BUSHFIRE ENGINEERING BRIEF
ALTERNATE SOLUTION

PROPOSED ECO-TOURIST DEVELOPMENT,
QUAD BIKE VISITORS CENTRE AND MANAGERS RESIDENCE

LOT 227 DP 1097995
32 Stockton Bight Track, Fullerton Cove

Date: **8/04/2019**

Prepared for: **Worimi Local Aboriginal Land Council**

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Document Status

Revision No.	Issue	Description	Reviewed	Approved by Director
1	08/05/2018	Draft	M. Hamilton	P.Couch
2	11/05/2018	Final	M. Hamilton	P.Couch
3	16/05/2018	Reviewed report with stakeholders listed	M. Hamilton	P.Couch
4	31/07/2018	Revised report with commons building closeable to become a safe central refuge that will comply with BAL-12.5	M. Hamilton	P.Couch
5	8/04/2019	Revised report including moving the quad bike visitors centre out of BAL-FZ, increased asset protection zones around amenities and adjacent walkway between quad bike visitors centre and central safe shelter	M. Hamilton	P.Couch

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1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES

This report has assessed the proposed eco-tourist development, quad bike visitors centre and managers residence against the requirements of section 100B of the Rural Fires Act 1997, AS3959 (2009) Building in Bushfire Prone Areas and Planning for Bushfire Protection (2006).

This report establishes that the eco-tourist development, quad bike visitors centre and managers residence does not comply with the acceptable solutions of Planning for Bushfire Protection 2006 and offers an alternate solution to provide safe shelter for users of the eco-tourist development whilst reducing impact on the environment.

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL

Applicant Name	Worimi Local Aboriginal Land Council		
Site Address	32 Stockton Bight Track, Fullerton Cove	**Lot/Sec/DP**	Lot 227 DP 1097995
Local Government Area	Port Stephens	**FDI**	100
Bushfire Prone Land	Yes, mapped bushfire prone land		
Type of development	Eco-tourist development and quad bike visitors centre	**Type of Area**	Coastal Bushland/ Rural Interface
Special Fire Protection Purpose	Yes	**Flame Temperature**	1200K
Application Complies with DTS Provisions	No. Alternate solution examining eco-tourist development having more than 12 persons.	**Referral to RFS required**	Yes. Bushfire Safety Authority Required

TABLE 2.0 – BUSHFIRE THREAT ASSESSMENT – QUAD BIKE VISITORS CENTRE

	North	**East**	**South and Southwest**	**Northwest**
AS3959 (2009) Vegetation Structure	Forest	Scrub/Tall Heath	Scrub/Tall Heath	Forest
Asset Protection Zone	39 metres	20 metres	20 metres	39 metres
Accurate Slope Measure	12 degrees downslope	9 degrees downslope	9 degrees downslope	12 degrees downslope
Slope Range	11 to 15 degrees downslope	6 to 10 degrees downslope	6 to 10 degrees downslope	11 to 15 degrees downslope
AS3959 (2009) Bushfire Attack Level (BAL)	BAL-40	BAL-29	BAL-29	BAL-40

TABLE 2.1 – BUSHFIRE THREAT ASSESSMENT – THE COMMONS BUILDING (SAFE CENTRAL REFUGE)

	North	East	South	West
AS3959 (2009) Vegetation Structure	Scrub/Tall Heath	Shrubland/Short Heath	Shrubland/Short Heath	Scrub/Tall Heath
Asset Protection Zone	74 metres	106 metres	85 metres	116 metres
Accurate Slope Measure	9 degrees upslope	Level/cross-slope	5 degrees upslope	5 degrees downslope
Slope Range	Level/upslope	Level/upslope	Level/upslope	1 to 5 degrees downslope
PBP (2006) Table A2.6 Minimum Setbacks	45 metres	35 metres	35 metres	50 metres
AS3959 (2009) Bushfire Attack Level (BAL)	BAL-12.5	BAL-12.5	BAL-12.5	BAL-LOW

TABLE 2.2 – BUSHFIRE THREAT ASSESSMENT – ECO-TOURIST CABINS

	North, South and Southwest	East	Southeast	Southwest and West
AS3959 (2009) Vegetation Structure	Shrubland and grassland	Forest	Shrubland	Forest
Asset Protection Zone	15 metres or greater	32 metres	15 metres	25 metres
Accurate Slope Measure	Level/ Upslope	5 degrees downslope	5 degrees downslope	12 degrees upslope
Slope Range	Level/ Upslope	1 to 5 degrees downslope	1 to 5 degrees downslope	Level/Upslope
AS3959 (2009) Bushfire Attack Level (BAL)	BAL-19	BAL-29	BAL-19	BAL-29

TABLE 2.3 – BUSHFIRE THREAT ASSESSMENT – MANAGERS RESIDENCE

	North	East	Southeast	West
AS3959 (2009) Vegetation Structure	Shrubland and grassland	Shrubland and grassland	Forest	Scrub
Asset Protection Zone	25 metres	25 metres or greater	59 metres	25 metres
Accurate Slope Measure	5 degrees downslope	5 degrees downslope	12 degrees upslope	4 degrees downslope
Slope Range	1 to 5 degrees downslope	1 to 5 degrees downslope	Level/Upslope	1 to 5 degrees downslope
AS3959 (2009) Bushfire Attack Level (BAL)	BAL-12.5	BAL-12.5	BAL-12.5	BAL-19

TABLE 3 – PLANNING FOR BUSHFIRE PROTECTION (2006) 4.2.7 COMPLIANCE

Performance Criteria	Proposed Development Determinations	Method of Assessment
Asset Protection Zone	Minimum setbacks have been determined in accordance with Planning for Bushfire Protection (2006) Table A2.6 and are able to be achieved within the subject site. Construction Asset Protection Zones have been determined in accordance with AS 3959-2009 Method 1 Simplified Procedure.	Acceptable Solution
Access – Internal Roads	The internal access roads are to comply with Planning for Bushfire Protection (2006) Section 4.2.7.	Acceptable Solution
Water Supply	A static water supply is to be provided in accordance with Planning for Bushfire Protection (2006) Section 4.2.7.	Acceptable Solution
Electrical Supply	The electrical transmission lines to the local area are located overhead with landscaping onsite to be managed so 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). The electrical supply to the proposed buildings will be located underground.	Acceptable Solution
Gas Supply	Gas supply if installed shall comply with deemed to satisfy requirements.	Acceptable Solution
Emergency and Evacuation Planning	The facility shall have an emergency management plan developed in accordance with AS 3745 'Emergency control organisation and procedures for buildings, structures and workplaces'. Specific consideration shall be given to the eco-tourism development for the evacuation of large volumes of people and consider their expected ages. A 4 metre asset protection zone shall be located around the emergency evacuation path between the quad bike visitors centre and the central safe refuge.	Acceptable Solution

2.0 INTRODUCTION

2.1 PURPOSE OF REPORT

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed eco-tourist development, quad bike visitors centre and managers residence to be constructed at Lot 227 DP 1097995, 32 Stockton Bight Track, Fullerton Cove. The assessment acknowledges the requirements of section 100B of the Rural Fires Act (1997) and Planning for Bushfire Protection (2006) to protect persons, property and the environment from danger that may arise from a bushfire.

Under the provisions of section 100B of the Rural Fires Act (1997) as amended, a Bushfire Safety Authority (BFSA) is required from the Commissioner of the NSW Rural Fire Service.

This report complies with Rural Fires Regulation (2008) Clause 44 Application for Bushfire Safety Authority. The assessment encompasses the subject site and neighbouring areas.

The recommendations within this report address the aims and objectives of Planning for Bushfire Protection (2006) to provide safe defendable space to fire fighters in a bushfire event.

2.2 PROPOSED DEVELOPMENT

The land is zoned E3 environmental management and is comprised of a single allotment being 63.18 hectares in size. The proposed development includes a visitors centre for quad bike riding and quad bike workshop. The development also includes a class 9b general assembly building performance stage for education on aboriginal culture and performances. The commons building is a closeable structure with metal roof and closeable doors and ventillation devices, it is the central safe refuge. An eco-tourist accommodation development is also proposed including 44 lodges circling south of the general assembly building. A managers residence will be located adjacent the eco tourist cabins.

Peak facility user occupancy estimates are detailed below:
Visitors Centre - Quad Bike Business
120 Visitors (4 x Groups of 30 Riders)
12 Staff
Commons Building (General Assembly Building) Aboriginal Heritage and Eco- tourism
222 Patrons (3 x 74 Passenger Coaches)
20 Staff/ Performers
Eco-tourist Accommodation (44 Lodges)
440 Patrons maximum

2.3 SIGNIFICANT ENVIRONMENTAL FEATURES

There are no known significant environmental features affecting the site.

2.4 ENVIRONMENTAL ASSETS

There are no known environmental assets on the subject site.

2.5 ABORIGINAL HERITAGE

Searches of National Parks and Wildlife database identify 4 Aboriginal sites are recorded in or near the subject site as defined by National Parks and Wildlife Act 1974.

2.6 STAKEHOLDERS

Name	Position
Worimi Local Aboriginal Land Council	Owner
Phillip Couch – Newcastle Bushfire Consulting	Bush Fire Engineering Consultant
Derive Design	Architect
Environmental Property Services	Project Manager
Port Stephens Council	Approval Authority
New South Wales Rural Fire Service (NSW RFS)	Approval Authority

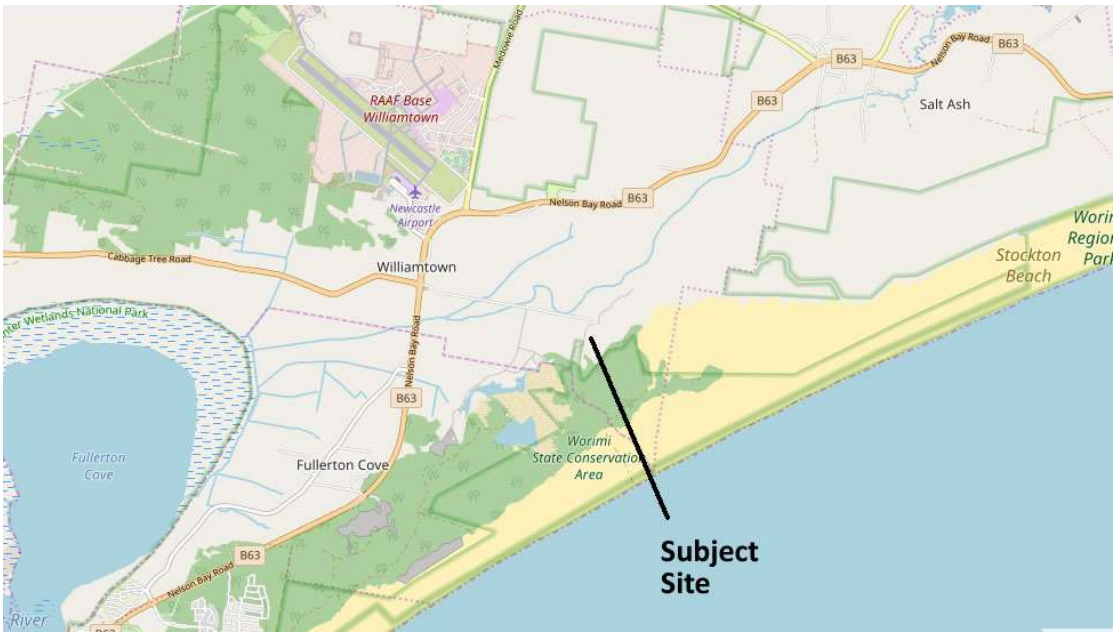

FIGURE 2 – LOCALITY MAP
Courtesy of OpenStreetMap

PHOTOGRAPH 1 – SITE PHOTO

View of the subject site looking southwest to where the proposed eco-tourist lodges will be located. The land contains primarily semi-managed grassland and shrubland located where the eco-tourist lodges and the general assembly building will be located. Forest extends around the perimeter of the shrubland.

PHOTOGRAPH 2 – EASTERN SHRUBLAND THREAT

View of the grassed valley located north of the proposed eco-tourist development. The shrubland increases in size to the north of the valley to form scrub exceeding 2 metres in height where located adjacent the quad bike visitors centre.

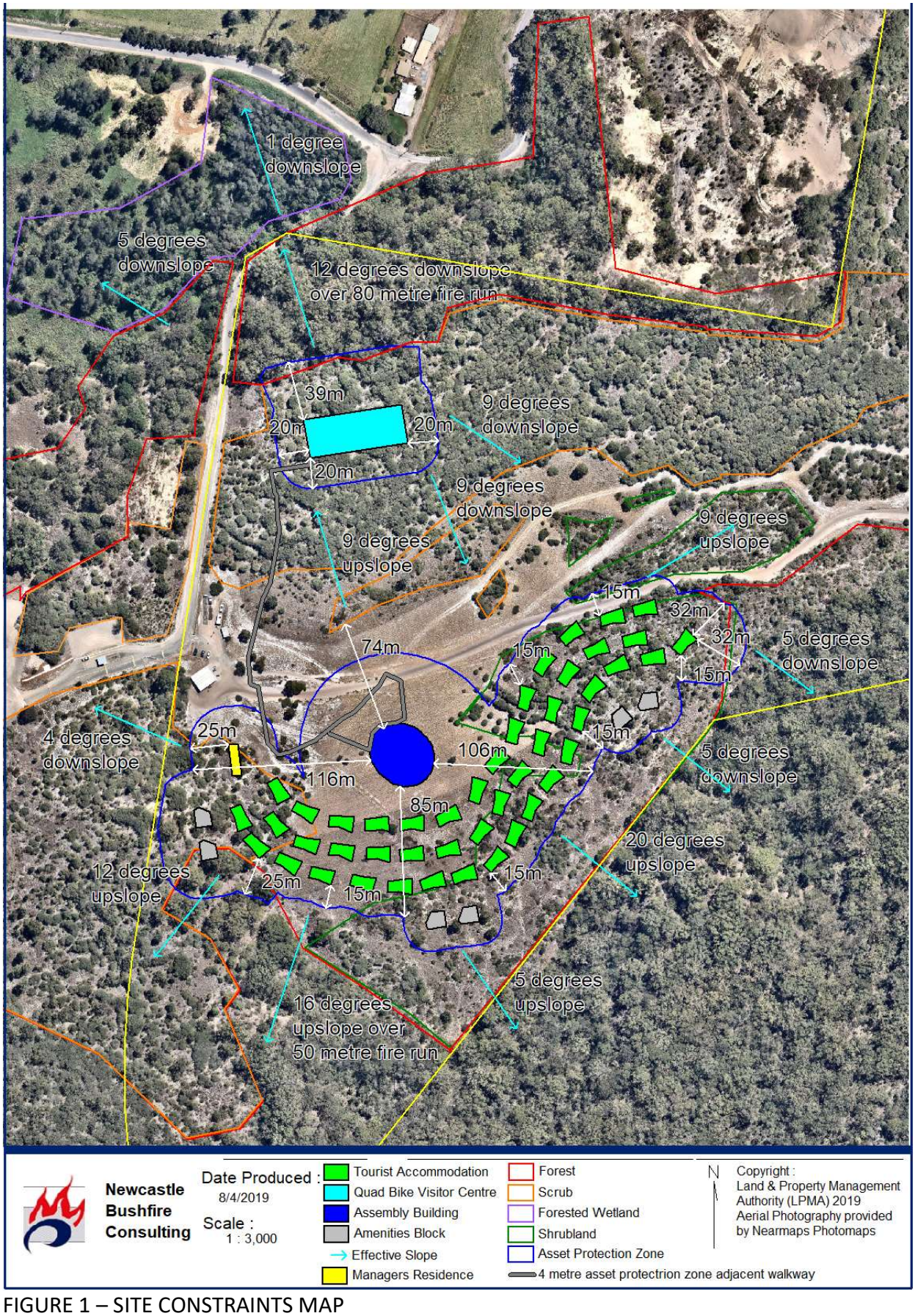

FIGURE 1 – SITE CONSTRAINTS MAP

3.0 BUSHFIRE ATTACK ASSESSMENT

3.1 VEGETATION CLASSIFICATION

Potential bushfire hazards were identified from Port Stephens Council bushfire prone mapping as occurring within the investigation area. Aerial mapping and inspection of the site reveals that the bushfire prone land map is reasonably accurate in respect to the current bushfire hazard.

The major vegetative threats have been determined using Keith (2004) to derive vegetation structures listed in Planning for Bushfire Protection (2006). General vegetation structures have been translated to AS3959 (2009) groupings.

Primary Vegetation Structures have been identified in Figure 1 – Site Constraints Map and separation distances shown in Tables 2.0-2.3 – Bushfire Attack Assessment.

3.2 EFFECTIVE SLOPE

Effective slope was measured using 1 metre contour data obtained from Department of Lands and verified by a laser hypsometer on site. The laser hypsometer verified slope within the vegetation calculating effective fire run slope from 5 separate measurements in each dominant direction.

Effective Slopes have been identified in Figure 1 – Site Constraints Map and slope ranges are shown in Table 2 – Bushfire Threat Assessment.

3.3 MINIMUM SETBACKS AND ASSET PROTECTION ZONES

Minimum setbacks for the central safe refuge have been determined in accordance with Table A2.6 (Planning for Bushfire Protection). The minimum Asset Protection Zone for special fire protection purpose developments has been demonstrated in Section 1 Executive Summary and Compliance Tables.

The required asset protection zone for all buildings is available within the subject site.

3.4 BUSHFIRE ATTACK LEVELS

Bushfire attack levels and relevant construction levels in accordance with AS3959 (2009) have been demonstrated in Section 1 Executive Summary and Compliance Tables, Table 2 Bushfire Threat Assessment.

PHOTOGRAPH 3 – SOUTHERN BUSHLAND THREAT

View of shrubland and grass located in the foreground where the eco tourist cabins will be located. Dry sclerophyl forest can be seen at the crest of the hill.

PHOTOGRAPH 4 – SITE ACCESS

View of present property access via Stockton Bight Track. There is significant turning area, staging area and parking area to the southwest of the proposed development due to this being the primary entry point to the Stockton Sand Dunes.

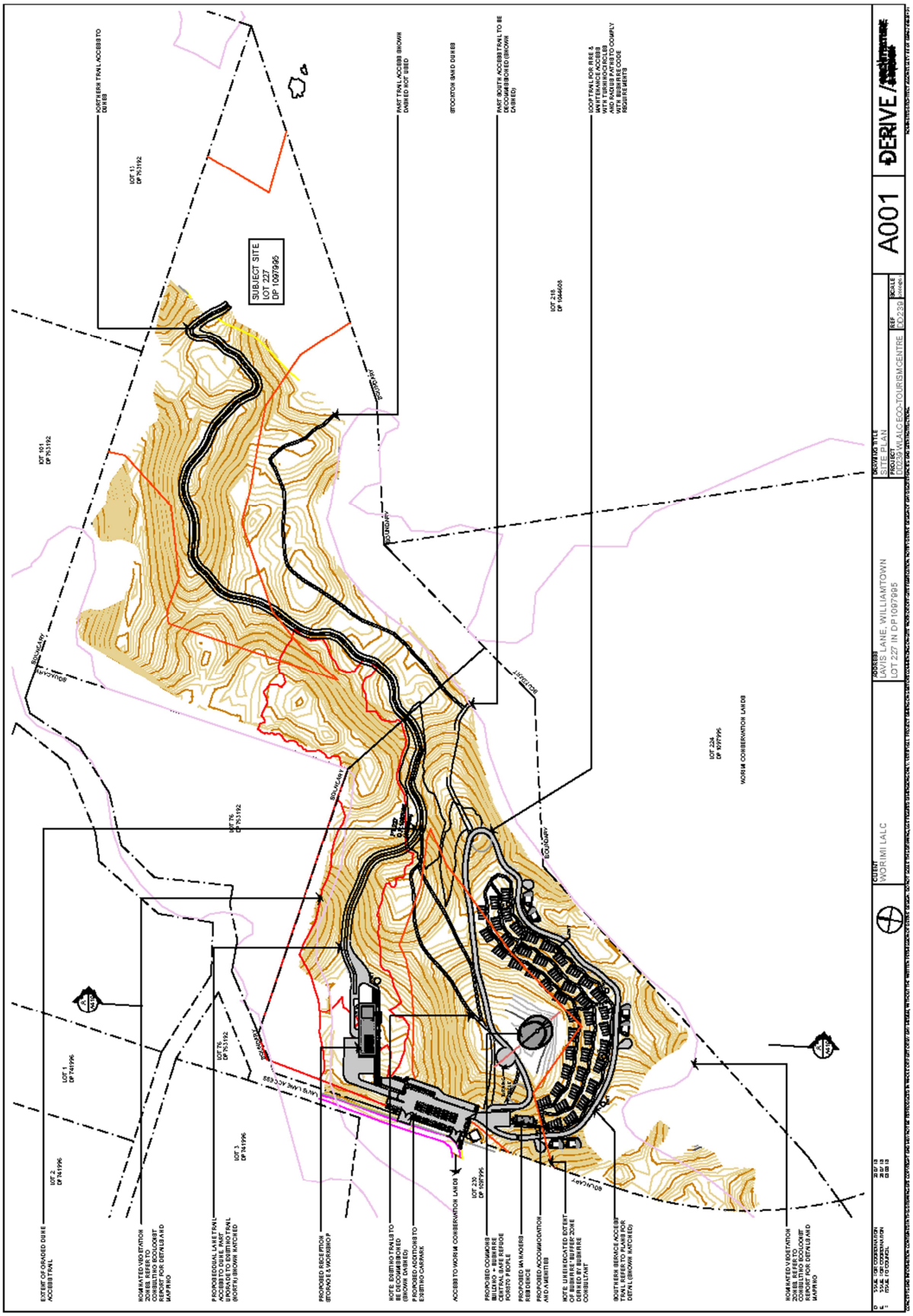

FIGURE 3 – SITE PLAN

4.0 UTILITY SERVICES AND INFRASTRUCTURE

4.1 WATER SERVICES

There will be no hydrant network servicing the site and static water supply is required. A static water supply, with provision for a minimum 10,000 litres per building shall be provided. There will be 44 tourist lodges, an eco-tourist general purpose assembly building, quad bike visitors centre and managers residence forming a total 47 buildings requiring 470,000 litres of static water supply.

The 470,000 litre water supply may be either a tank, dam or pool, providing that the 470,000 litres is available for firefighting purposes. The following requirements should be adhered to for the water supply:

- The water source shall be made available or located within the inner protection area (IPA) and away from the structure. This is measured to the central safe regue buildings being the visitors centre and the eco-tourist general purpose assembly building.
- A hardened ground surface for truck access is to be supplied up to and within 4 metres of the water source.
- A 65mm metal Storz outlet with a gate or ball valve shall be provided.
- Above ground tanks are manufactured of concrete or metal and raised tanks are to have their stands protected. Plastic tanks shall not be used.
- The water tank if located above ground shall be of a non-combustible material.
- The gate or ball valve, pipes and tank penetration are adequate for full 50mm inner diameter water flow through the Storz fitting and are metal.
- All associated fittings to the tank shall be non-combustible.
- A minimum 5hp or 3kW petrol or diesel powered pump shall be made available to the water supply.
- An 'SWS' marker shall be obtained from the local NSW Rural Fire Service and positioned for ease of identification by brigade personnel and other users of the SWS. In this regard:
  a) Markers must be fixed in a suitable location so as to be highly visible; and
  b) Markers should be positioned adjacent to the most appropriate access for the static water supply.

4.2 ELECTRICITY SERVICES

The existing electrical supply to the local area is via overhead electrical transmission lines. Landscaping onsite should be managed so 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).

The proposed electrical transmission lines servicing the development will be located underground.

4.3 GAS SERVICES

- Reticulated or bottled gas installed and maintained in accordance with AS 1596 (2002) and the requirements of the relevant authorities. Metal piping is to be used.
- Fixed gas cylinders to be kept clear of flammable material by a distance of 10m and shielded on the hazard side of the installation.
- Gas cylinders close to the dwelling are to have the release valves directed away from the building and at least 2m from flammable material with connections to and from the gas cylinder being of metal.
- Polymer sheathed flexible gas supply lines to gas meters adjacent to the buildings are not to be used.

5.0 PROPERTY ACCESS

Public Road Access
The subject site is located on Stockton Bight Track being a bitumen road terminating in a wide turning area and parking area to the southwest of the site where Stockton Beach access is available. Emergency Services are expected to have good access to the area at most times.

The existing public road network is deemed adequate to handle increased volumes of traffic in the event of a bush fire emergency with dedicated bus parking bays proving for effective evacuation or staging area if buses are not present. No new public roads are proposed for this development.

Fire Trails
Dedicated fire trails do not intersect the vegetation in the local area however access trails are utilised by the quad bike adventure business and beach access is available. No new fire trails are proposed for this development.

Property Access
Property access is provided by way of Stockton Bight Track providing access from the public road system directly to the private land giving fire fighters access to the buildings.
Property access roads shall comply with section 4.2.7 of Planning for Bush Fire Protection (2006) as detailed below:

- Internal roads are two-wheel drive, sealed, all-weather roads.
- Roads are through roads. Dead end roads are not more than 100 metres in length from a through road, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end.

- Traffic management devices are constructed to facilitate access by emergency services vehicles.
- Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.
- The minimum distance between inner and outer curves is six metres.
- Maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees.
- Crossfall of the pavement is not more than 10 degrees.
- Roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge).
- Roads are clearly sign-posted and bridges clearly indicate load ratings.
- The internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).

Property access shall be provided to the central safe refuge as per NSW RFS Ecotourism Fact Sheet 1/14.

Specific examination of property access has been provided in section 8.0 Alternate Solution which examines the performance criteria of an eco-tourist development.

6.0 LANDSCAPING MAINTENANCE

It is recommended that landscaping is undertaken in accordance with appendix 5 of Planning for Bushfire Protection (2006) and maintained for the life of the development.

Trees should be located greater than 2 metres from any part of the roofline of a building. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground.

The landscaped area should be maintained free of leaf litter and debris. The gutter and roof should be maintained free of leaf litter and debris.

Landscaping should be managed so that flammable vegetation is not located directly under windows.

Ground fuels such as fallen leaves, twigs (less than 6mm in diameter) and branches should be removed on a regular basis, and grass needs to be kept closely mown and where possible green.

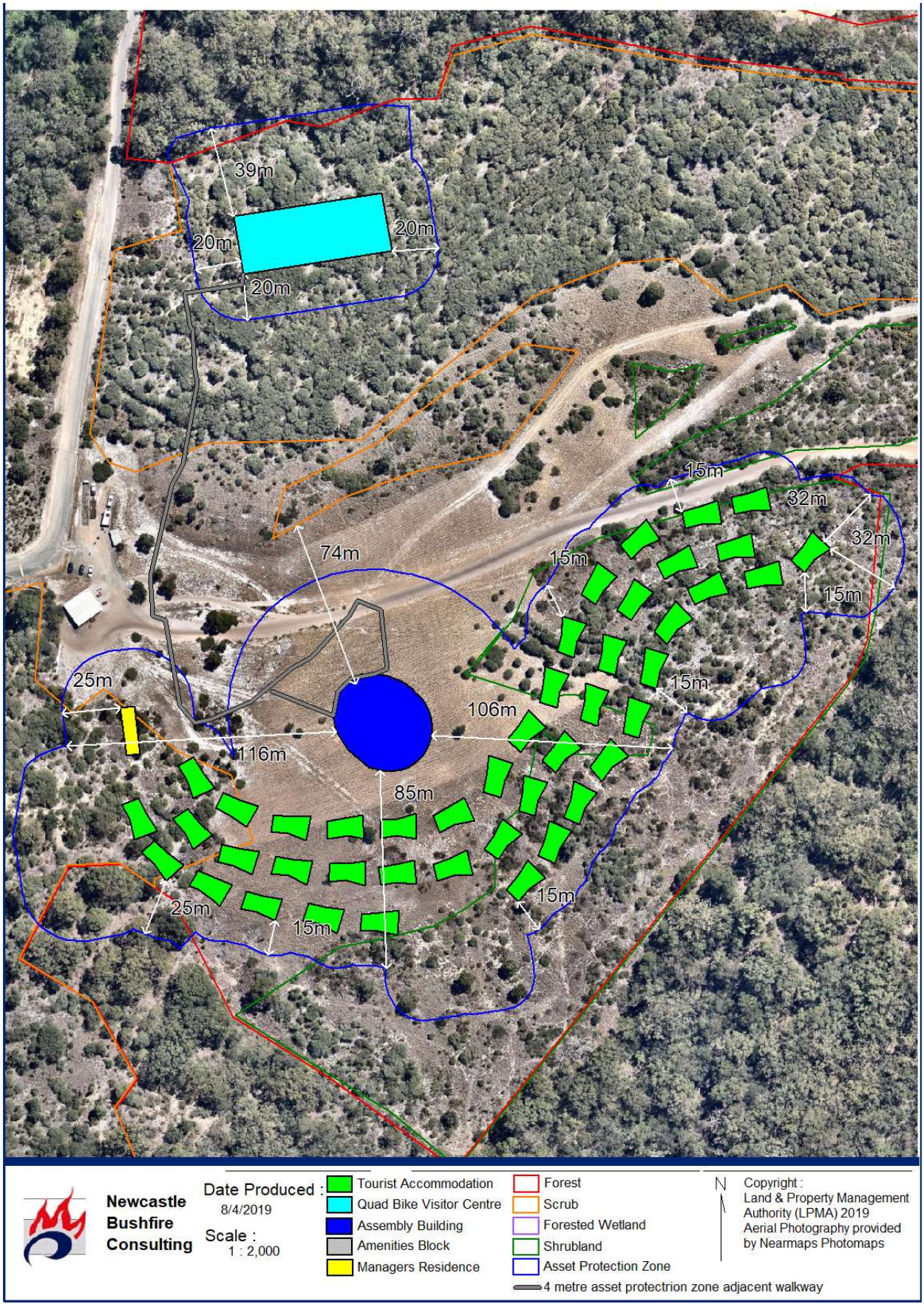

FIGURE 4 – ASSET PROTECTION ZONE MAP

7.0 EMERGENCY AND MAINTENANCE PLANS

7.1 BUSHFIRE MAINTENANCE PLANS

A fire management plan is to be prepared that addresses the following requirements:

a) Contact person / department and details; and
b) Schedule and description of works for the construction of asset protection zones and their continued maintenance.
c) Landscaping shall be managed as outlined within section 4.1.3 and Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for asset protection zones.

7.2 FIRE EMERGENCY PROCEDURES

Arrangements for emergency and evacuation are to comply with section 4.2.7 of Planning for Bush Fire Protection 2006.

An Emergency /Evacuation Plan is to be prepared in accordance with the NSW Rural Fire Service Guidelines for the Preparation of Emergency/Evacuation Plan and comply with Australian Standard AS 3745 -2002 'Emergency Control Organisation and Procedures for Buildings Structures and Workplaces for Residential Accommodation'.

8.0 ALTERNATE SOLUTION

At the request of the client I have been asked to provide an unbiased safety model for the proposed development. The proposed alternate solution offers compliance with the National Construction Code 2016 performance measure of reducing the chance of ignition to the building from the firefront and the objectives of Planning for Bushfire Protection (2006).

Proposed Alternate Solution
The proposed alternate solution examines an eco-tourist development for a 440 person peak occupancy accommodation load with Planning for Bushfire Protection (2006) nominating a maximum 12 person occupancy for eco-tourism.
The alternate solution examines the recommendations of New South Wales Rural Fire Service Ecotourism Factsheet 1/14 dated October 2014.

Evaluation of Alternate Solutions

Planning for Bushfire Protection (2006) details the deemed to satisfy conditions for special fire protection purpose with full compliance being made for "the Commons" eco-tourism general assembly building which will be exposed to 10 kw/m2 or less. The building is a closeable assembly hall that will comply with BAL-12.5 construction.

The proposed building shall be built in a location where a person could be evacuated to less than 10 kw/m2 radiant heat exposure.

It is deemed unlikely that a firefighter would evacuate a building user directly towards the bushland and if a fire was impacting on the buildings the 10 kw/m2 radiant heat exposure would be likely to last for 30 seconds or less.

New South Wales Rural Fire Service Ecotourism Factsheet 1/14 dated October 2014.

The eco-tourist lodges are located on E3 Environmental Management zoned land with an intention to reduce ecological impact in sympathy with the eco-tourist and aboriginal education focus of the development. The development will provide asset protection zones for BAL-29 or lower and buildings that comply with the appropriate bushfire attack level.

Building occupants and firefighters are able to evacuate to the safe central shelter (general assembly building) which will be in a direction away from the bushland into a defendable valley of managed grass.

The site is not deemed isolated with a short distance to primary arterial roads servicing Port Stephens. Fire fighting response is not deemed excessive and the duration via vehicle is not deemed significant however the co-ordination of 440 tourist accommodation users would be the primary concern which shall be managed through emergency evacuation planning.

<u>Emergency Management Planning</u>

An emergency management plan shall be prepared with the site recommended to be closed on catastrophic fire danger days. Many of the eco-tourist cabins are exposed to less than 10 kw/m2 of radiant heat. The majority of the southernmost cabins will be exposed to BAL-19 with cabins to the west and east exposed to BAL-29 if evacuating directly towards the bushland. Emergency management planning shall examine the expected occupancy of the eco-tourist cabins and provide safe central refuge for the building occupants. The Commons Building is 870 square metres in size and shall be able to house the entirety of the eco-tourism development and quad bike riders (Sand Dune Adventures) based on the Building Code of Australia (BCA) occupancy loading of 1 person per 1 square metre for a hall (BCA Table D1.13).

An emergency management plan shall nominate a safe evacuation point within the sand dunes exposed to less than 2 kw/m2 of radiant heat exposure for any quad bike riders located within the sand dunes if a fire front impacts.

Refuge Building/s

- The identified refuge building/s are designed to accommodate all occupants of the facility;
- Any refuge building must comply with the occupancy levels permissible for that structure under the BCA;
- To ensure radiant heat levels of greater than 10kw/m² are not experienced at any external point of the building refuge buildings are provided with APZs in accordance with Table A2.6 of PBP;
- The refuge building/s are designed and sited in accordance with the principles listed in PBP and constructed to a minimum BAL 12.5 of AS 3959;
- Vehicular access (internal access) is to be provided from a public road to the nominated refuge building and comply with the requirements of Section 4.2.7 of PBP;
- Pedestrian paths from cabins to the refuge building/s are to be provided and clearly signposted;
- APZs are provided wholly within the boundaries of the proposed development site (exceptional circumstances for the provision of APZ's on adjoining land may apply as per Section 3.3b PBP).
- The emergency management plan shall examine management of potential traffic conflicts (i.e. emergency vehicles vs evacuating members of the facility and beach users).
- The water, electricity and gas supply to the nominated refuge building/s is to comply with the requirements of Section 4.2.7 of Planning for Bushfire Protection.

Sand Dune Adventures Visitors Centre

AS3959 (2009) construction levels are designed for residential development and the proposed development is identified as "other development" under Planning for Bushfire Protection (2006). The provisions of the National Construction Code (2016) for fire safety are accepted for bushfire purposes where the aims and objectives of Planning for Bushfire Protection are met.

Construction of the building is to comply with National Construction Code structural fire safety provisions.

The aims and objectives of Planning for Bushfire Protection for a non-combustible commercial building are addressed below.

Afford occupants of any building adequate protection from exposure to a bush fire

Building exits are available, located away from the vegetative threats. Building users can evacuate south away from the bushland threat. Evacuation planning in the event of bushfire should clearly indicate to building occupants to evacuate in a direction away from the fire or stay within the sand dunes where people will be riding quad bikes.

The building walls and roof are concrete non-combustible walls with an FRL 60/60/60 fire rating. The primary vulnerabilities will be metal roller doors and exit doors with no known fire rated roller doors. The building has been moved to be located outside of flame contact zone as defined by method 1 AS3959 simplified assessment.

Provide for a defendable space to be located around buildings
The building directly interfaces forest and scrub. In the event of bush fire, firefighters will have direct access via onsite property access. In the event a fire front impacts on the building defendable space is available south of the building where fire fighters can shelter whilst the fire front passes or within the commons building.

Asset protection zones are listed below and represent defendable space when coupled with present firefighting access.

Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition
There is an asset protection zone surrounding the building to have the building outside of flame zone.

The building shall be constructed to National Construction Code Structural Fire Resistance construction levels.

Examination of potential building ignition
The building is outside of BAL-FZ. The metal roller doors could deform in the event of sustained direct flame contact but will not ignite. The building shall be constructed in accordance with National Construction Code Structural Fire Resistance construction levels.

Ensure that safe operational access and egress for emergency service personnel and residents is available
The primary access to the facility offers compliance with Planning for Bushfire Protection access requirements and is designed for larger vehicles. A firefighting staging area is available adjacent the building.

Following discussions with New South Wales Rural Fire Service a 4 metre asset protection zone will be provided around the footpath linkage between the visitors centre and the central safe refuge/assembly building.

Provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ)
The building manager shall maintain landscaping and fuel management in accordance with Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for asset protection zones.

Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire fighting)
Utility services shall comply with Planning for Bushfire Protection 2006.

Bushfire Certification
In accordance with NSW RFS Alternate Solutions Practice Note 1/07 (Release 3), this report has been prepared by Phillip Couch, a Fire Protection Association, Bushfire Planning and Design - Alternate Solutions certified practitioner (FPAA BPAD-Level 3) and a Graduate Fire Engineer with the Institution of Fire Engineers. Phillip Couch certifies that the described Bushfire Behaviour is the expected fire behaviour for the adjacent vegetation and the design complies with the Performance Criteria of Planning for Bushfire Protection.

Phillip Couch GIFireE
Bach Info Science
Grad Dip Design for Bushfire Prone Areas
FPAA BPAD – Level 3 Accreditation Number BPD-PA-16132

9.0 RECOMMENDATIONS

Based upon an assessment of the plans and information received for the proposal, it is recommended that development consent be granted subject to the following conditions:

1. The proposed building works of the Sand Dune Adventures visitors centre shall comply with National Construction Code (2016) Structural Fire Resistance requirements. The wall construction and roof construction shall be concrete with a minimum fire rating of FRL 60/60/60.
2. The proposed building works of the "Commons" general purpose assembly building shall comply with BAL-12.5 in accordance with AS 3959-2009 Building in Bushfire Prone Areas and the construction requirements of Planning for Bushfire Protection (2006) Appendix 3 (amended May 2010).
3. The proposed building works of the managers residence shall comply with BAL-19 in accordance with AS 3959-2009 Building in Bushfire Prone Areas and the construction requirements of Planning for Bushfire Protection (2006) Appendix 3 (amended May 2010).
4. The tourist accommodation units numbered 2, 3, 5, 6, 8, 9, 11, 12, 14, 15, 17, 18, 20, 21, 23, 24, 26, 27, 29, 30, 32, 33, 36 and 39 shall comply with BAL-12.5 in accordance with AS 3959-2009 Building in Bushfire Prone Areas and the construction requirements of Planning for Bushfire Protection (2006) Appendix 3 (amended May 2010).
5. The tourist accommodation units numbered 35, 38 shall comply with BAL-19 in accordance with AS 3959-2009 Building in Bushfire Prone Areas and the construction requirements of Planning for Bushfire Protection (2006) Appendix 3 (amended May 2010).

6. The tourist accommodation units numbered 1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 41, 42, 43 and 44 shall comply with BAL-29 in accordance with AS 3959-2009 Building in Bushfire Prone Areas and the construction requirements of Planning for Bushfire Protection (2006) Appendix 3 (amended May 2010).
7. At the commencement of building works and in perpetuity, the property around the building shall be managed as follows as outlined within section 4.1.3 and Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for Asset Protection Zones:

   Visitors Centre Quad Bikes

   a. For a distance of 20 metres as an inner protection area to the east, south and west;
   b. For a distance of 29 metres as an inner protection area and 10 metres as an outer protection area to the north;

   The Commons – General Assessmbly Building

   a. For a distance of 50 metres as an inner protection area;

   Managers Residence

   b. For a distance of 25 metres as an inner protection area;

   Ecotourism – Accommodation Lodges

   a. North and south for a distance of 15 metres as an inner protection area;
   b. East of the easternmost accommodation lodges for a distance of 22 metres as an inner protection area and 10 metres as an outer protection area;
   c. West and southwest of the westernmost accommodation lodges for a distance of 15 metres as an inner protection area and 10 metres as an outer protection area;
8. A 4 metre asset protection zone will be provided around the footpath linkage between the visitors centre and the central safe refuge/assembly building.
9. Water, electricity and gas are to comply with section 4.2.7 of Planning for Bush Fire Protection 2006.

   Water Services

   a. A 470,000 litre static water supply with fire fighting fittings is required with a minimum 20,000 litres of the static water supply to be plumbed to the quad bike visitors centre and the remaining volume to be within the asset protection zone of the central safe refuge building for the eco-tourist development.
10. Property access shall comply with section 4.2.7 of Planning for Bush Fire Protection 2006.
11. Landscaping is to be undertaken in accordance with Appendix 5 of Planning for Bushfire Protection (2006) and managed and maintained in perpetuity. The facility managers have indicated a desire to landscape around the eco-tourist development with native and “bush tucker” plantings. The landscaping shall be managed as plantings/landscaping with managed understorey and paths and not become bushland where within the asset protection zone.

12. It is recommended that the property owner and occupants familiarise themselves with the relevant bushfire preparation and survival information provided by the New South Wales Rural Fire Service.
13. An Emergency /Evacuation Plan is to be prepared consistent with AS 3745 'Emergency control organisation and procedures for buildings, structures and workplaces' and consider bushfire.

10.0 CONCLUSION

The final recommendation is that there is buildable area onsite for the development with appropriate services and asset protection zones available. The proposed development can comply with the requirements of Planning for Bushfire Protection 2006 guidelines as required under section 100b of the Rural Fires Act (1997). This report should be referred to NSW Rural Fire Service for the issue of a Bushfire Safety Authority.

11.0 APPENDIX 1.0 – ASSET PROTECTION ZONES SUMMARY

Below is a summary of Asset Protection Zones outlined in Appendix 5 of Planning for Bushfire Protection (2006) and the NSW Rural Fire Services "Standards for Asset Protection Zones". The property owner should obtain these two documents and familiarise themselves with their content.

Generally

Asset Protection Zones (APZ) refers to the area between the bushfire threat and the asset (i.e. building). The APZ may contain two areas; the Inner Protection Area (IPA) and the Outer Protection Area (OPA). Some areas should be managed entirely as an Inner Protection Area (IPA). Refer to the plans for locations of APZ and distances from Assets.

Inner Protection Area (IPA)

The inner protection area is located adjacent to the asset and is identified as a fuel free zone.

A. Shrubs (consisting of plants that are not considered to be trees)

1. Shrubs must be located away from a buildings glazing and vent openings.
2. Avoid planting around entry ways if the vegetation is flammable.
3. A maximum 30% of the Inner Protection Area may contain shrubs.
4. A minimum 1.5 metre separation of shrubby vegetation from the building shall be maintained.
5. Shrubs must not have a connection with the tree canopy layer; remove/trim shrubs or underprune trees.
6. Ensure turf is suitably mown and/or grasslands are continually slashed to restrict to max 100mm high.

B. Trees: Maintain a minimum 2-5 metre canopy separation.

1. Trees are allowed in the inner protection area however they should not touch or overhang buildings. No tree should be within 2 metres of the roofline.
2. Underprune branches between the shrub layer and the canopy layer.
3. Ensure branches do not overhang buildings.
4. Ensure all trees in the IPA within 3 metres of buildings do not provide a serious fire threat.
5. Trees should have lower limbs removed up to a height of 2 metres above the ground.

Outer Protection Area (OPA)

The Outer Protection Area (OPA) is located adjoining vegetation threat. The OPA should be maintained as a fuel reduced area. This assumes trees may remain but with a significantly reduced shrub, grass, and leaf litter layer. In many situations leaf litter and the shrub layer may not require maintenance at all.

A. Shrubs:

1. Reduce or trim large stands of shrubs

B. Trees:

1. Existing trees can be retained.
2. Ensure a separation is available between shrubs and tree canopy.
3. Reduce tree canopy so there is no interlocking canopy.

12.0 REFERENCES AND DISCLAIMER

References

Standards Australia (2009) AS3959 Construction of Buildings in Bushfire-Prone Areas

Keith D. (2004) "Ocean Shores to Desert Dunes", Department of Environment and Conservation, Sydney.

Environmental Planning and Assessment Act (1979)

New South Wales Rural Fire Service (2006) Planning for Bushfire Protection

New South Wales Rural Fire Service (2010) Planning for Bushfire Protection Appendix 3 Amendment

Rural Fires Act (1997)

Rural Fire Regulation (2008)

Disclaimer

Despite the recommendations in this report, it is impossible to remove the risk of fire damage to the building entirely. This report assesses and provides recommendations to reduce that risk to a manageable level. It is of paramount importance that the recommendations are adhered to for the life of the structure and that all maintenance is performed, to ensure a level of protection is provided to the building, occupants and fire fighters.

Planning for Bushfire Protection (2006) states that notwithstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small always remains.

AS3959 (2009) Building in Bushfire Prone Areas states that the standard is designed to lessen the risk of damage to buildings occurring in the event of the onslaught of bushfire. There can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.