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URBAN DESIGN • SURVEYING • URBAN PLANNING • ENVIRONMENTAL CONSULTING
CIVIL & STRUCTURAL ENGINEERING • MAPPING & SPATIAL INFORMATION



Bush Fire Assessment Cobaki Lakes

(Lot 1 DP570076, Lot 2 DP566529, Lot 1 DP562222, Lot 1 DP570077, Lot 1 DP823679 & Lots 46, 54, 55, 199, 200, 201, 202, 205, 206, 209, 228 & 305 DP755740, Piggabeen Road, Tweed Heads. A report on behalf of Leda Manorstead Pty Ltd)

19 November 2008

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Ref No. BA060025





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1 Introduction

This Bushfire Assessment has been prepared by LandPartners Limited under the Director General's Requirements (issued 21/08/07, item 8.1). The Assessment pertains to Lot 1 DP570076, Lot 2 DP566529, Lot 1 DP562222, Lot 1 DP570077, Lot 1 DP823679 & Lots 46, 54, 55, 199, 200, 201, 202, 205, 206, 209, 228 & 305 DP755740 (the "subject site") which are located off Piggabeen Road, Tweed Heads, Northern NSW. The Subject Site contains bush fire prone land as mapped by Tweed Shire Council (refer Fig. 1).

The Director General's Requirements (item 8.1) state:

"Demonstrate that the future development of the site is consistent with the Planning for Bushfire Protection 2006".

Clause 46 of the *Rural Fires Regulation 2002* specifies the points to be considered in preparing an application for a Bush Fire Safety Authority (BFSA). Regardless of the fact that under the Part 3A environmental impact assessment process a BFSA is not required, the points set by cl. 46 are still relevant in assessing the development according to *Planning for Bushfire Protection 2006* (PBP). In addition, Section 4 and Appendix 5 of PBP require consideration of a number of Bush Fire Protection Measures and Provisions for Residential Subdivisions and Special Fire Protection Purposes. These Measures, summarised below, are addressed in detail in this report:

- Asset Protection Zones;
- Access;
- Services;
- Emergency Management;
- Landscaping and Maintenance; and
- Construction Standards.

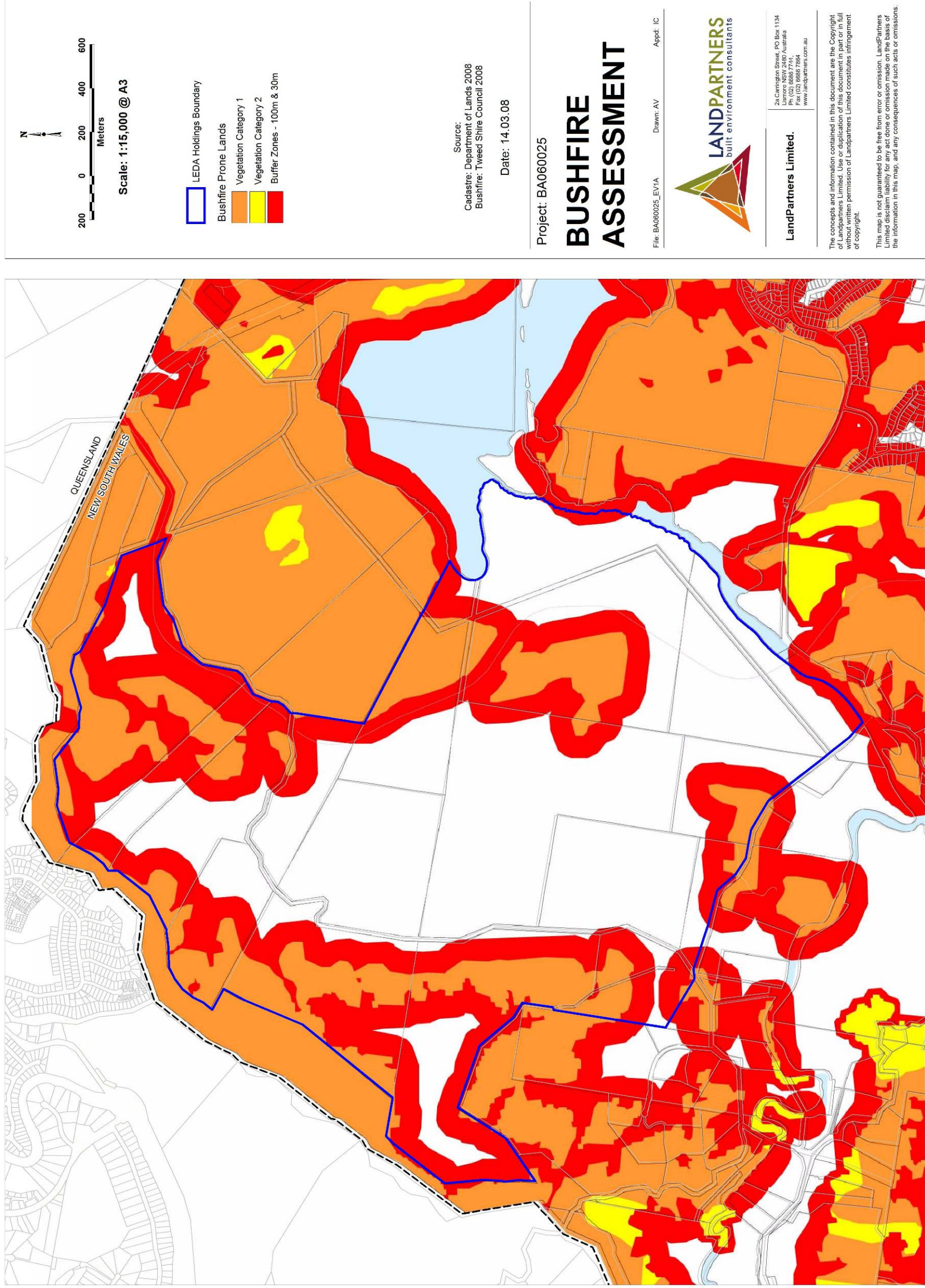


Figure 1. Bushfire prone land (Source: Tweed Shire Council 2004).

1.1 Subject Site and Proposal

The subject site is located off Piggabeen Road, Tweed Heads (refer Figs. 2 & 3) and has a total area of approximately 606 hectares.

The site consists of flat land adjacent to Cobaki Lakes in the east of the site, and rises gently to the north and steeply to the west, where areas of native vegetation occur. The natural topography of the site has been significantly altered by cut and fill works. Much of the site has been historically cleared for grazing and agricultural purposes.

The site is currently zoned (refer Fig. 4):

- 2(a) Low Density Residential
- 2(c) Urban Expansion
- 6(b) Recreation
- 7(d) Environmental Protection (Scenic/Escarpment)
- 7(l) Environmental Protection (Habitat)

The proposed development of the site will include areas of residential development, business precincts and community facilities (including a school).

A concept plan for the site has been prepared and is attached as Appendix A. While this plan may undergo minor refinement, the final layout is expected to be similar to the one shown.

Note that zonings shown in the concept plan are those proposed by the proponent, and not those which currently apply to the site as per the Tweed Local Environment Plan (2000), and shown as Figure 4.

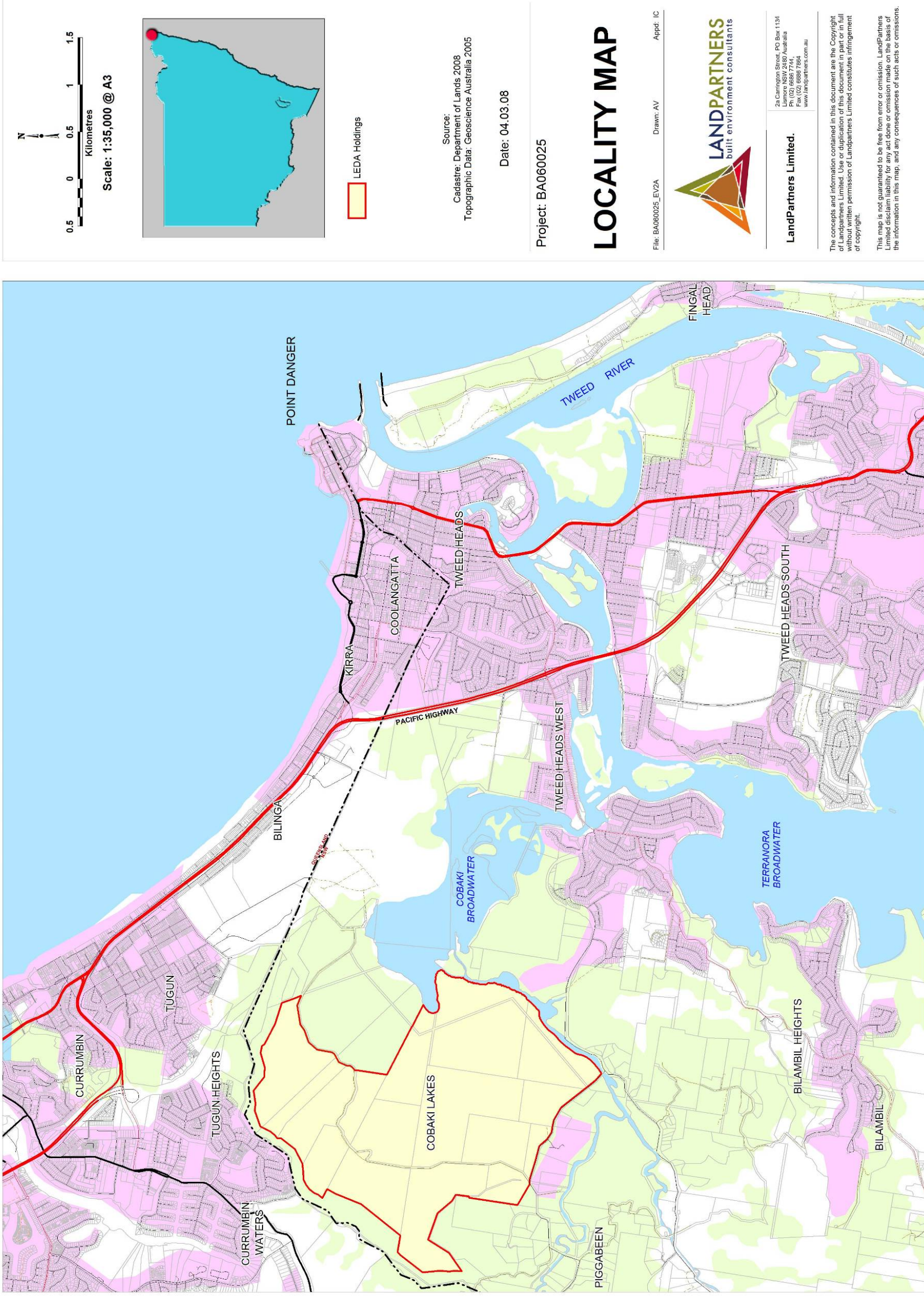


Figure 2. Locality map.



Scale: 1:15,000 @ A3



Leda Holdings

Source:
Cadastral: Department of Lands 2008
Aerial Photo: Site - Fugro 2007
Surrounds - Department of Lands 2000

Date: 14.03.08

Project: BA060025

SUBJECT SITE, AERIAL PHOTOGRAPH

File: BA060025_EV3A

Drawn: AV

Appd: IC



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Figure 3. The subject site.

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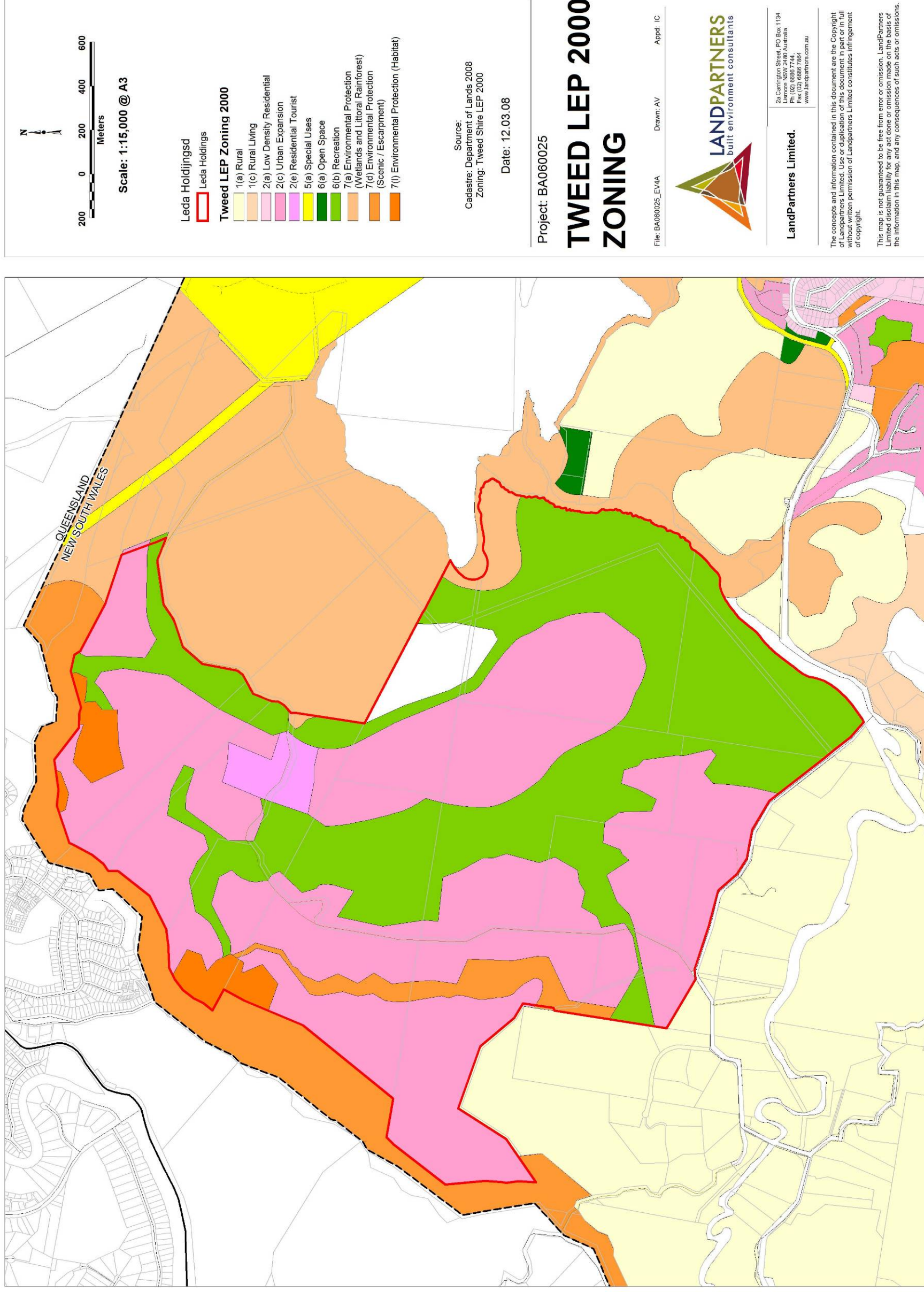


Figure 4. Zoning map.

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1.2 Site Topography and Slope

The subject site and its immediate surroundings range from flat to steep with slopes generally between 5° and 10°. However, in some areas slopes exceeding 10°. The slope analysis has been overlaid over the Concept Plan to indicate where residential precincts occur, as shown in Fig. 5.

1.3 Significant Environmental Features

The ecology of the Cobaki Lakes site has been extensively studied by several consultants (Parker 1999, James Warren & Associates 2008). Several threatened flora and fauna species and Endangered Ecological Communities (EECs) listed under the *Threatened Species Management Act 1995* have been recorded at the site. Refer to James Warren & Associates (2008) for these records.

Some portions of Wetlands gazetted under State Environmental Planning Policy (SEPP) 14 – Coastal Wetlands, also occur in the east of the site (refer Appendix B).

It is of great importance that vegetation and habitat areas at the site are not compromised for the sake of bushfire protection measures. As such Asset Protection Zones should be realistically based on the boundaries of existing vegetation, and should not seek to modify areas of native vegetation by thinning, underscrubbing etc to reduce bushfire risks, as these areas may comprise habitat for threatened species, or be identified as habitat management areas for specific species.

No sites of heritage significance have been identified at the site (pers comm. Dr Richard Robins [Everick Consultants]), although community consultation is ongoing.

1.4 Risk Assessment

Given that areas of native vegetation will be retained at the site (ie. vegetation within Environmental Protection zonings), and that these communities have connectivity with large contiguous areas of vegetation it is considered that the site has a moderate bushfire risk.

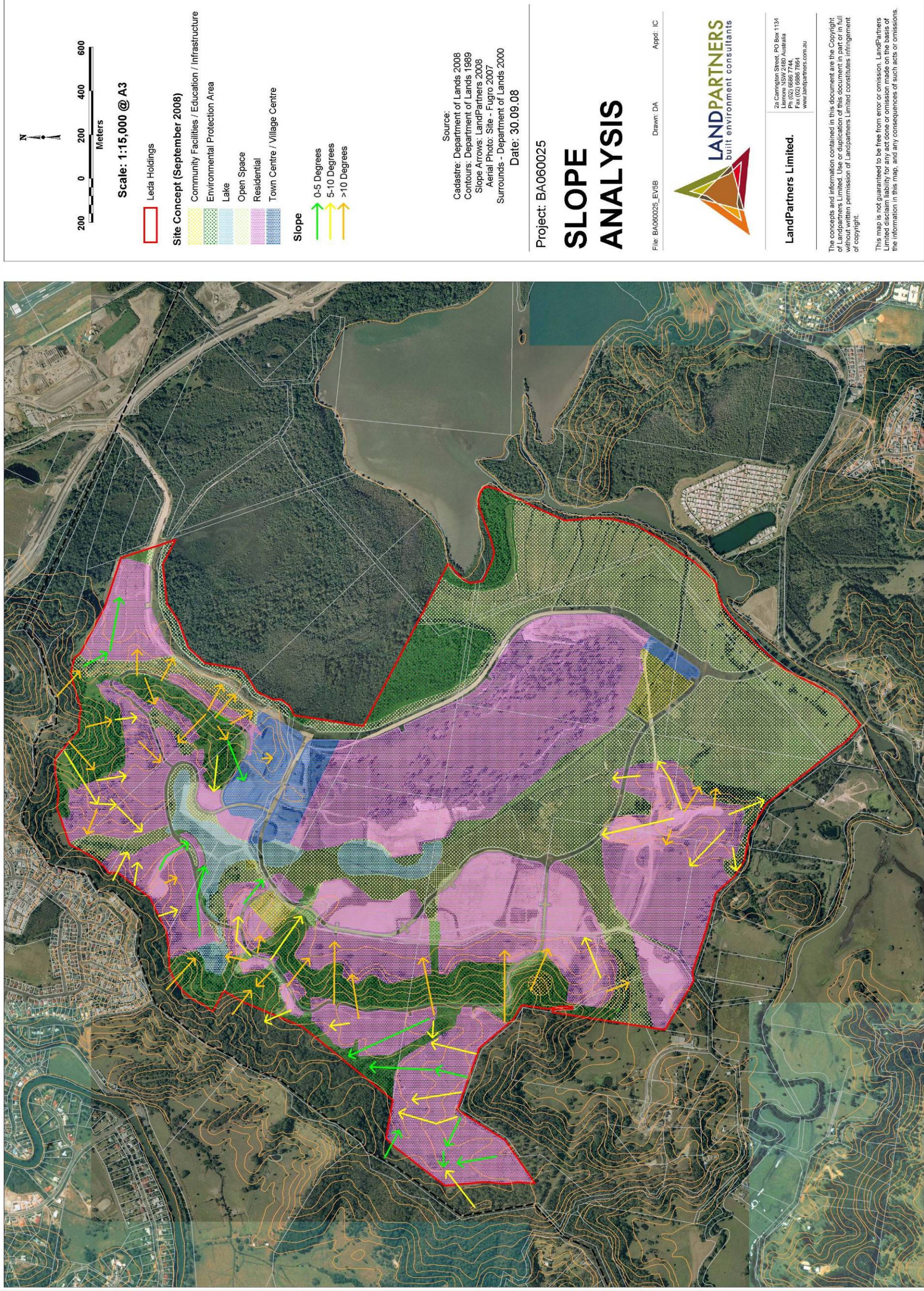


Figure 5. Slope analysis.

2 Planning for Bushfire Protection

2.1 Introduction

All development on Bush Fire Prone Land must satisfy the aims and objectives of PBP. The aim of PBP is to provide for the protection of human life (including firefighters) and to minimise impacts on property from the threat of bush fire, while having due regard to development potential, on-site amenity and protection of the environment.

The objectives of PBP are to:

- 1. Afford occupants of any building adequate protection from exposure to a bush fire;*
- 2. Provide for a defensible space to be located around buildings;*
- 3. Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;*
- 4. Ensure that safe operational access and egress for emergency service personnel and residents is available;*
- 5. Provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zones (APZ); and*
- 6. Ensure that utility services are adequate to meet the needs of firefighters (and other assisting in bush firefighting).*

The proposed development of the Cobaki Lakes site will incorporate a number of measures such that these aims and objectives are met.

Specific Objectives for residential development and Special Fire Protection Purposes (SFPP) are detailed in Sections 2.2 and 2.3.

2.2 Residential Subdivision

The Specific Objectives of PBP with respect to residential subdivision are to:

- Minimise perimeters of the subdivision exposed to the bush fire hazard. Hourglass shapes, which maximise perimeters and create bottlenecks, should be avoided;*
- Minimise bushland corridors that permit the passage of bush fire;*
- Provide for the siting of future dwellings away from ridge-tops and steep slopes - particularly up-slopes, within saddles and narrow ridge crests;*
- Ensure that separation distances (APZ) between a bush fire hazard and future dwellings enable conformity with the deemed- to-satisfy requirements of the BCA. In a staged development, the APZ may be absorbed by future stages;*

- *Provide and locate, where the scale of development permits, open space and public recreation areas as accessible public refuge areas or buffers (APZs);*
- *Ensure the ongoing maintenance of asset protection zones;*
- *Provide clear and ready access from all properties to the public road system for residents and emergency services; and*
- *Ensure the provision of and adequate supply of water and other services to facilitate effective firefighting.*

2.3 Special Fire Protection Purposes (SFPP)

The proposed development will include schools and childcare facilities. It is recognised that under PBP provisions these types of facilities are considered Special Fire Protection Purposes (SFPP).

The Specific Objectives of PBP with respect to Special Fire Protection Purposes are to:

- *Provide for the special characteristics and needs of occupants. Unlike residential subdivisions, which can be built to a construction standard to withstand the fire event, enabling occupants and firefighters to provide property protection after the passage of fire, occupants of SFPP developments may not be able to assist in property protection. They are more likely to be adversely affected by smoke or heat while being evacuated.*
- *Provide for safe emergency evacuation procedures. SFPP Developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bush fire threats. During emergencies, the risk to fire fighters and other emergency services personnel can be high through prolonged exposure, where door-to-door warnings are being given and exposure to the bush fire is imminent.*

3 Site Vegetation and Classification

3.1 Vegetation at and Adjoining the Site

Vegetation at the site consists of a combination of cleared and disturbed grazing/agricultural land, and areas of native vegetation comprising dry sclerophyll, wet sclerophyll, swamp sclerophyll, rainforest, heath, grassland, sedgeland and marine communities (saltmarsh, mangroves).

Detailed vegetation mapping for the site has been completed by James Warren & Associates (2008) and is shown as Fig. 6. Note that large areas of the site (shown in grey as Community 19) consist of bare earth following extensive earthworks (cut and fill).

Table 1 shows the vegetation types present on the site and their classification according to Table A2.1 of PBP (NSW Rural Fire Service 2006).

Table 1. Vegetation Description (as per JWA 2008) and Bush Fire Classification (PBP 2006)

Vegetation Community (as per JWA 2008)	Vegetation classification* (as per Keith 2004)
Communities 1a, 1b, 1c, 1d, 11	Dry sclerophyll forest
Community 3	Wet sclerophyll forest
Communities 7, 8, 9	Grassy woodlands
Communities 2a, 2b, 2c, 2d, 4, 6	Rainforest
Community 17	Forested wetlands
Community 5	Heathlands (Shrublands)
Communities 13 & 15	Saline wetlands
Community 14	Freshwater Wetland
Communities 10 & 18	Grasslands

* based on Table A2.1 PBP

While it is anticipated that the majority of vegetation within residential precincts is likely to be removed, the likelihood of retention of areas of isolated vegetation within these areas is unknown.

Vegetation surrounding the subject site for a distance of 140 metres occurs as agricultural land to the south and south-east, heathland and dry sclerophyll forest to the east, wet sclerophyll forest/rainforest to the north along the NSW/QLD border reserve, and dry sclerophyll forest to the west.

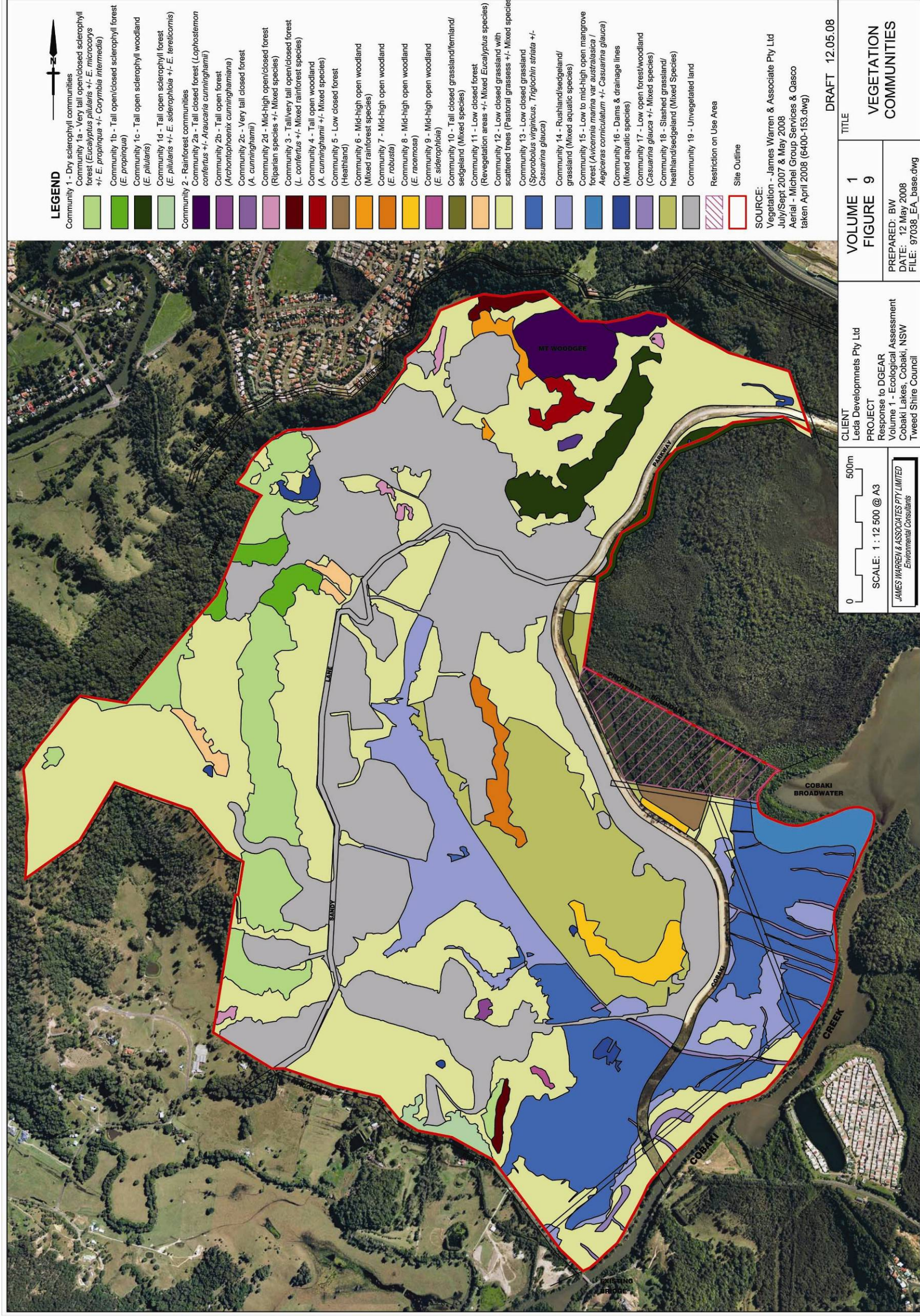


Figure 6. Vegetation mapping for the site according to James Warren & Associates (2008)

4 Consistency with Planning for Bushfire Protection (2006)

4.1 Asset Protection Zones

Introduction

Asset Protection Zones (APZs) are buffer areas between development and a fire hazard which aim to protect human life and property. The APZ comprises an Inner Protection Area (IPA) and an Outer Protection Area (OPA). These areas will be managed to reduce the bushfire hazard. The general requirements of APZs are described below.

Inner Protection Area (IPA) General Requirements

Specifications and Management	
Location	The IPA extends from the edge of the OPA to the development.
Purpose	Ensures that the presence of fuel, which could become involved in fire, is minimised.
Depth	Varies from 10 to 100 metres.
Fuel Loading	Minimum fine fuel at ground level, which could be set alight by bushfire.
Vegetation Requirements	Do not touch or overhang the building; Are well spread out and do not form a continuous canopy; Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period; and Are located far enough away from the house so that they will not ignite the house by direct flame contact or radiated heat emissions.
Uses Within the Area	Tennis courts, swimming pools and gardens are permitted. Woodpiles, wooden sheds, combustible material storage areas, large quantities of garden mulch, stacked flammable building materials are not permitted.
Maintenance	This Area should be regularly mowed and all fuel removed e.g. fallen branches, leaf build-up.

Outer Protection Area (OPA) General Requirements

Specifications and Management	
Location	Located adjacent to the hazard. Originally the OPA would have formed part of the bushfire hazard but becomes an area where the fuel loadings are reduced.
Purpose	Reduction of fuel in this area substantially decreases the intensity of an approaching fire and restricts the pathway of crown fuels; reducing the level of direct flame, radiant heat and ember attack on the IPA.
Depth	Varies from 0 to 25 metres.
Fuel Loading	Fine fuel loads should be kept to a level where the fire intensity expected will not impact on adjacent developments. In the absence of any policy to the contrary, 8 tonnes per hectare of fuel is commonly used. In grasslands, fuel height should be maintained below 10 centimetres.
Vegetation Requirements	Any trees and shrubs should be maintained in such a manner that the vegetation is not continuous.

Specifications and Management	
Maintenance	This area should be regularly mowed and all excess fuels should be removed e.g. fallen branches, leaf build-up.

Required Asset Protection Zones

It is of great importance that vegetation and habitat areas at the site are not compromised for the sake of bushfire protection measures. As such, APZs should be realistically based on the boundaries of existing vegetation, and should not seek to modify areas of native vegetation by thinning, underscrubbing etc to reduce bushfire risks, as these areas may comprise habitat for threatened species, or be identified as habitat management areas for specific species.

As a school and other community facilities are proposed (likely to include childcare centres and the like), APZs for Special Fire Protection Purposes (SFPP) will apply to these areas.

Residential APZs

Broad APZs based on vegetation type, as prescribed in Table A2.5 of PBP are described in Table 2. Only forest and rainforest vegetation occurs adjacent to residential precincts, these types have been used to determine Asset Protection Zones. **Note that stated APZs are for residential areas only (i.e. areas shown in pink on the Concept Plan) and are based on Level 3 Construction Standards as per AS3959-1999 (Construction of Buildings in Bush Fire Prone Areas).**

These APZs are mostly applicable to those dwellings on the perimeter of residential areas, as shown schematically on Fig. 7. Note that if APZs are increased, building construction standards will decrease accordingly.

Table 2. Broad Asset Protection Zone setbacks for residential zones within the Proposed Development (as per Table A2.5, PBP)

Vegetation Formation from PBP	Slope	APZ Required*
Forest (includes wet & dry sclerophyll forest)	Upslope/Flat	20m
	>0° - 5°	20m
	>5° - 10°	30m
	>10° - 15°	40m
	>15° - 18°	45m
Rainforest	Upslope/flat	10m
	>0° - 5°	10m
	>5° - 10°	15m
	>10° - 15°	15m
	>15° - 18°	20m

*The APZs distances given are broad and are only indicative, the APZ calculator tool on the RFS web site should be used to work out exact distances to be applied to the future subdivision of the site.

Notes:

- APZs are likely to be 'taken up' by perimeter roads, batters, footpaths/cycleways, drainage swales, nature strips and landscaping. As such, APZs are unlikely to be prescribed for individual allotments, unless circumstances exist where some 'residual' APZ not accounted for by perimeter roads (etc) needs to be taken up. In cases where staging of the development is proposed (which is likely for a site of this size), PBP allows the opportunity for locating APZs on the future stages of the development, provided the proponent takes the responsibility for their maintenance. Such flexibility allows for lots to be released unencumbered.
- Residential areas adjacent to the saline wetlands in the east of the site will be effectively separated by Cobaki Parkway (as proposed), and as such an APZ will already be in place.
- For residential areas in the south of the site, Piggabeen Road already provides some separation from scattered eucalypt vegetation adjacent to the site. Some nominal additional setback may be required to achieve APZs.

SFPP APZs

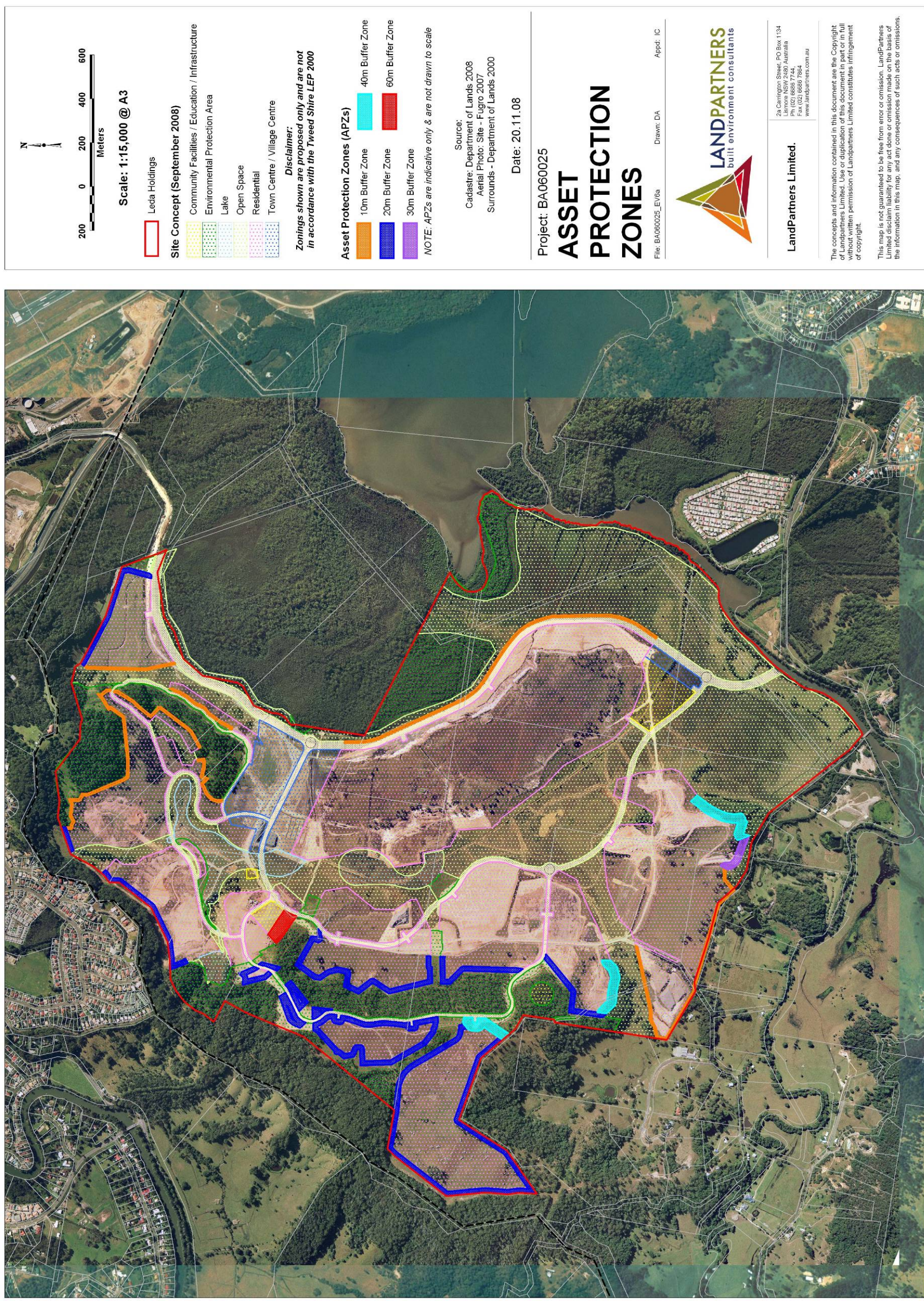
APZs for the three parts of the site where SFPP are proposed (refer yellow areas – 'Community Facilities/Education/Infrastructure') are shown in Table 3.

Note that where SFPP development is incorporated and buffered by residential development APZ prescriptions maybe significantly reduced or not required, with large setbacks only required where these areas occur adjacent to areas of retained vegetation within Environmental Protection Areas.

Table 3. Asset Protection Zone setbacks for SFPP zones within the Proposed Development (as per Table A2.5, PBP).

Vegetation Formation from PBP	Slope	APZ Required
Forest (includes wet & dry sclerophyll forest)	Upslope/Flat	60m
	>0° - 5°	70 m
	>5° - 10°	85m
	>10° - 15°	100m
	>15° - 18°	100m
Rainforest	Upslope/flat	30m
	>0° - 5°	40m
	>5° - 10°	50m
	>10° - 15°	60m
	>15° - 18°	65m

Figure 7.
Schematic of
Asset Protection
Zones



Hazard Reduction and Maintenance of Asset Protection Zones

The following recommendations apply for the maintenance of Asset Protection Zones:

- All vegetation is to be maintained in a fuel free condition;
- Controlled burning is not required. Manual fuel reduction will sufficiently reduce fuel loads surrounding the proposed development;
- All trees will be maintained so that a continuous canopy is not formed;
- All regrowth of shrubs and bushes will be removed.

The above conditions could be formalised via a Section 88B Instrument under the *NSW Conveyancing Act 1919* if required.

Conclusion

It is considered that APZs can easily be achieved for the majority of the site for both the proposed residential and Special Fire Protection Purposes development to meet PBP requirements. However, a couple of small proposed residential enclaves to the northwest of the site, as shown on Fig. 7, will need to be looked in more detail at the subdivision design stage to ensure that they can meet required APZs.

4.2 Access

Residential Subdivision

Public Roads

An extensive public road system is proposed for the development, which will link to Boyd Street in the north (QLD) and Piggabeen Road in the south (NSW). While the concept plan shows a schematic road network, the detailed road layout has not yet been established. Any future road design must conform to acceptable solutions under PBP (refer below), or if not, alternative solutions must be provided.

One of the key design principles in any road network is the provision of perimeter roads, which is the preferred option to separate bushland from urban areas (PBP 2006). PBP notes that perimeter roads can form part of an APZ and provide separation between buildings and the boundary of the bushfire hazard.

The proposed Cobaki Parkway effectively functions as a perimeter road in the east of the site, and it is recommended that each residential precinct within the site is also serviced by a perimeter road to ensure consistency with PBP principles (as shown below).

Performance Criteria	Acceptable Solutions
Firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources).	Public roads are two-wheel drive, all weather roads
Public road widths and design that allow safe access for firefighters while residents are evacuating an area.	Urban perimeter roads are two-way, that is, at least two traffic lane widths (Carriageway 8 m minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with PBP Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle).
	The perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas.
	Traffic management devices are constructed to facilitate access emergency services vehicles.
	Public roads have a cross fall not exceeding 3 degrees.
	All roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 m outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard.
	Curves of roads (other than perimeter roads) are a minimum inner radius of six metres and minimal in number, to allow for rapid access and egress.
	The minimum distance between inner and outer curves is six metres.
	Maximum grades for sealed roads do not exceed 15 degrees and an

Performance Criteria	Acceptable Solutions
	<p>average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.</p> <p>There is a minimum vertical clearance of four metres above the road at all times.</p>
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, 28 tonnes or 8 tonnes per axle for all other areas). Bridges clearly indicate load rating.
Roads that are clearly sign-posted (with easily distinguishable names) and buildings/properties that are clearly numbered.	<p>Public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression.</p> <p>Public roads between 6.5 and 8 metres wide are 'No Parking' on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.</p>
There is clear access to reticulated water supply.	<p>Public roads up to 6.5 metres wide provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.</p> <p>One way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.</p>
Parking does not obstruct the minimum paved width	<p>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.</p> <p>Public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road.</p>

Property Access

As noted previously, while the concept plan shows a schematic road network, the detailed road layout, including property access roads has not yet been established. Property access roads must comply with the acceptable solutions to address performance criteria of PBP (refer below) or if not, alternative solutions must be provided.

Performance Criteria	Acceptable Solutions
Access to properties is provided in recognition of the risk to firefighters and/or evacuating occupants.	At least one alternative property access road is provided for individual dwellings (or groups of dwellings) that are located more than 200 metres from a public through road.
The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles. All weather access is provided.	Bridges clearly indicates load rating and pavement and bridges are capable of carrying a load of 15 tonnes Roads do not traverse a wetland or other land potentially subject to periodic inundation (other than flood or storm surge)
Road width and design enable safe access for vehicles	A minimum carriageway width of four metres for rural-residential areas, rural landholdings or urban areas with a distance of greater than 70 metres from the nearest hydrant point to the most external part of a proposed building (or footprint).
	In forest, woodland and heath situation, rural property access roads have passing bays every 200 metres that are 20 metres long by two metres wide, making a minimum trafficable width of six metres at the passing bay.
	A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches.
	Internal roads for rural properties provide a loop road around any dwelling or incorporate a turning circle within a minimum 12 metre outer radius.
	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.
	The crossfall is not more than 10 degrees.
	Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degree for unsealed roads
	Access to a development comprising more than three dwellings have formalised access by dedication of a road and not by right of way.

Fire Trails

PBP notes that fire trails will only be considered as part of development applications in exceptional circumstances, primarily due to difficulties and costs with maintaining fire trails on private land. PBP recommends that fire trails should be under council management to ensure that maintenance occurs.

If any firetrails are proposed for the development they must be connected to the public road system at regular intervals and comply with acceptable solutions to address performance criteria of PBP (refer below) or if not, alternative solutions must be provided.

Performance Criteria	Acceptable Solutions
The width and design of the fire trails enables safe and ready access for firefighting vehicles.	<ul style="list-style-type: none"> • A minimum carriageway width of four metres with an additional one metre wide strip on each side of the fire trail (clear of bushes and long grass) is provided. • The trail is a maximum grade of 15 degree if sealed and not more than 10 degrees if unsealed. • A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches is provided. • The crossfall of the trail is not more than 10 degrees. • The trail has the capacity for passing by: <ul style="list-style-type: none"> - reversing bays using the access to properties to reverse fire tankers, which are six metres wide and eight metres deep to any gates, with an inner minimum turning radius of six metres and outer minimum radius of 12 metres; and/or - a passing bay every 200 metres, 20 metres long by three metres wide, making a minimum trafficable width of seven metres at the passing bay. <p><i>Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m) and extend for no more than 30m and where obstruction cannot be reasonably avoided or removed.</i></p>
Fire trails are trafficable under all weather conditions. Where the fire trail joins a public road, access shall be controlled to prevent use by non-authorized persons.	<ul style="list-style-type: none"> • The fire trail is accessible to firefighters and maintained in a serviceable condition by the owner of the land. • Appropriate drainage and erosion controls are provided. • The fire trail system is connected to the property access road and/or to the through road system at frequent intervals of 200 metres or less. • Fire trails do not traverse a wetland or other land potentially subject to periodic inundation (other than a flood or storm surge). • Gates for fire trails are provided with a key/lock system authorised by the local RFS.
Fire trails are designed to prevent weed infestation, soil erosion and other land degradation.	<ul style="list-style-type: none"> • Fire trail design does not adversely impact on natural hydrological flows. • Fire trail design acts as an effective barrier to the spread of weeds and nutrients. • Fire trail construction does not expose acid-sulphate soils.

Special Fire Protection Purposes

Any SFPP development (eg. school, childcare facility, etc.) will require that the internal road network must comply with acceptable solutions to address performance criteria of PBP (refer below) or if not, alternative solutions must be provided.

Performance Criteria	Acceptable Solutions
<p>Internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle.</p>	<p>Internal roads are two-wheel drive, sealed, all weather roads;</p> <p>Internal perimeter roads are provided with at least two traffic lane widths (Carriageway 8 m minimum kerb to kerb) and shoulders on each side, allowing traffic to pass in opposite directions;</p> <p>Roads are through roads. Dead end roads are not more than 100 metres in length from a through road, incorporate a minimum 12 m outer radius turning circle, and are clearly sign posted as a dead end</p> <p>Traffic management devices are constructed to facilitate access emergency services vehicles.</p> <p>A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches, is provided.</p> <p>Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.</p> <p>The minimum distance between inner and outer curves is six metres.</p> <p>Maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees.</p> <p>Crossfall of the pavement is not more than 10 degrees.</p> <p>Roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge).</p> <p>Roads are clearly sign-posted and bridges clearly indicate load ratings.</p> <p>The internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).</p>

Conclusion

It is considered that access can easily be achieved for all parts of the site to meet PBP requirements. Perimeter roads are to be incorporated into the future road network as the Concept Plan is refined.

4.3 Water, Electricity and Gas

Provision of services to the development must comply with acceptable solutions to address performance criteria of PBP for residential development (refer below) or if not, alternative solutions must be provided.

Performance Criteria	Acceptable Solutions
<p>Reticulated water supplies</p> <p>Water supplies are easily accessible and located at regular intervals</p>	<ul style="list-style-type: none"> • Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads. • Fire hydrant spacing, sizing and pressures comply with AS2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles. • Hydrants are not located within any road carriageway. • All above ground water and gas service pipes external to the building are metal, including, and up to any taps. • The provisions of parking on public roads are met.
<p>Electricity Services</p> <p>Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings.</p> <p>Regular inspection of lines is undertaken to ensure they are not fouled by branches.</p>	<ul style="list-style-type: none"> • Where practicable, electrical transmission lines are underground. • Where overhead electrical transmission lines are proposed: <ul style="list-style-type: none"> - lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; and - no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).
<p>Gas Services</p> <p>Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.</p>	<ul style="list-style-type: none"> • Reticulated or bottled is installed and maintained in accordance with AS1596 and the requirements of relevant authorities. Metal piping is to be used. • All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation. • If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal. • Polymer sheathed flexible gas supply lines to gas metres adjacent to buildings are not used.

For those parts of the site where SFPP facilities apply the following performance criteria for services must be met (refer below), or alternative solutions must be provided.

Performance Criteria	Acceptable Solutions
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Performance Criteria	Acceptable Solutions
<p>Reticulated water supplies</p> <p>Water supplies are easily accessible and located at regular intervals</p>	<ul style="list-style-type: none"> • Access points for reticulated water supply to SFPP developments incorporates a ring main system for all internal roads. • Fire hydrant spacing, sizing and pressures comply with AS2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority, once development has been completed. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles. • The provisions of parking on public roads are met.
<p>Electricity Services</p> <p>Location of electricity services will not lead to the ignition of surrounding bushland or the fabric of buildings or risk to life from damaged electrical infrastructure.</p>	<ul style="list-style-type: none"> • Electrical transmission lines are underground.
<p>Gas Services</p> <p>Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.</p>	<ul style="list-style-type: none"> • Reticulated or bottled is installed and maintained in accordance with AS1596 and the requirements of relevant authorities. Metal piping is to be used. • All fixed LPG tanks are kept clear of all flammable materials and located on the non-hazard side of the development. • If gas cylinders need to be kept close to the building, the release valves are directed away from the building and away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal. • Polymer sheathed flexible gas supply lines to gas metres adjacent to buildings are not used.

Conclusion

It is considered that water, electricity and gas services can be provided for the proposed development to meet PBP requirements.

4.4 SFPP Emergency and Evacuation Planning

One of the objectives of Special Fire Protection Purposes developments is to provide suitable emergency and evacuation (and relocation) arrangements. The following acceptable solutions to address PBP (refer below) must be complied with for any proposed schools, childcare facilities or similar, or alternative solutions must be provided.

Performance Criteria	Acceptable Solutions
The intent may be achieved where:	
An Emergency and Evacuation Management Plan is approved by the relevant fire authority for the area.	<ul style="list-style-type: none"> • An emergency/evacuation plan is consistent with the RFS Guidelines for the <i>Preparation of Emergency/Evacuation Plan</i>. • Compliance with AS 3745-2002 'Emergency control organisation and procedures for buildings, structures and workplaces' for residential accommodation'. • Compliance with AS 4083-1997 'Planning for emergencies – for health care facilities'.
Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan.	<ul style="list-style-type: none"> • An Emergency Planning Committee is established to consult with residents (and their families in the case of aged care and schools) and staff in developing and implementing an Emergency Procedures Manual. • Detailed plans of all Emergency Assembly Areas including "onsite" and "offsite" arrangements as stated in AS 3745-2002 are clearly displayed, and an annual (as a minimum) trial emergency evacuation is conducted.

Conclusion

It is considered that emergency evacuation planning for Special Fire Protection Purposes can be provided for the proposed development to meet PBP requirements.

4.5 Landscaping and Property Maintenance

Landscaping

The following principles from PBP are to be incorporated into future landscaping design for the development of the site:

- Prevent flame impingement on dwellings;
- Provide a defendable space for property protection;
- Reduce fire spread;
- Deflect and filter embers;
- Provide shelter from radiant heat; and
- Reduce wind speed.

The above can be achieved via appropriate species selection, plant location, planting density and ongoing maintenance.

Vegetation Management

Vegetation management is the responsibility of individual landowners and should include (as per PBP):

- Maintaining a low cut lawn;
- Keeping areas around the garden free of fuel;
- Utilising non-combustible fencing materials;
- Breaking up tree and shrub canopies by defining garden beds;
- Using non-flammable mulch;
- Ensuring tree branches do not overhang roofs;
- Ensuring tree canopies are not continuous; and
- Installing windbreaks in the direction from which fires are likely to approach.

Property Maintenance

Property maintenance should include (as per PBP):

- Removal of material such as litter from the roof and gutters;
- Ensure painted surfaces are in good condition with decaying timbers being given particular attention to prevent the lodging of embers within gaps;
- Check pumps and water supplies are available and in working order;
- Driveways are in good condition with trees not being too close and forming an obstacle during smoky conditions;
- Check tiles and roof lines for broken tiles or dislodged roofing materials;
- Screens on windows and doors are in good condition without breaks or holes in flyscreen material and frames are well fitting into sills and window frames;

- Drenching or spray systems are regularly tested before the commencement of the fire season;
- Hoses and hose reels are not perished and fittings are tight and in good order;
- Doors are fitted with draught seals and well maintained;
- Mats are of non combustible material or in areas of low potential exposure; Woodpiles, garden sheds and other combustible materials are located downslope and well away from the house; and
- Trees and other vegetation in the vicinity of power lines and tower lines should be managed and trimmed in accordance with the specifications in "Vegetation Safety Clearances" issued by Energy Australia (NS179, April 2002).

Conclusion

Landscaping design for the proposed development will be incorporate PBP landscaping principles. Residents will be made aware of their responsibilities in regard to property and vegetation maintenance as per PBP principles.

4.6 Construction Standards

Table A3.4 (Appendix 3 of PBP) determines the category of bushfire attack according to the vegetation formation of the hazard and the distance from the hazard. Level 1, 2 or 3 of Australian Standard 3959-1999 Construction of Buildings in Bush Fire Prone Areas is then prescribed. Table A3.4 does not assign a Construction Standard to construction in the Flame Zone. Construction within the Flame Zone must comply with the Performance Requirements of the Building Code of Australia and the Specific Objectives of PBP before proceeding.

Construction standards cannot be stated with any precision at the current stage of the proposal. However, Construction Standard levels decrease with increased separation from any bushfire hazard. For example, those lots closest to a hazard may be built to a Level 3 Construction Standard, while those furthest from the hazard will only required Level 2 Construction Standard and so on. For distances greater than 100 metres from the hazard no construction standards will apply.

Conclusion

Construction Standards for the proposed development will meet PBP requirements.

5 Compliance

This Bushfire Assessment has been prepared by LandPartners Limited for Project 28 Pty Ltd. The Assessment pertains to Lot 1 DP570076, Lot 2 DP566529, Lot 1 DP562222, Lot 1 DP570077, Lot 1 DP823679 & Lots 46, 54, 55, 199, 200, 201, 202, 205, 206, 209, 228 & 305 DP755740 (the “subject site”) which are located off Piggabeen Road, Tweed Heads, Northern NSW.

This bushfire assessment has been prepared in accordance with the Director General’s requirements (issued 21/08/07, item 8.1). The Director General’s Requirements state:

“Demonstrate that the future development of the site is consistent with the Planning for Bushfire Protection 2006”.

The Specific Objectives of PBP with respect to residential subdivision and Special Fire Protection Purposes are referred to in Section 2 of this report. Future development of the site is capable of being achieved which will meet the specific objectives and criteria as per PBP. In particular it is concluded that:

- APZs can easily be achieved for the majority of the site for both the proposed residential and Special Fire Protection Purposes development to meet PBP requirements. However, a couple of small proposed residential enclaves to the northwest of the site, as shown on Fig. 7, will need to be looked in more detail at the subdivision design stage to ensure that they can meet required APZs.
- Access to all parts of the site can be designed to meet PBP requirements. Perimeter roads are to be incorporated into the future road network as the Concept Plan is refined.
- Water, electricity and gas services can be provided for the proposed development to meet PBP requirements.
- Emergency evacuation planning for Special Fire Protection Purposes can be provided for the proposed development to meet PBP requirements.
- Landscaping design for the proposed development will be incorporate PBP landscaping principles.
- Construction Standards for the proposed development will meet PBP requirements.

Therefore, this report demonstrates that development of the subject site, if implementing the protection measures and provisions addressed in this Assessment, complies with the specific objectives referred to in Section 2 of this report, therefore the requirements of PBP have been addressed according to the Director General’s requirements made under part 3A of the *Environmental Planning and Assessment Act 1979*.

6 References

James Warren & Associates, 2008, *Ecological Assessment, Cobaki Lakes*. A report to Leda Manorstead Pty Ltd.

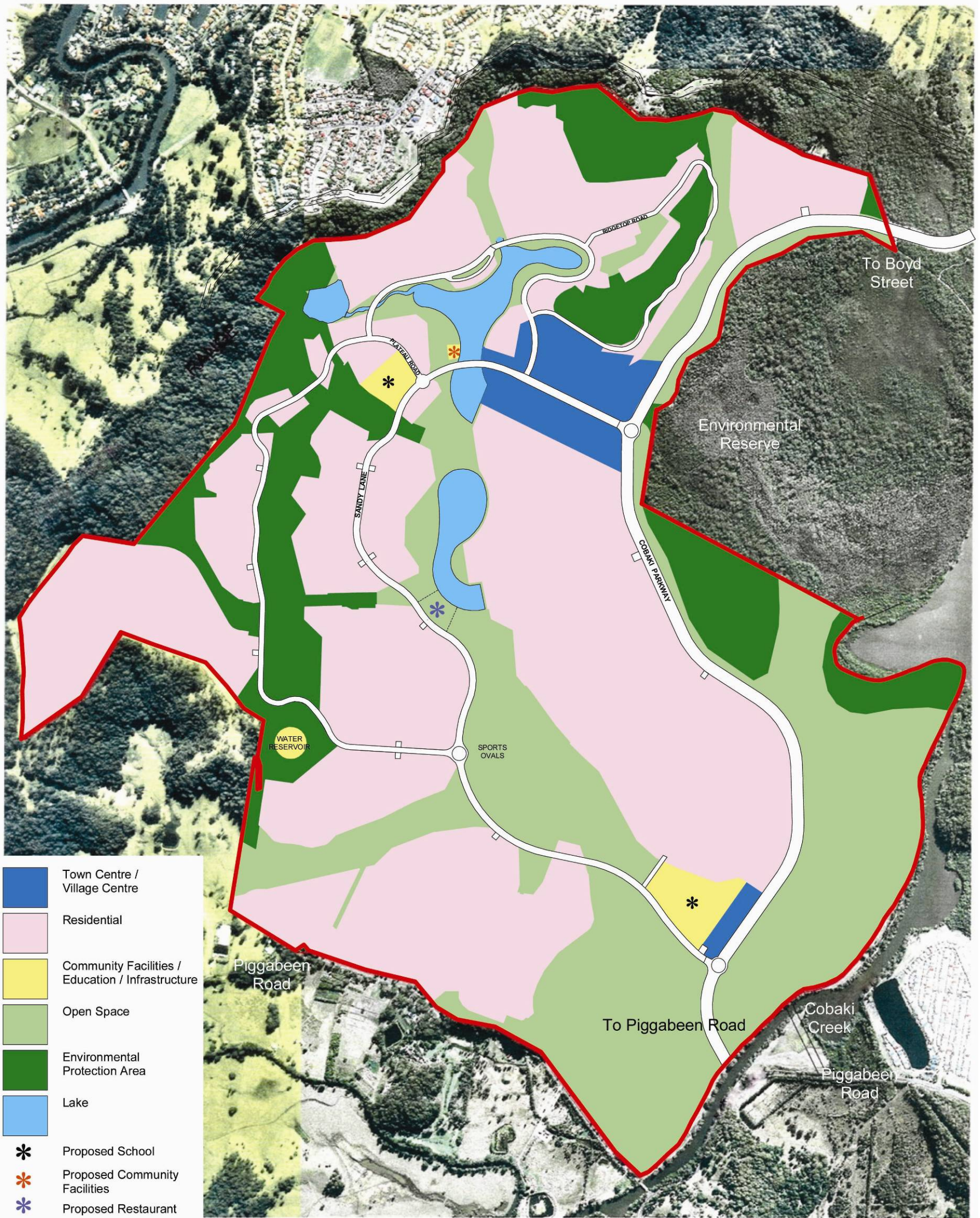
Keith, D., 2004, *Ocean Shores to Desert Dunes*, Department of Environment and Conservation, Sydney.

Parker, P., 1999, *A Species Impact Statement for the Cobaki Lakes Project*. A report to Leda Manorstead Pty Ltd.

Rural Fire Service (RFS), 2006, *Planning for Bushfire Protection*, Produced by NSW Rural Fire Service in cooperation with the Department of Planning.

Appendix A – Concept Plan

Concept Plan



- Town Centre / Village Centre
- Residential
- Community Facilities / Education / Infrastructure
- Open Space
- Environmental Protection Area
- Lake
- Proposed School
- Proposed Community Facilities
- Proposed Restaurant

Concept Plan for LEDA MANORSTEAD PTY LTD

of COBAKI LAKES, NSW

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Scale: 1:12000 @ A3

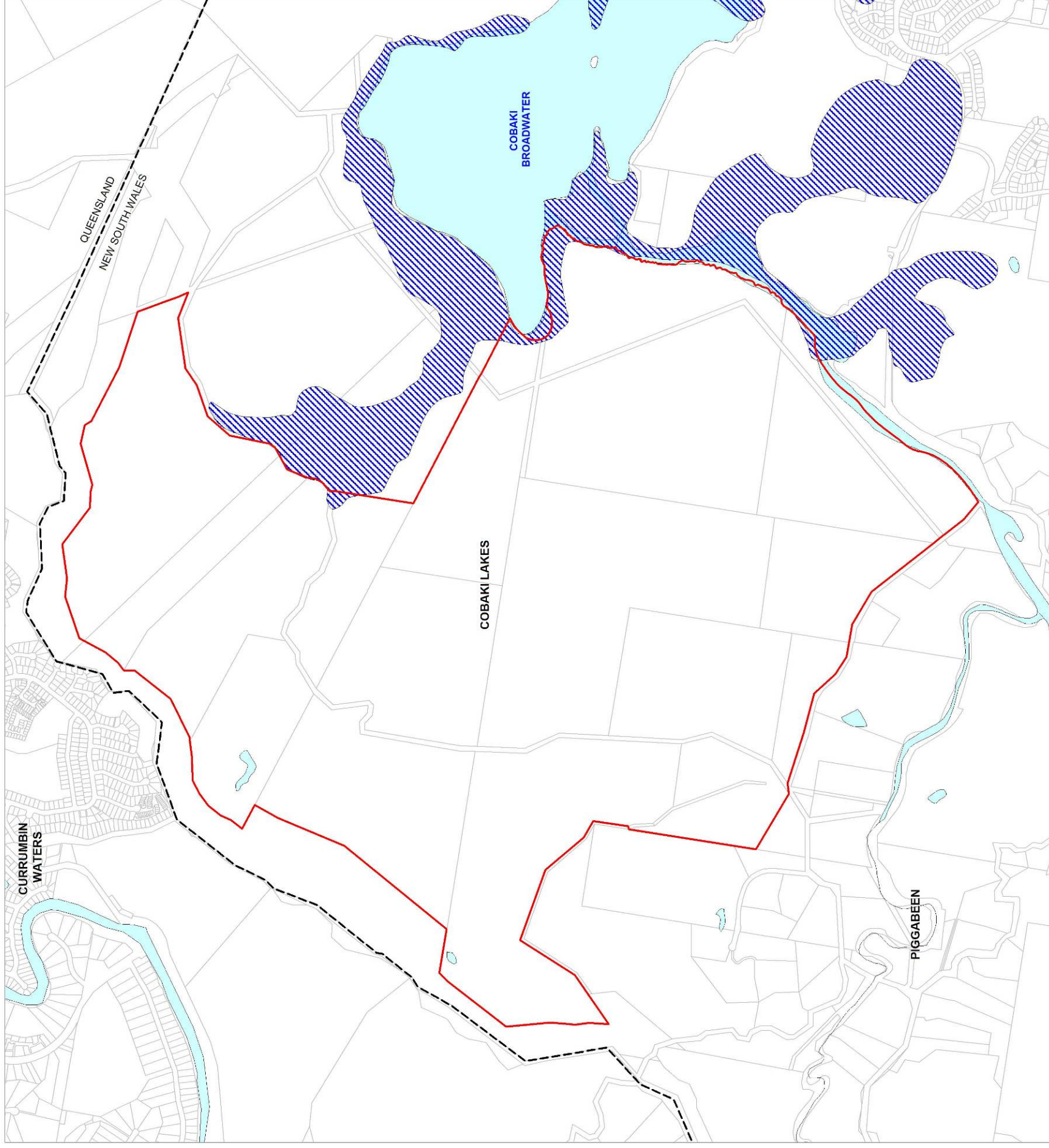
■ LED006 / SK 01.01

■ Friday, 15 August 2008

■ Issue U



Appendix B – SEPP 14 Coastal Wetland



Scale: 1:15,000 @ A3

- Leda Holdings
- SEPP 14 Coastal Wetlands

Source:
Cadastral: Department of Lands 2008
Bushfire: Tweed Shire Council 2008

Date: 14.03.08

Project: BA060025

SEPP 14 Amendment 15 COASTAL WETLANDS

File: BA060025_Appendix B Drawn: AV Appd: IC



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