire Management Committee

The Tweed Shire Fire Management Committee has the responsibility for preparing a Bush Fire Risk Management Plan for the area. The aim of the Tweed Bush Fire Risk Management Plan is to provide for the coordinated prevention and mitigation of bush fires for:

- (a) the protection of life, property and the environment within the community; and
- (b) the protection, maintenance and wherever possible the enhancement of the natural and cultural values of the area through the management of appropriate fire regimes.

The Tweed Shire Bush Fire Management Committee is supported by the Rural Fires Act 1997 in which:

- Section 50 (1) of the Act states that *'the Bush Fire Co-ordinating Committee must constitute a Bush Fire Management Committee for the whole of the area of any local authority for which a rural fire district is constituted.'*
- Section 51 (1A) requires *'a Bush Fire Management Committee must, within 2 months after the end of each financial year, report to the Bush Fire Co-ordinating Committee on implementation of each bush fire risk management plan in force for the rural fire district or other part of the State for which the Bush Fire Management Committee is constituted.'*
- Section 52 (1) requires *'each Bush Fire Management Committee must, in accordance with this Division, prepare and submit to the Bush Fire Co-ordinating Committee a draft of each of the following kinds of bush fire management plans for the rural fire district or other part of the State for which it is constituted:*
 - (a) a plan of operations, and*
 - (b) a bush fire risk management plan.'*
- Section 54 of the Act specifies:
 - (1) A draft bush fire risk management plan for a rural fire district or other part of the State is to set out schemes for the reduction of bush fire hazards in the rural fire district or other part of the State.*
 - (2) Without limiting the matters that may be contained in a draft bush fire risk management plan, it may restrict or prohibit the use of fire or other particular fire hazard reduction activities in all or specified circumstances or places to which the plan applies.*

3.5 Private Land Owners & Occupiers

The Rural Fires Act 1997 presents several legislative opportunities to require land owners and occupiers to manage hazardous fuels.

Section 63 states that:

- (2) It is the duty of the owner or occupier of land to take the notified steps (if any) and any other practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from, that land'.*
- (3) A public authority or owner or occupier is liable for the costs incurred by it in performing the duty imposed by this section.*
- (4) The Bush Fire Co-ordinating Committee may advise a person on whom a duty is imposed by this section of any steps (whether or not included in a bush fire risk management plan) that are necessary for the proper performance of the duty.*
- (5) In this section: "notified steps" means:*
 - (a) any steps that the Bush Fire Co-ordinating Committee advises a person to take under subsection (4), or*
 - (b) any steps that are included in a bush fire risk management plan applying to the land.*

Section 87 states that:

(1) A person who lights a fire on land for the purpose of land clearance or for burning any fire break during a bush fire danger period that applies to the land is guilty of an offence unless the person:

- (a) is authorised to do so by a fire permit issued by the appropriate authority and the person complies with any conditions set out in the fire permit, and*
- (b) has given notice in accordance with section 86.*

Maximum penalty: 50 penalty units or imprisonment for 12 months, or both.

(2) Nothing in this section requires an authorised officer of a fire fighting authority who lights a fire for the purpose of back burning to be authorised to do so by a fire permit or to give any notice before lighting such a fire.

4 Information relating to Bush Fire Risk

4.1 Vegetation

The vegetation within the site consists largely of grassland used for pasture with scattered paperbark and regrowth rainforest species on the southern slopes. In the northern part of the site an area of SEPP 14 wetland is bordered by broad-leaved paperbark and swamp she-oak forest. The site is also surrounded by patches of eucalypt forest. (See Ecological Assessment prepared by Cardno for further information regarding vegetation species.)

According to Planning for Bush Fire Protection (2006), the vegetation can be classified as:-

- Forested Wetland – restricted to riverine corridors and floodplains subject to periodic inundation. Dominated by eucalypts, tea-trees and paperbarks or she-oaks. Distinguished by presence of hydrophytes, woody plants that can live in flooded environments e.g. sedges, rushes, buttercups, knot weeds, lignum, ferns & grasses.
- Dry Sclerophyll Forests (Open Forest) - dominated by eucalypts 10-30m tall with crowns that touch or overlap (i.e. foliage cover of 20-50%). Prominent layer of hard-leaved shrubs. Infertile soils. Rainfall >500mm. Coast, tablelands & western slopes.
- Grassy Woodlands (Woodlands) – dominated by an open to sparse layer of eucalypts (typically boxes and red gums) with the crowns rarely touching (i.e. <30% foliage cover). Typically 15-35m high. Diverse ground cover of grasses and herbs. Long lived perennial tussock grasses form the structural matrix of the understorey. Shrubs are sparsely distributed. Found on fine textured soils of moderate to high fertility, principally on flat to undulating terrain. Rainfall 500-900mm. Tablelands, western slopes and low rainfall coastal lowlands.
- Grassland – dominated by large perennial tussock grasses & the presence of broad-leaved herbs in the inter-tussock spaces. Lack of woody plants. Associated with fertile heavy clay soils on flat topography or in regions with low to moderate rainfall. Plants include grasses, daisies, legumes, geraniums, saltbushes & copperburrs.

Refer to Appendix C for photographs of the vegetation.

4.2 Slope of the land

Slope is an important dynamic when assessing bush fire risk and probable fire behaviour.

The proposed subdivision site is situated on the eastern slope of a ridgeline which runs along the western boundary. The southern and western portions of the site comprise minor ridges off the principal ridge to the west, and associated side slopes. Steeper slopes are found in the southern portion of the site, with the northern portion of the site being relatively level (refer to Concept Plan for contour information).

In accordance with Planning for Bush Fire Protection (2006), an assessment of the slope over an approximate distance of 100m in all directions from the proposed building line on the development site was undertaken. Details of these slopes can be seen in Tables 1-3 in Section 5.1 of this report.

4.3 Fire History

According to the Tweed Bush Fire Risk Management Plan (2002), the Tweed does not possess large tracts of unmanaged land and indiscriminate burning, together with carelessness or vandalism, are the greatest problems in the Tweed.

The main areas of fire activity are the fast growing Tweed Coast and Cudgen areas and those areas to the west of the shire that have evolved from grazing properties to multiple occupancy sites and hobby farms such as Byrrill Creek, Kunghur and Rowlands Creek.

The Tweed experiences almost identical fire incidences every year. Fires are usually lit by arsonists on the western boundaries of Pottsville village and in the surrounding wetlands. These fires often spread rapidly presenting a direct threat to the village of Pottsville. Fires are also lit by arsonists in pine plantations behind Kingscliff and Cudgen and these fires almost always threaten small intensive farming and residential communities. In the western parts of the shire fires are more often the result of mis-managed burn offs which run through multiple occupancies and grazing properties where proper access, availability of water and household fire prevention are not well planned or executed.

Reliable fire history has only been kept in the Tweed Shire since 1990.

4.4 Bush Fire Season

The start of the bush fire season coincides with the arrival of strong north-west to westerly winds in late winter or spring. The majority of serious bush fires occur from this period until the onset of summer rains which normally start from December and continue through to autumn. Longer fire seasons are experienced when summer rainfall is lower than normal, with the bush fire season extending through summer to early autumn.

4.5 Climate and Weather

The Tweed Shire has a subtropical climate with the moist air and sea breezes having a noticeable effect on summer temperatures, particularly along the coastal strip. The Border Ranges to the north and west of the Tweed Shire have a strong orographic effect, contributing to the mean annual rainfall of 1500-2000mm. There is a distinct wet season over summer and autumn, with winter and spring generally being drier. February to March is the wettest period and August to September are on average the driest months, receiving only 3% of the average annual rainfall.

By definition, the most extreme fire weather conditions will involve all the following conditions:-

- 40° C temperature
- Relative humidity of around 15%
- Average wind speed of 55 km/h
- Extended drought for 6 - 8 weeks
- Unstable atmospheric conditions
- Abundant and well distributed fuel

In general, bush fires occurring outside these critical times are much less likely to get out of control.

Analyses of the frequency of high bush fire danger days in the Tweed suggest that very high or extreme fire weather conditions are rare. The analysis (over the past 13 years) suggests that on average there were less than three days per year with a sufficient combination of high temperature and low humidity to support such fire danger ratings.

4.6 Threatened Species, Population Communities or Ecological Communities

Flora and fauna matters are addressed in detail in the assessment prepared by Cardno. The assessment concludes that the plan for the proposed development makes provision for the preservation, buffering and appropriate management of that part of the site that possess ecological values that warrant conservation.

The proposed development will result in the loss of a single specimen of rough-shelled Queensland nut. At least 10 seedlings are recommended to be propagated from this tree prior to removal and replaced on the site. Two stinking cryptocaryas located near the SEPP 14 wetland will be retained within the proposed 50m buffer.

The establishment of Asset Protection Zones, as detailed in Section 5.1 of this report, should not have any additional impact on threatened flora and fauna identified by the Cardno report.

4.7 Aboriginal and European Heritage

An assessment prepared by Adrian Piper in 2000 analysed the site for potential value as a culturally significant site and archaeological significant site for indigenous peoples. An analysis was also undertaken to determine if the site retained any European heritage values. The assessment indicated that no evidence or record exists that indicates the site contains any significant heritage values. Therefore, the establishment of Asset Protection Zones, as detailed in Section 5.1 of this report, should not have any impact on Aboriginal or European heritage within the site.

5 Planning for Bush Fire Protection

Planning for Bush Fire Protection (2006) provides a methodology for determining setback distances (Asset Protection Zones) required for habitable buildings in residential development that is designated as bush fire prone.

Section 5.1 below uses this methodology to determine Asset Protection Zones required for future dwellings.

5.1 Bush Fire Protection Assessment

Section A2.3 of Planning for Bush Fire Protection (2006) requires the following procedure for determining an appropriate Asset Protection Zone:-

- Determine predominant vegetation type and formation;
- Determine effective slope of the land between the predominant vegetation class and the site;
- Determine appropriate fire (weather) area and note relevant FDI; and
- Consult Tables A2.4- A2.7 to determine appropriate Asset Protection Zone.

Generally, an Asset Protection Zone consists of an Inner Protection Area. The Inner Protection Area extends from the edge of the development to the predominant vegetation and is an area in which fuels are discontinuous and there is minimal fine fuel at ground level which could be set alight by a bush fire. Where the predominant vegetation is forest or woodland, an Outer Protection Area may also be established. The Outer Protection Area is located adjacent to the hazard and is an area in which fuel loadings are reduced. Figure 4.3 of Planning for Bush Fire Protection (2006), as shown below, illustrates Asset Protection Zones and progressive reduction in fuel loads.

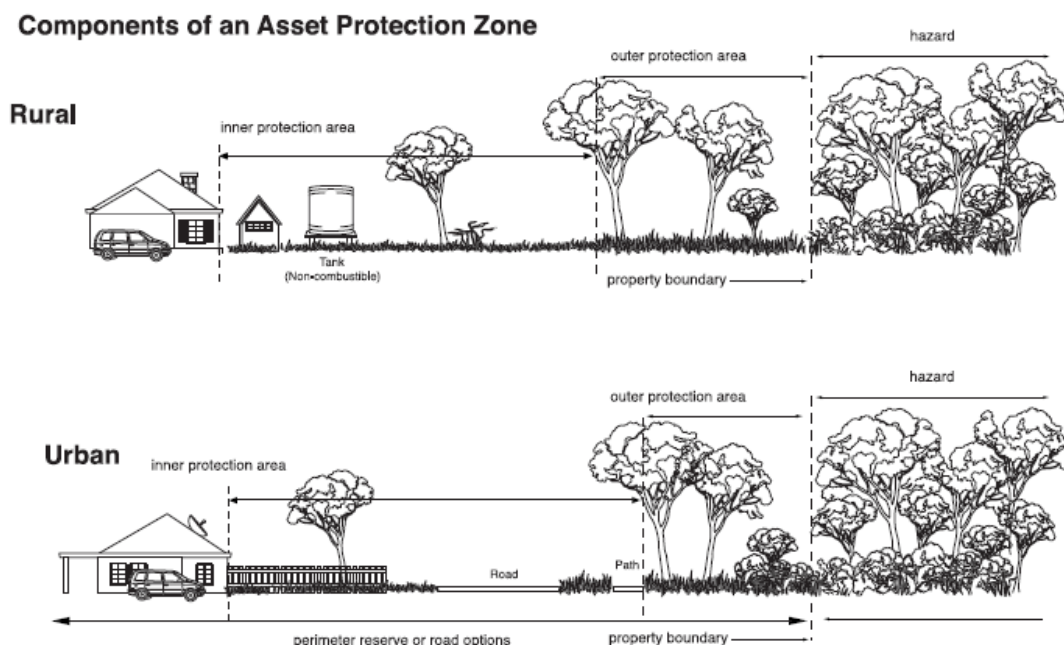


Figure 4.3 APZs and progressive reduction in fuel loads

A Bush Fire Protection Assessment was completed on the entire site using the above methodology. The following assessment concentrates on those areas found to be bush fire prone.

The assessment has been divided into three areas:-

- (1) lots in the south-east of site adjoining Fraser Drive;
- (2) lots in the east of site adjoining Fraser Drive; and
- (3) lots adjoining the SEPP 14 wetland.

The number of lots along Fraser Drive that are bush fire prone are limited (see Bush Fire Map at Appendix A). Tables 1 to 3 below provide a summary of this assessment.

Table 1 – Bush Fire Protection Assessment for lots in south-east of site adjoining Fraser Drive

Aspect	Predominant Vegetation Formation Class within 140m of development	Effective Slope	Fire (weather) Area and FDI rating	Recommended width of Asset Protection Zone (Inner Protection Area) (Table A2.5)
North	Grasslands – to be cleared for residential development	Flat	80	-
East	Woodland	Upslope	80	10 metres
South	Residential development	Flat	80	-
West	Grasslands – to be cleared for residential development	Upslope	80	-

According to Section A2.3 in Planning for Bush Fire Protection 2006, non-vegetated areas including roads, footpaths, cycleways and the like are not considered a hazard or as a predominant vegetation class/formation and can be included within an Asset Protection Zone. Fraser Drive provides a 30m permanent Asset Protection Zone between the adjoining lots and the hazard.

Table 2 – Bush Fire Protection Assessment for lots in east of site adjoining Fraser Drive

Aspect	Predominant Vegetation Formation Class within 140m of development	Effective Slope	Fire (weather) Area and FDI rating	Recommended width of Asset Protection Zone (Inner Protection Area) (Table A2.5)
North	Grasslands – to be cleared for residential development	Flat	80	-
East	Dry sclerophyll forest (Open Forest) (less than 1ha)	Upslope	80	10 metres
South	Residential development	Upslope	80	-
West	Grasslands – to be cleared for residential development	Upslope	80	-

Although dry sclerophyll forest (open forest) vegetation normally requires a 20m Asset Protection Zone for upslope/flat effective slopes, small remnant forest areas less than 1 hectare are considered equivalent to specifications in Rainforest vegetation.

According to Section A2.3 in Planning for Bush Fire Protection 2006, non-vegetated areas including roads, footpaths, cycleways and the like are not considered a hazard or as a predominant vegetation class/formation and can be included within an Asset Protection Zone. Fraser Drive provides a 30m permanent Asset Protection Zone between the adjoining lots and the hazard.

Table 3 – Bush Fire Protection Assessment for lots adjoining SEPP 14 wetland

Aspect	Predominant Vegetation Formation Class within 140m of development	Effective Slope	Fire (weather) Area and FDI rating	Recommended width of Asset Protection Zone (Inner Protection Area) (Table A2.5)
Integrated Housing (east of SEPP 14 wetland)				
North	Residential development	Flat	80	-
East	Grasslands – to be cleared for residential development	Flat	80	-
South	Grasslands – to be cleared for residential development	Flat	80	-
West	Forested wetland	0-5° Downslope	80	20
Lots south of SEPP 14 wetland				
North	Forested wetland	0-5° Downslope	80	20
East	Grasslands – to be cleared for residential development	Flat	80	-
South	Grasslands – to be cleared for residential development	Upslope	80	-
West	Grasslands – to be cleared for residential development	Upslope	80	-

The Concept Plan has incorporated a 50m buffer alongside the SEPP 14 wetland which is proposed to contain public recreational facilities such as boardwalks and footpaths. The 20m Inner Protection Area should be situated adjacent to this buffer.

Other areas

A small area along the western boundary of the site adjoining residential lots on Hillcrest Avenue is also classified as bush fire prone land. As no residential lots are affected by the bush fire prone classification and the area is separated from the bush fire prone vegetation by two rows of residential lots and a street, no Asset Protection Zones are required.

5.2 Bush Fire Attack Assessment

Section A3.4 of Planning for Bush Fire Protection (2006) provides the following procedure for assessing bush fire attack and determining the level of construction required for a building within a designated bush fire prone area:-

- (a) Determine vegetation formation types and sub-formations around the building;
- (b) Determine distance between each vegetation formation identified and building;
- (c) Determine the effective slope of the ground for each vegetation group;
- (d) Determine the relevant FDI for the council area;
- (e) Match the relevant FDI, appropriate vegetation, distance and effective slope classes to determine category of bush fire attack applicable to the site; and
- (f) Determine the appropriate level of construction found in Section 3 of AS3959 (1999) as identified within Table A3.3 to A3.5 for each façade of the building.

Planning for Bush Fire Protection (2006) identifies five categories of bushfire attack:-

1. **Low** – minimal attack from radiant heat and flame due to distance of site from vegetation, although some attack by burning debris possible. Insufficient threat to warrant specific construction requirements. No construction requirements.
2. **Medium** – attack by burning debris significant with radiant heat and flame attack insufficient to threaten building elements. **Level 1** Construction required according to AS3959 (1999).
3. **High** – attack by burning debris significant with radiant heat levels and flame threatening some building elements. **Level 2** Construction required according to AS3959 (1999).
4. **Extreme** – attack by burning debris significant and radiant heat levels and flame could threaten building integrity. **Level 3** Construction required according to AS3959 (1999).
5. **Flame Zone** – flames and radiant heat levels likely to significantly threaten building integrity and result in significant risk to residents who will not be adequately protected. Construction outside scope of AS3959 (1999).

A Bush Fire Attack Assessment was completed on the site using the above methodology. Details of this assessment are shown in Tables 4-6 below.

Table 4 – Bush Fire Attack Assessment for lots in south-east of site adjoining Fraser Drive

Aspect	Predominant Vegetation Formation Class within 140m of development	Average Slope of Land	Fire (weather) Area and FDI rating	Distance (m) of site from predominant vegetation class	Category of bush fire attack applicable to the site (Table A3.4)	Appropriate level of construction (Table A3.4)
North	Grasslands – to be cleared for residential development	Flat	80	-	Medium*	Level 1*
East	Woodland	Upslope	80	~30m	Medium	Level 1
South	Residential development	Flat	80	-	Medium*	Level 1*
West	Grasslands – to be cleared for residential development	Upslope	80	-	Medium*	Level 1*

*Due to the eastern facade of the proposed dwellings requiring Level 1 Construction, all other facades require Level 1 construction as outlined in Section A3.3 of Planning for Bush Fire Protection (2006).

Table 5 – Bush Fire Attack Assessment for lots in east of site adjoining Fraser Drive

Aspect	Predominant Vegetation Formation Class within 140m of development	Average Slope of Land	Fire (weather) Area and FDI rating	Distance (m) of site from predominant vegetation class	Category of bush fire attack applicable to the site (Table A3.4)	Appropriate level of construction (Table A3.4)
North	Grasslands – to be cleared for residential development	Flat	80	-	Medium*	Level 1*
East	Dry sclerophyll forest (Open Forest) (less than 1 ha)	Upslope	80	~30m	Medium	Level 1
South	Residential development	Upslope	80	-	Medium*	Level 1*
West	Grasslands – to be cleared for residential development	Upslope	80	-	Medium*	Level 1*

*Due to the eastern facade of the proposed dwellings requiring Level 1 Construction, all other facades require Level 1 construction as outlined in Section A3.3 of Planning for Bush Fire Protection (2006).

Table 6 – Bush Fire Attack Assessment for lots adjoining SEPP 14 wetland

Aspect	Predominant Vegetation Formation Class within 140m of development	Average Slope of Land	Fire (weather) Area and FDI rating	Distance (m) of site from predominant vegetation class	Category of bush fire attack applicable to the site (Table A3.4)	Appropriate level of construction (Table A3.4)
Integrated Housing (east of SEPP 14 wetland)						
North	Residential development	Flat	80	-	High	Level 2
East	Grasslands – to be cleared for residential development	Flat	80	-	High	Level 2
South	Grasslands – to be cleared for residential development	Flat	80	-	High	Level 2
West	Forested wetland	0-5° Downslope	80	20m	Extreme	Level 3
Lots south of SEPP 14 wetland						
North	Forested wetland	0-5° Downslope	80	20m	Extreme	Level 3
East	Grasslands – to be cleared for residential development	Flat	80	-	High	Level 2
South	Grasslands – to be cleared for residential development	Upslope	80	-	High	Level 2
West	Grasslands – to be cleared for residential development	Upslope	80	-	High	Level 2

The Inner Protection Area of 20m recommended in Section 5.1 of this report is based upon the need for the façade facing the hazard to comply with Level 3 construction as outlined in AS3959-1999. If the developer intends to construct to a lower bush fire protection standard, this Inner Protection Area may be increased to 24m for Level 2 construction or 34m for Level 1 construction. All other facades may be reduced by one level of construction but cannot fall to less than Level 1 construction.

6 Services

6.1 Water

The subject site has access to water infrastructure connected to the town water supply.

It is recommended that the water supply comply with the performance criteria outlined in Planning for Bush Fire Protection (2006). Namely that:-

Performance Criteria	Acceptable Solutions
The intent may be achieved where:	
Reticulated water supplies water supplies are easily accessible and located at regular intervals	- reticulated water supply to urban subdivisions uses a ring 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 pipes external to the building are metal including and up to any taps. - the provisions of parking on public roads are met.

6.2 Gas

Planning for Bush Fire Protection (2006) states that any reticulated or bottled gas shall be installed and maintained in accordance with AS1596. Metal piping is to be used.

All fixed gas cylinders should be kept clear of all flammable materials to a distance of 10m and shielded on the hazard side of the installation. Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings should not be used.

If a gas cylinder must be kept close to a building the release valve must be directed away from the building and at least 2m away from other combustible materials. Connections to and from gas cylinders are metal.

The above standards will be applied to future dwellings within the residential development.

6.3 Electricity

Underground electrical transmission lines are favoured by Planning for Bush Fire Protection (2006) and are recommended for the proposed subdivision. Where overhead electrical transmission lines are necessary the following guidelines apply:-

- lines are installed with short pole spacing (30m) unless crossing gullies, gorges or riparian areas; and
- regular inspections are carried out to ensure that no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).

7 Access/Egress

Principal access to the site will be gained from Fraser Drive, a bitumen sealed two lane road, which borders the eastern boundary of the site. There is a possibility that the road will be upgraded to four lanes some time in the future.

The Concept Plan indicates that access will also be provided to the site from Hillcrest Avenue, Ocean Avenue and Merlot Court.

A future interchange is currently being negotiated by the Tweed Shire Council and the Roads and Traffic Authority that will allow direct access from Fraser Drive to the Pacific Highway. The Pacific Highway is approximately one kilometre to the west of the site.

Approximately 2kms of internal access roads will be constructed to provide access to the proposed lots.

Roads will be two-wheel drive, all weather roads and be two-way, that is, at least two traffic lane widths with shoulders on each side, allowing traffic to pass in opposite directions.

Fraser Drive, as the perimeter road in Part 'A' of the development, will be linked to the internal road system at an interval of approximately 300 metres.

Roads will be through roads, however, where dead end roads are greater than 200m in length, as will be the case with the road constructed off Hillcrest Avenue, a minimum 12m radius turning circle will be incorporated. Such roads will be clearly sign posted as dead ends.

The internal road system should be upgraded where necessary to comply with the performance criteria outlined in Planning for Bush Fire Protection (2006). Namely that:-

Performance Criteria	Acceptable Solutions
The intent may be achieved where:	
public road widths and design allow safe access for firefighters while residents are evacuating an area.	- traffic management devices are constructed to facilitate access by emergency services vehicles. - curves of roads (other than perimeter roads) are 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. - there is a minimum vertical clearance to a height of four metres above the road at all times.
roads that are clearly sign-posted (with easily distinguishable names) and buildings/properties that are clearly numbered.	for public roads greater than 6.5 metres wide locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression.

• parking does not obstruct the minimum paved width	• parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays. • public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road.
• 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 15 tonnes for areas with reticulated water). Bridges clearly indicate load rating.

8 Recommendations and Conclusion

In summary, the following measures are recommended to be applied to the Concept Plan for the proposed Fraser Drive residential subdivision:-

- (a) Asset Protection Zones, where required, are to be maintained on all aspects of the lots as specified in Section 5.1 of this report.
- (b) Dwellings on lots in the east and south-east of the site adjoining Fraser Drive will need to comply with Level 1 construction as outlined in AS3959-1999.
- (c) The elevation of the integrated housing and residential lots facing the SEPP 14 Wetland/Forested Wetland is to be constructed in accordance with Level 3 performance levels AS3959-1999. If the developer intends to construct to a lower bush fire protection standard, the Inner Protection Area may be increased to 24m for Level 2 construction or 34m for Level 1 construction. All other facades may be reduced by one level of construction but cannot fall to less than Level 1 construction.
- (d) The subdivision will be serviced by a reticulated water supply. The water system and installed fire hydrants should comply with the performance criteria outlined in Section 4.1.3 of Planning for Bush Fire Protection (2006).
- (e) Underground electrical transmission lines are recommended, although where overhead electrical transmission lines are installed these should comply with Section 4.1.3 of Planning for Bush Fire Protection (2006).
- (f) The internal road system should be constructed and upgraded where necessary to comply with Section 4.1.3 of Planning for Bush Fire Protection (2006).

The determining authorities and RFS officers may suggest additional or alternative measures be included in the planning and construction of individual dwellings.

It is considered that should the recommendations in this assessment be incorporated in the design and construction of the proposed subdivision, that the fire hazard present is containable to a level considered necessary to provide an adequate level of protection to life on the site. While it is believed that the implementation of the measures and recommendations contained within this report would contribute to the amelioration of the potential impact of any bush fire upon this site, they do not and cannot guarantee that the area will not be affected by bush fire at some time.

If there is a need to discuss any matter raised in this report, please do not hesitate to contact Bridget Aulton on (02) 6625 1704.

9 References

Councils of Standards Australia AS3959 (1999) *Australian Standard "Construction of buildings in bush fire-prone areas"*.

NSW Rural Fire Service (2006) *Planning for Bush Fire Protection – A Guide for Councils, Planners, Fire Authorities and Developers*.

Cardno (2006) *Ecological Assessment*.

Tweed Shire Bush Fire Management Committee (2002) *Tweed Bush Fire Risk Management Plan*.

Tweed Shire Council (2000) *Tweed Local Environmental Plan*.

APPENDIX A – TWEED SHIRE COUNCIL BUSH FIRE MAP



Tweed Shire Council Bushfire Prone Land Map. Date Plotted: 1 September 2006

APPENDIX B - SITE PHOTOS



Northern aspect showing north-east corner of site



Southern aspect showing south-east corner of site



North-western slopes of site



Eastern slopes of site



North-west aspect from south-east corner of site

APPENDIX C – VEGETATION PHOTOS



Close up of vegetation adjacent Fraser Drive in south-east corner of site



Long shot of vegetation adjacent Fraser Drive in south-east corner of site



Vegetation adjacent Fraser Drive in east of site



Vegetation adjacent Fraser Drive in east of site



SEPP 14 Vegetation in north of site



SEPP 14 Vegetation in north of site

APPENDIX D – CONCEPT PLAN

PRELIMINARY ONLY

DEVELOPMENT STATISTICS

STAGE 1A

Total Stage Area	3,008 ha
Area of Open Space	1,712 ha
Water Quality	
Total No. of Allotments	12 (19 Dwellings)
450 - 475 m ²	1
480 - 509 m ²	1
510 - 539 m ²	3
540 m ² +	7 (14 Dwellings)
Area of Road Widening	285 m ²
Area of New Road	5420 m ²
Length of New Road	
18.0m Wide Road	190 m
15.0m Wide Road	130 m

STAGE 1B

Total Stage Area	5,688 ha
Total No. of Allotments	1
450 - 475 m ²	1
480 - 509 m ²	1
510 - 539 m ²	19
540 m ² +	4425 m ²
Area of New Road	
Length of New Road	334 m

STAGE 2A

Total Stage Area	2,591 ha
Total No. of Allotments	32 (33 Dwellings)
450 - 475 m ²	5
480 - 509 m ²	3
510 - 539 m ²	5
540 m ² +	18
Area of Road Widening	112 Dwellings
Area of New Road	4858 m ²
Length of New Road	
15.0m Wide Road	323 m

STAGE 2B

Total Stage Area	10,495 ha
Area of Open Space	
Water Quality	3755 m ²
Park and Recreation	915 m ²
SEPP 14 Wetland Conservation	5.74 ha
Total No. of Allotments	26
450 - 475 m ²	26
480 - 509 m ²	2703 m ²
510 - 539 m ²	5222 m ²
540 m ² +	
Area of Road Widening	1988 m ²
Area of New Road	7112 m ²
Length of New Road	
6.5m Wide Road	191 m
15.0m Wide Road	399 m

STAGE 3A

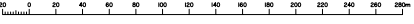
Total Stage Area	3,116 ha
Area of Open Space	
Park and Recreation	2520 m ²
Common Property Open Space	385 m ²
Total No. of Allotments	35 (43 Dwellings)
< 449 m ²	5
450 - 475 m ²	5
480 - 509 m ²	1
510 - 539 m ²	9
540 m ² +	7
Area of Road Widening	8 (16 Dwellings)
Area of New Road	1988 m ²
Length of New Road	7112 m ²
6.5m Wide Road	191 m
15.0m Wide Road	399 m

STAGE 3B

Total Stage Area	5,519 ha
Area of Open Space	
Park and Recreation	2726 m ²
Total No. of Allotments	27
450 - 475 m ²	27
480 - 509 m ²	2464 m ²
510 - 539 m ²	7948 m ²
540 m ² +	
Area of Road Widening	
Area of New Road	
Length of New Road	535 m

- LEGEND
- Stage Boundaries
 - Building Location Envelope
 - Park and Recreation / Water Quality
 - SEPP 14 Wetland Conservation
 - SEPP 14 Wetland 50m Buffer
 - SEPP 14 Wetland 20m APZ Buffer
 - 10m Wide Road Widening
 - Right of Way Access
 - Proposed Bln Pad Locations
 - Proposed Bus Stop
 - Proposed Footpath

Note
All dimensions and areas are approximate only,
and are subject to survey and Council approval.
Dimensions have been rounded to the nearest 0.1
metres.
The boundaries shown on this plan should not be
used for final detailed engineers design.
Contours and Sep 14 Wetland Information sourced
from B&P Surveys, Plan T14246-12045 E



Level Datum	Date	05 MARCH 2008
Origin	Surveyed	
	Comp By.	KCH/JWP/TJE/WW
	DWG Name.	20934-PRO
Scale	Local Authority	TWEED SHIRE COUNCIL
1:2000 @ A1	Job Reference	20934

CLIENT	PROJECT
MFS DIVERSIFIED	PROPOSED SUBDIVISION
PROPOSED LAYOUT	Plan Reference
FRASER DRIVE	20934-5H
TWEED HEADS	

CONICS (BRISBANE) PTY LTD
A.C.N. 010370449
A.B.N. 81591046588
743 ANN STREET
PO BOX 1559,
FORTITUDE VALLEY QLD 4006.
TELEPHONE 07 3237 8899
FACSIMILE 07 3237 8833
email: conics@conics.com.au
web: www.conics.com.au

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15 May 2008



Attn: Peter Johnson

MFS Diversified Developments Pty Ltd

PO Box 7720

GCMC Bundall QLD 9726

tel +61 2 6625 1704
fax +61 2 6625 2376
mob 0414 527070
email brad@boskae.com.au

PO Box 7240
Lismore NSW 2480

ABN 23558219895

Dear Mr Johnson

Addendum to Bush Fire Assessment: Proposed residential subdivision, Fraser Drive, South Tweed, Lot 2 DP1000385 and Lot 9 DP 1039569

BOSKAE Environmental Planning has been engaged by MFS Diversified Developments Pty Ltd to provide additional information for the above development application. Tweed Shire Council and the NSW Department of Planning require further information to determine the bush fire risk of vegetation in the north-west of the site that is to be managed by council as open space.

Bridget Aulton of BOSKAE Environmental Planning inspected the site on 9 May 2008 to perform an assessment of the bush fire risk of the area south-west of the SEPP14 Wetland. The area is located adjacent to neighbouring lots on Hillcrest Avenue and Ridgeway Street, and recommendations are made to adequately manage the bush fire risk presented to the adjoining residential land.

The proposed open space is predominantly cleared land with some trees interspersed along the slope. See attached photos.

The area contains slopes ranging from 11° to 16° and lays upslope to the hazard presented by the SEPP14 Wetland to the north-east. Considering that the slopes are less than 18°, this area is considered capable of being accessed by council officers for maintenance.

The proposed open space should be managed as a low fuel zone or Outer Protection Area (OPA) for 20m from the rear boundaries of the residential properties. The OPA should provide a tree canopy cover of less than 30% and be managed in accordance with Planning for Bush Fire Protection 2006. The understory in this area should be managed (mowed where possible) to treat all shrubs and grasses on an annual basis in advance of bush fire season (usually September).

If there is a need to discuss any matter raised in this assessment, please do not hesitate to contact Bridget Aulton on (02) 6625 1704.

Yours sincerely

A handwritten signature in dark ink, appearing to read "Bridget Aulton", written in a cursive, flowing style.

Bridget Aulton

Enc: Photos of area south-west of SEPP14 Wetland

Public Open Space Area, South-west of SEPP14 Wetland

(Source: Google Earth 14 May 2008)



Selection of Photos of Public Open Space Area

(Photos taken 9 May 2008)





