



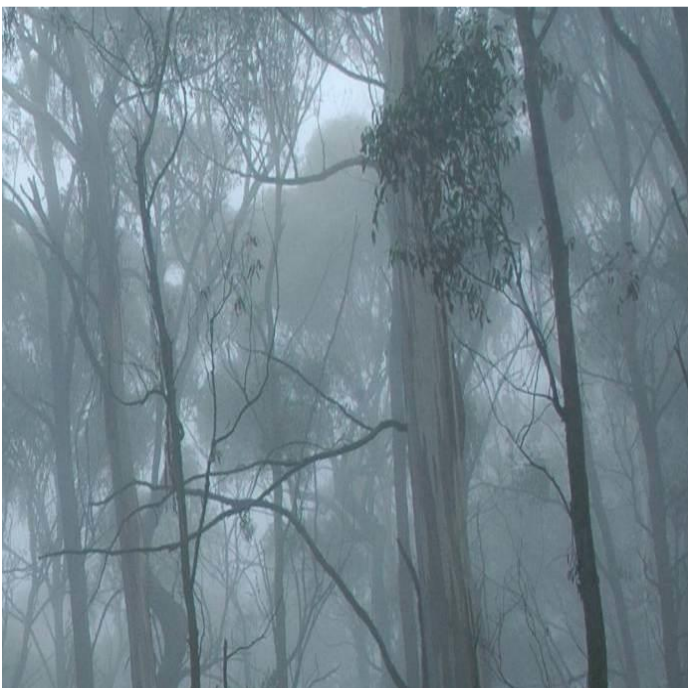
Ingleside Precinct

Bushfire Protection Assessment

Proposed Structure Plan Assessment

Prepared for
Department of Planning and Infrastructure

October 2016





DOCUMENT TRACKING

| ITEM | DETAIL |
|-----------------|--|
| Project Name | Ingleside - Biodiversity, Riparian Corridor and Bushfire |
| Project Number | 13SYDPLA-0039 |
| Project Manager | Dr Steven Ward |
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| Approved by | Nathan Kearnes |
| Status | Final |
| Version Number | 5 |
| Last saved on | 25 October 2016 |

This report should be cited as 'Eco Logical Australia 2016. Bushfire Protection Assessment: Proposed Structure Plan Assessment – Ingleside Release Area for Department of Planning and Environment.'

ACKNOWLEDGEMENTS

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1 Introduction

1.1 DESCRIPTION OF PROPOSAL

In May 2016 Pittwater Council was merged into a new body, the Northern Beaches Council. As this report was prepared prior to these changes, it makes reference to the former council. The plans and strategies of the former council continue to apply to the former Local Government Area (LGA) until the new council prepares its own plans and strategies.

The Ingleside Release Area (Ingleside Precinct) is located within the North East Subregion in Pittwater LGA. The majority of the precinct is zoned Rural Landscape (RU2) under *Pittwater Local Environment Plan (LEP) 2014*, which has a range of permissible uses. Ownership is a mix of public and private, with approximately one third in State Government ownership.

The Minister for Planning and Pittwater Council agreed to undertake a Precinct Planning Process for the Ingleside Precinct to confirm development potential and to establish development controls to enable development consistent with that potential.

Eco Logical Australia Pty Ltd (ELA) has been engaged by Department of Planning and Environment (DP&E) to prepare a Bushfire Protection Assessment to inform the development of a Structure Plan for the precinct.

ELA has also been engaged to undertake Biodiversity and Habitat Conservation Assessment (using the Biodiversity Certification Assessment Methodology), Riparian Assessment and Bio-certification Strategy for the Ingleside Precinct, the results of which are presented in separate documents.

1.2 STUDY AREA

The Ingleside Precinct is approximately 700 hectares (**Figure 1**) and is bounded by major roads, conservation areas and other lands. Mona Vale Road transects the Precinct and also forms part of its south-western boundary.

Significant conservation lands are immediately adjacent to the Precinct, including: Ku-ring-gai Chase National Park to the north and northwest, Garigal National Park to the south, Katandra Bushland Sanctuary to the east and Ingleside Chase Reserve to the east. The Katandra Bushland Sanctuary is Crown Land managed by Katandra Bushland Sanctuary Trust. The Healesville Estate, Ingleside Park and Haydon Reserve have been combined to create Ingleside Chase Reserve.

The vegetation types within the Ingleside Precinct are strongly influenced by the topography of the area. Heath vegetation is associated with shallow soils and rocky outcrops and generally occur at higher elevations within the Precinct. The topography slopes down to the north and east where at times the terrain rapidly falls away to a series of steep moist gullies. Overall, topography within the Ingleside Precinct varies from steep slopes to gently undulating terrain.

1.3 STRUCTURE PLAN

A Structure Plan has been developed for the precinct by the Department of Planning and Environment as shown in **Figure 3**. The plan proposes a mix of uses including environmental conservation, residential, a neighbourhood centre and a school.

1.4 AIM AND STRUCTURE OF REPORT

This report investigates the current bushfire risk of the study area and appropriateness for rezoning. Specifically, this analysis responds to the requirements of Planning for Bushfire Protection (PBP), *Australian Standard AS 3959 Construction of buildings in bushfire-prone areas* (AS3959). This report details the outcomes of these investigations in the context of the proposed land use.

The overarching objective of this report is to identify all potential bushfire constraints to the future urban development of the study area. The results of this assessment will directly support the preparation of necessary planning documentation. As such the objectives of this report are to:

- Ensure the statutory requirements for bushfire protection are identified and can be adequately met; and
- Implement suitable management frameworks for bushfire protection, whilst having consideration of the vegetation and ecological issues for the study area, enabling long term conservation and management of these environmental values while facilitating safe urban development outcomes.

This report assesses the potential bushfire hazard across the study area, in the context of existing and future vegetation. It then identifies planning requirements as per PBP. Management of future asset protection zones (APZ) and environmental areas are also considered.

Future subdivision of land and the construction of buildings will require a detailed site specific assessment against PBP. As such the provisions of this report are to be considered in the planning and design of any development following the rezoning process.

1.5 LEGISLATIVE REQUIREMENTS

1.5.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal planning legislation for NSW, providing a framework for the overall environmental planning and assessment of rezoning and development proposals.

The study area includes land mapped as bushfire prone land on the Pittwater Council Bush Fire Prone Land Map under Section 149 of the EP&A Act (**Figure 2**). In NSW, bushfire prone lands are those identified that could support a bushfire or are potentially likely to be subject to bushfire attack, and are generally lands that contain or are within 100 m of significant stands of bushland.

A variety of other legislation and environmental planning instruments, such as the *Threatened Species Conservation Act 1995* (TSC Act), *Water Management Act 2000* and *Rural Fires Act 1997* (RF Act), are integrated with the EP&A Act.

1.5.2 Threatened Species Conservation Act 1995

The TSC Act aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. The TSC Act is integrated with the EP&A Act and requires consideration of whether a development (assessed under Part 4 of the EP&A Act) is likely to significantly affect threatened species, populations and ecological communities or their habitat.

1.5.3 Rural Fires Act 1997

Bushfire suppression and management is regulated by the RF Act. Both the EP&A Act and the RF Act were modified by the *Rural Fires and Environmental Assessment Legislation Amendment Act*

2002 to enhance bushfire protection through the development assessment process. Key requirements of the RF Act include:

- The need for a bushfire safety authority to be issued by the RFS under section 100B of the RF Act for any development applications for subdivision in bushfire prone areas (therefore considered integrated development);
- All landowners to exercise a duty of care to prevent bushfire from spreading on or from their land under section 63 of the RF Act. This relates to the appropriate provision and maintenance of APZs, landscaping and any retained vegetation when developing land.

1.5.4 Direction 4.4 Planning for Bush Fire Protection

Direction 4.4 Planning for Bushfire Protection identifies matters for consideration for planning proposals that will affect, or are in proximity to land mapped as bush fire prone. In particular a planning proposal where development is proposed must:

- have regard to *Planning for Bush Fire Protection 2006* (PBP),
- provide an Asset Protection Zone (APZ) incorporating at a minimum:
 - an Inner Protection Area (IPA) bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and
 - an Outer Protection Area (OPA) managed for hazard reduction and located on the bushland side of the perimeter road,
- for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service (RFS). If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the RF Act), the APZ provisions must be complied with,
- contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,
- contain provisions for adequate water supply for fire fighting purposes,
- minimise the perimeter of the area of land interfacing the hazard which may be developed,
- introduce controls on the placement of combustible materials in the Inner Protection Area.

Consideration must also be given to NSW RFS *Practice Note 2/12 Planning Instruments and Policies*. It is expected that the RFS, in its assessment of the proposal will consider the requirements of this Practice Note.

1.5.5 Planning for Bush Fire Protection 2006

Rezoning proposals require consultation with the NSW RFS as the lead agency for managing bushfire. As such the requirements of *Planning for Bush Fire Protection* (NSW RFS, 2006) are to be addressed. This includes having regard to the following planning principles of PBP:

- Provision of a perimeter road with adequate two way access which delineates the extent of the intended development;
- Provision, at the urban bushland interface, for the establishment of adequate asset protection zones for future housing;
- Specifying minimum residential lot depths to accommodate asset protection zones for lots on perimeter roads;
- Minimising the perimeter of the area of land, interfacing the hazard, which may be developed;

- Introduction of controls which avoid placing inappropriate developments in hazardous areas;
and
- Introduction of controls on the placement of combustible materials in asset protection zones.

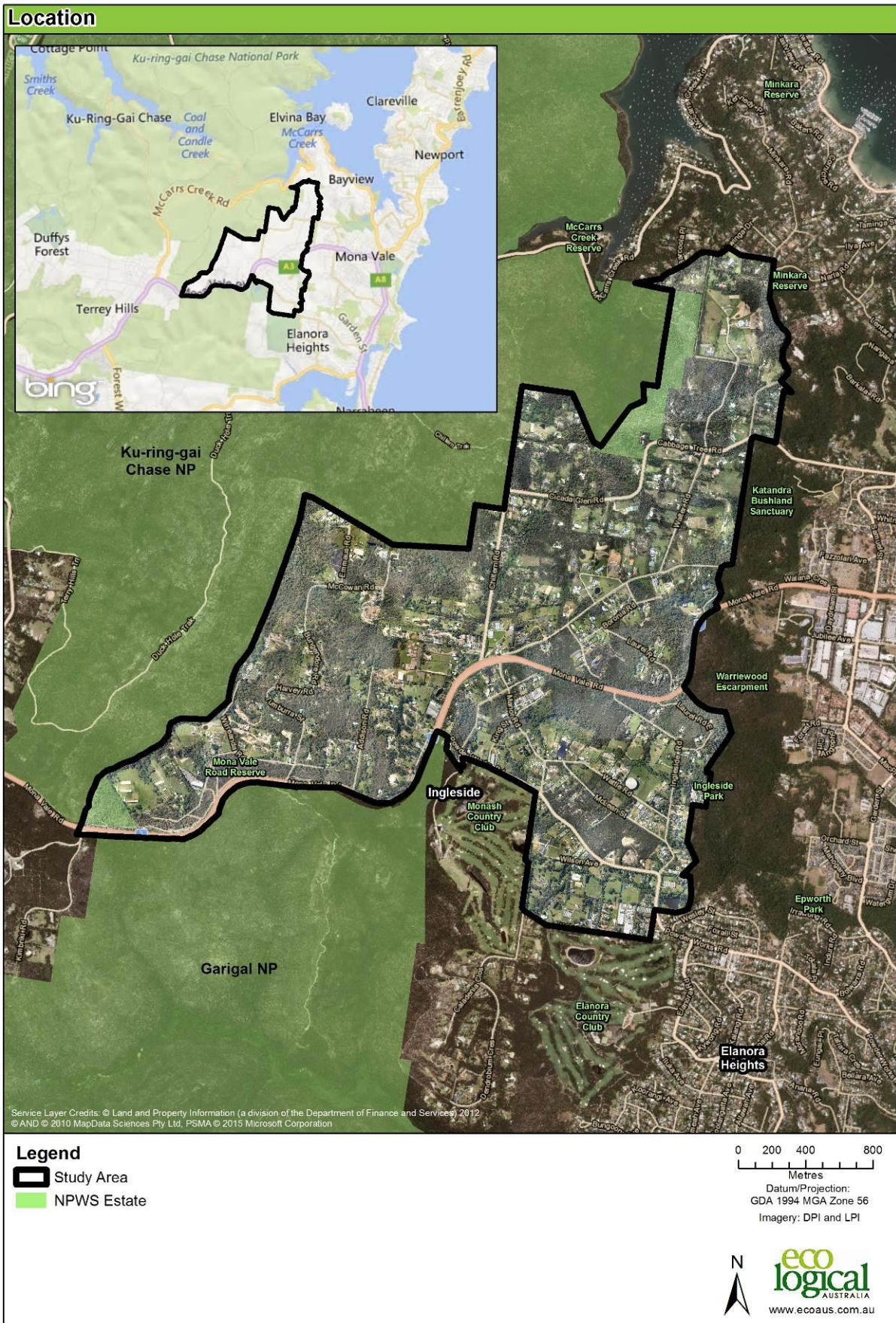


Figure 1: Study area

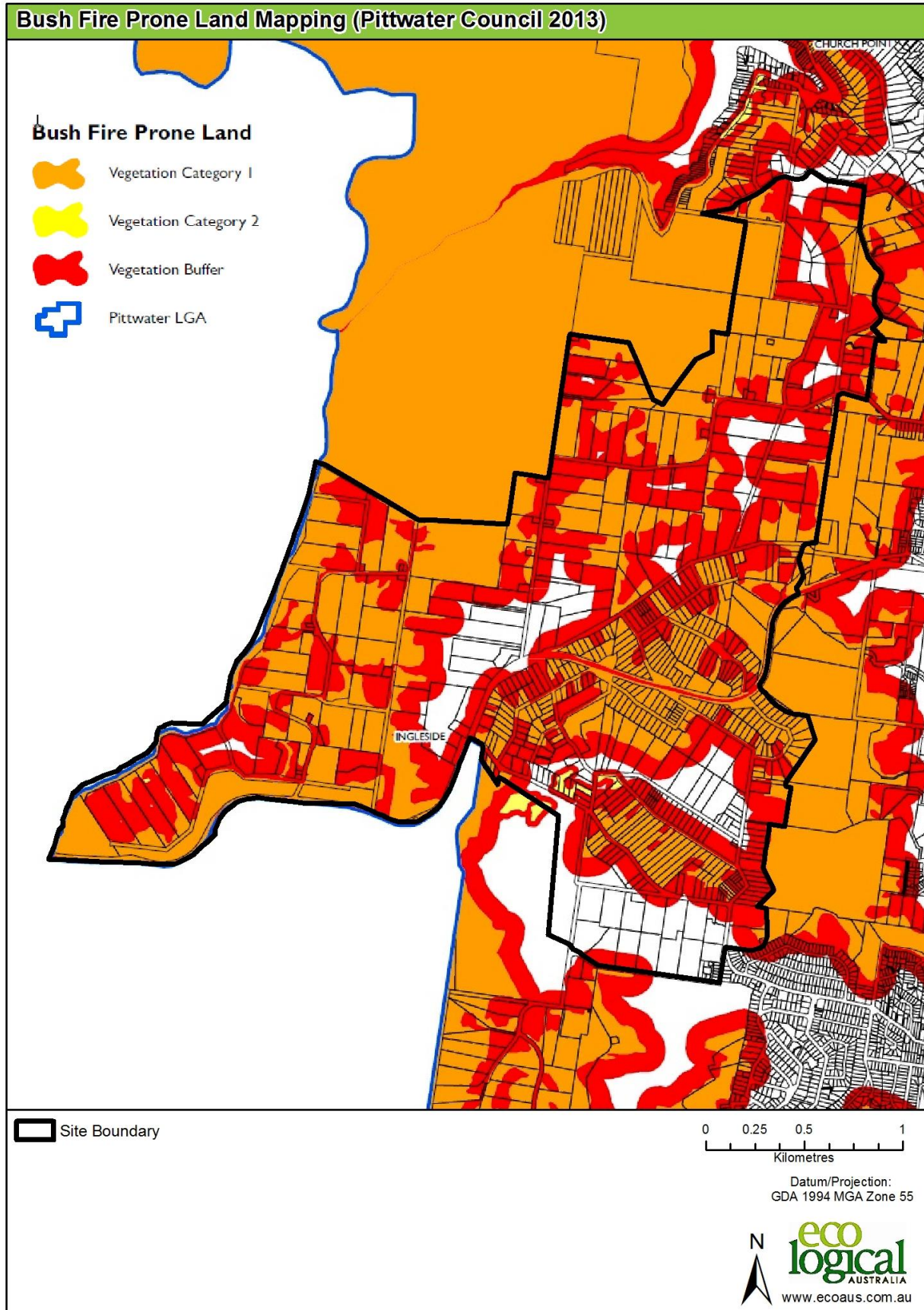


Figure 2: Bush Fire Prone Land Mapping (Pittwater Council 2013)

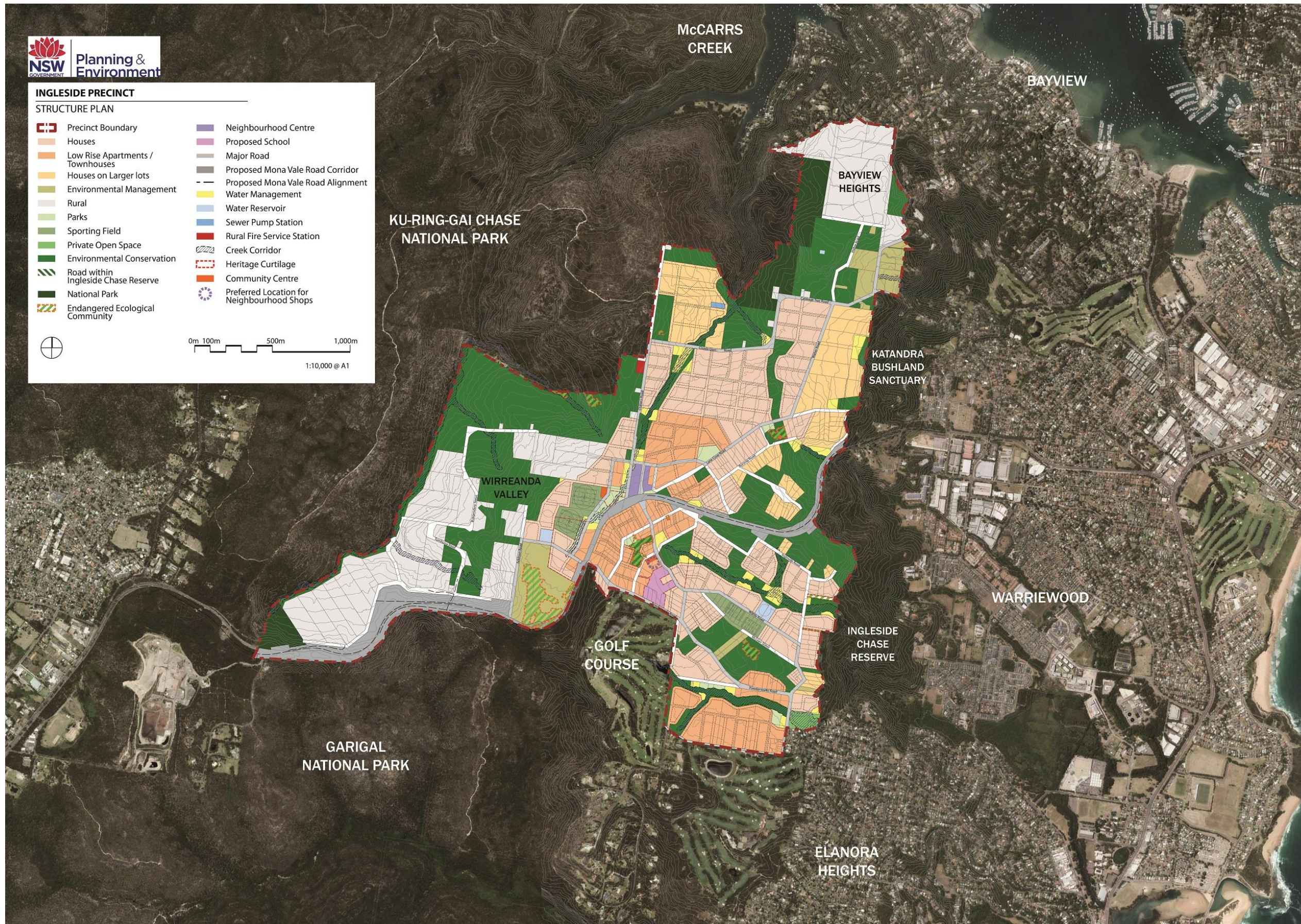


Figure 3 Ingleside Precinct Structure plan

2 Bushfire Hazard Assessment

An assessment of the bushfire hazard is necessary to determine the application of bushfire protection measures. The following sub-sections provide a detailed account of the vegetation formations (bushfire fuels) and the topography (effective slope) that combine to create the bushfire hazard that may affect bushfire behaviour at the site.

The concept of bushfire risk as influenced by fire history and current and past bushfire issues has little bearing on the determination of bushfire protection strategies for rezoning and future development at this site. This is due the fact that PBP assesses bushfire protection based purely on vegetation and slope (i.e. hazard and not risk), making the assumption that a fire may occur in any patch of bushland at a worst-case scenario.

Notwithstanding this, the *Warringah Pittwater Bushfire Risk Management Plan (2008)* and *Ingleside / Bayview / Elanora Heights Bush Fire Preparation Maps (RFS 2013)* were reviewed to gain a greater understanding of the bushfire environment, hazard and risk issues that affect the study area. The only impact the plans have specifically on the study area is the requirement to conduct hazard reduction (to Strategic Fire Advantage Zone specifications) of vegetation within and surrounding the study area. This management will need to be addressed in future bushland management plans; however it will not impact the bushfire protection measures required for future development within the study area.

2.1 VEGETATION FORMATIONS INFLUENCING BUSHFIRE

The 'predominant vegetation' influencing fire behaviour approaching future developable areas has been assessed strictly in accordance with the methodology specified within PBP.

A map displaying the current vegetation formation (PBP 2006) within and adjoining the site is provided in **Figure 4**. This mapping was based on vegetation community mapping undertaken by ELA for the rezoning Biodiversity report (Eco Logical Australia 2016) and a brief field assessment in September 2014. **Figure 5** shows the future coverage of vegetation formations based on the proposed Structure Plan and it is this layer that the bushfire assessment is based on.

Mapped vegetation formations within the study area include Forest, Woodland, Tall Heath, Freshwater Wetland and Low Hazard Vegetation (treated as Rainforest (PBP 2006)). Low Hazard Vegetation includes small remnants (less than 1 ha) and narrow corridors (less than 50 m in width) which are able to be classified as 'low hazard' due to the lesser fire behaviour expected in these areas of vegetation. 'Water Management' areas are likely to range from cleared land with mown grass or rocks to planted wetland species less than 1 m in height with the occasional scattered trees. As such, they have been conservatively treated as 'low hazard' for the purpose of this report.

2.2 SLOPES INFLUENCING BUSHFIRE

The 'effective slope' influencing fire behaviour approaching the developable area has been assessed strictly in accordance with the methodology specified within PBP. This is conducted by measuring the worst-case scenario slope where the vegetation occurs over a 100 m transect measured outwards from the development boundary. The slope classes are listed in **Table 1** below.

All slope classes are represented within the study area, which is characterised by relatively flat ridgelines adjoining steep slopes with gullies and cliff lines. The slopes across the study area can be appreciated from the digital terrain model presented in **Figure 6**.

Table 1: PBP slope classes

| Upslope or Downslope | PBP Slope Class |
|----------------------|--|
| Upslope / Flat Land | Flat land and all upslope land leading away from the development |
| Downslope | >0-5 degrees downslope leading away from the development |
| | >5-10 degrees downslope leading away from the development |
| | >10-15 degrees downslope leading away from the development |
| | >15-18 degrees downslope leading away from the development |

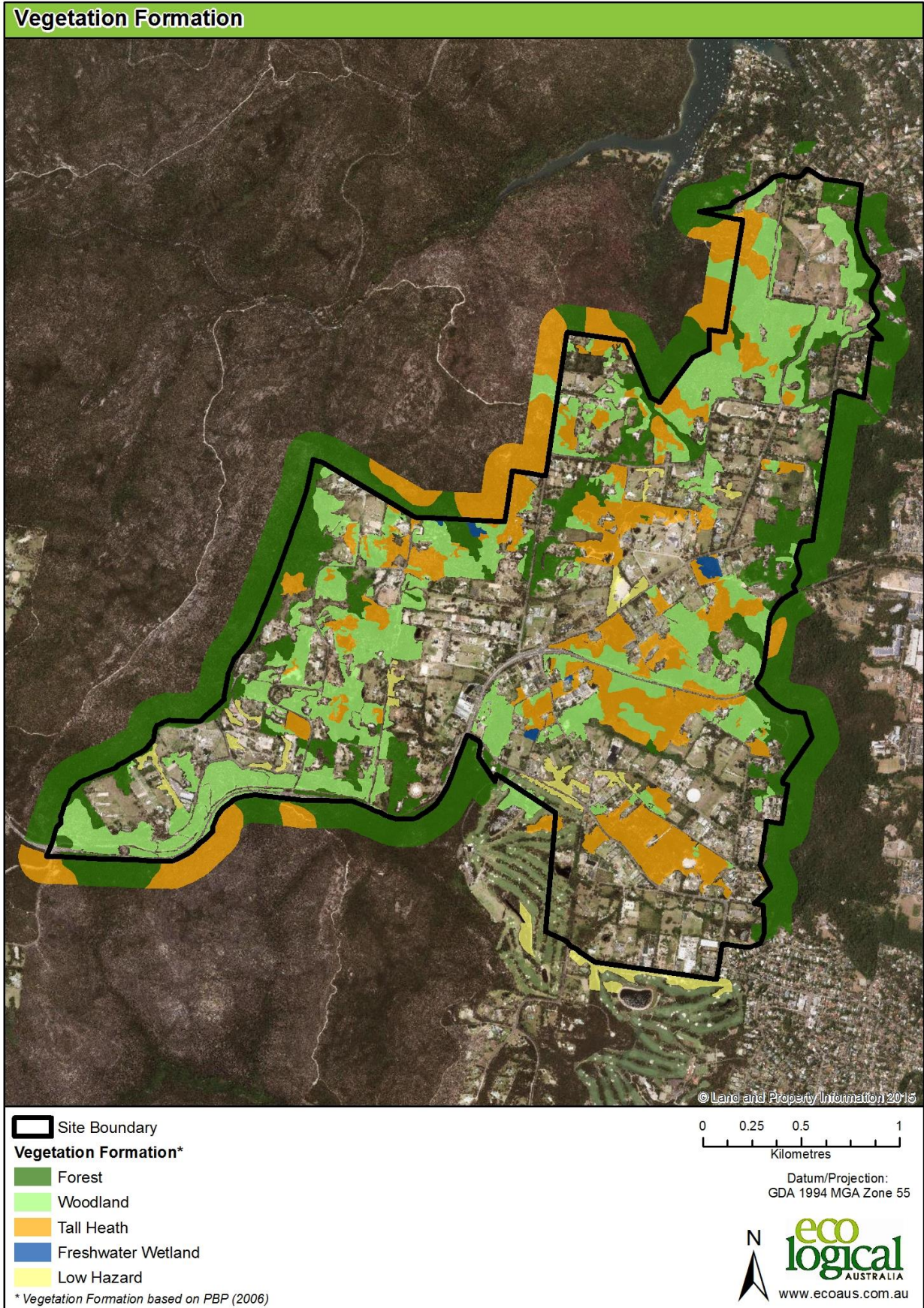


Figure 4: Current Vegetation Formations assessed using PBP 2006

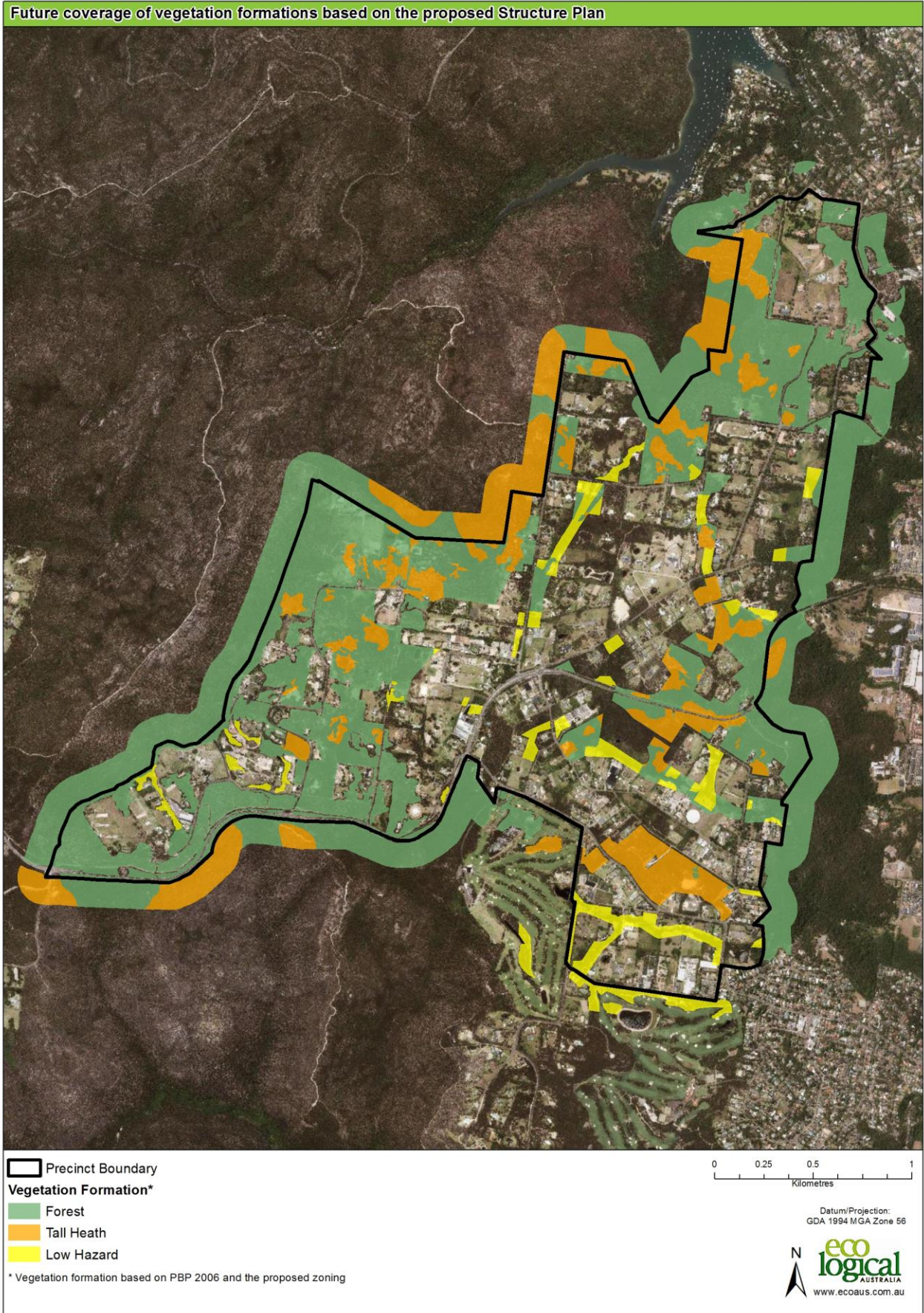


Figure 5: Future coverage of vegetation formations based on the proposed Structure Plan.

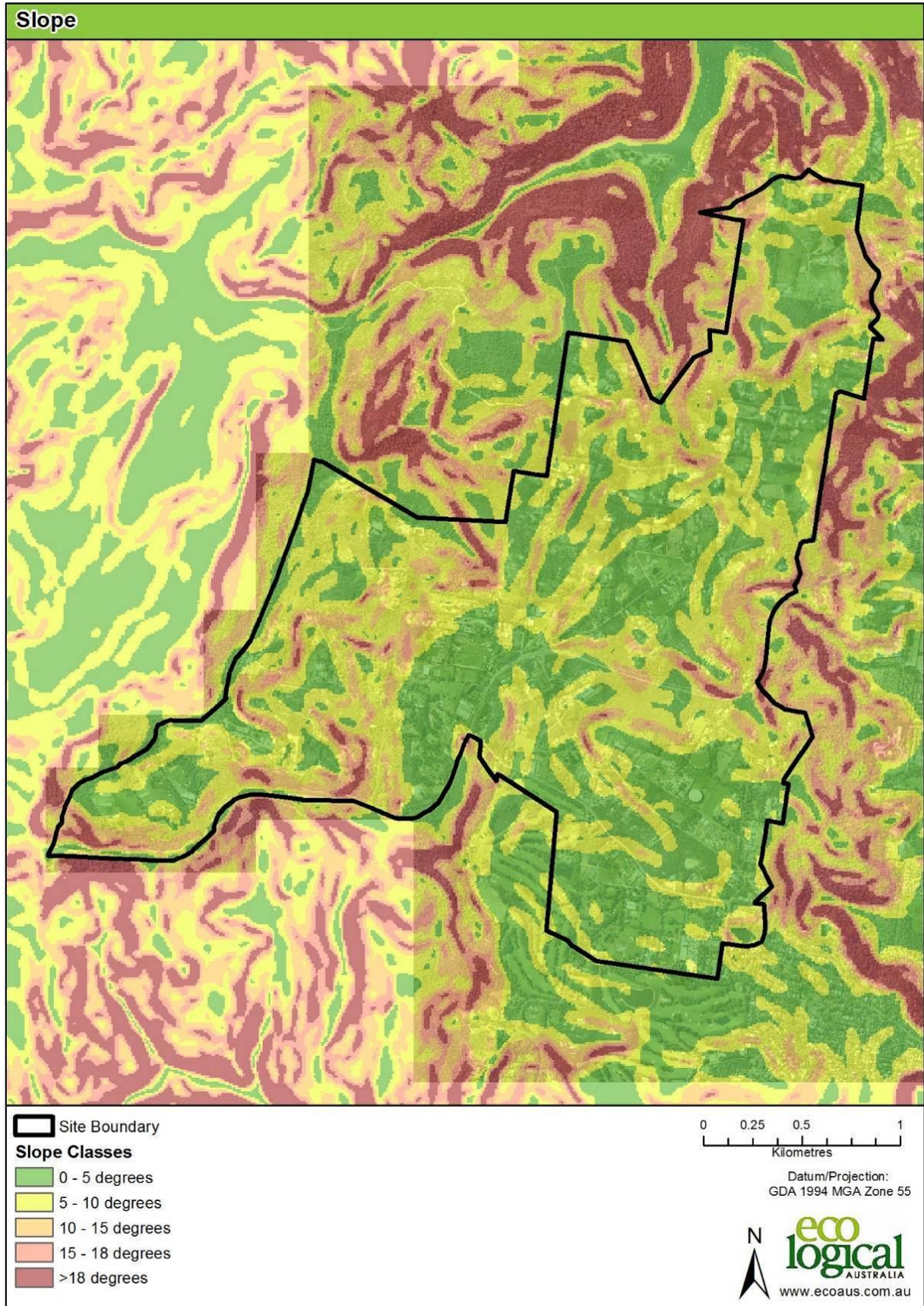


Figure 6: Slope Class Distribution assessed using PBP 2006

3 Bushfire Protection Measures

PBP requires the assessment of a suite of bushfire protection measures that in total afford an adequate level of protection. The measures required to be assessed for rezoning are listed in **Table 2** below and are discussed in detail in the remainder of this section. This section demonstrates that the study area can accommodate the required bushfire protection measures and achieve the Direction 4.4 objectives and RFS requirements.

Table 2: PBP bushfire protection measures

| Bushfire Protection Measure | Considerations |
|----------------------------------|---|
| Asset Protection Zones (APZ) | Location and dimension of APZ setbacks from vegetation including prescriptions of vegetation management within the APZ. |
| Access | Assessment to include access and egress in and out of a developable area such as alternate access, operational response and evacuation options. APZ perimeter access to be considered as is design standards of public roads and any fire trails. |
| Water supply and other utilities | List requirements for reticulated water supply and hydrant provisions, and any static water supplies for fire fighting. |
| Building construction standards | Provide a guide on the application of construction standards for future buildings. |

3.1 ASSET PROTECTION ZONES

3.1.1 APZ Location and Dimension

Using the vegetation and slope data discussed in Section 3, APZs suitable for future residential subdivision have been calculated for all vegetated areas and areas planned for future revegetation. These have been mapped and identified on **Figure 7** and described in **Table 3**.

It is currently considered best practice to provide an APZ dimension that achieves a building construction standard under *AS 3959-2009 Construction of buildings in bushfire-prone areas* (Standards Australia 2009) of Bushfire Attack Level (BAL)-29. The current accepted minimum APZ dimension required by PBP in many cases allows for a BAL-40 standard. The increase in APZ (to BAL-29) provides a higher level of bushfire protection and ensures that future home owners are not impacted by the additional costs associated with construction of a dwelling at BAL-40. **Table 3** lists the current minimum APZ (PBP 2006) and best practice APZ corresponding to BAL-29 (refer to Section 4.4 for more information on AS 3959-2009

An APZ dimension for Special Fire Protection Purposes (SFPP) is also listed in **Table 3** for schools, child care centres, accommodation, retirement villages and other uses listed under s100B (6) RF Act.

It is recommended that development associated with employment lands, such as commercial and industrial development, be treated as residential development for the purpose of the rezoning analysis. Non-habitable development of this kind has the opportunity to have an APZ less than that required for residential subdivision. This flexibility relies on the known use of the building, its design and construction standard, and can only be determined at the subdivision application stage, thus it is considered appropriate to assess residential sized APZs for such development at this stage in the planning process.

It is important to note that the APZ calculations quoted in this assessment are indicative only and have been determined at a landscape scale. This level of detail is suitable for a rezoning assessment whereby the aim is to demonstrate whether a parcel of land can accommodate the bushfire hazard, the expected APZ and future development. The final APZ dimensions for any future subdivision or development depends on the accuracy of a slope assessment undertaken at a site-specific level. The APZ dimensions quoted in this assessment should not be relied on to approve a future subdivision; they may be used as a guide only.

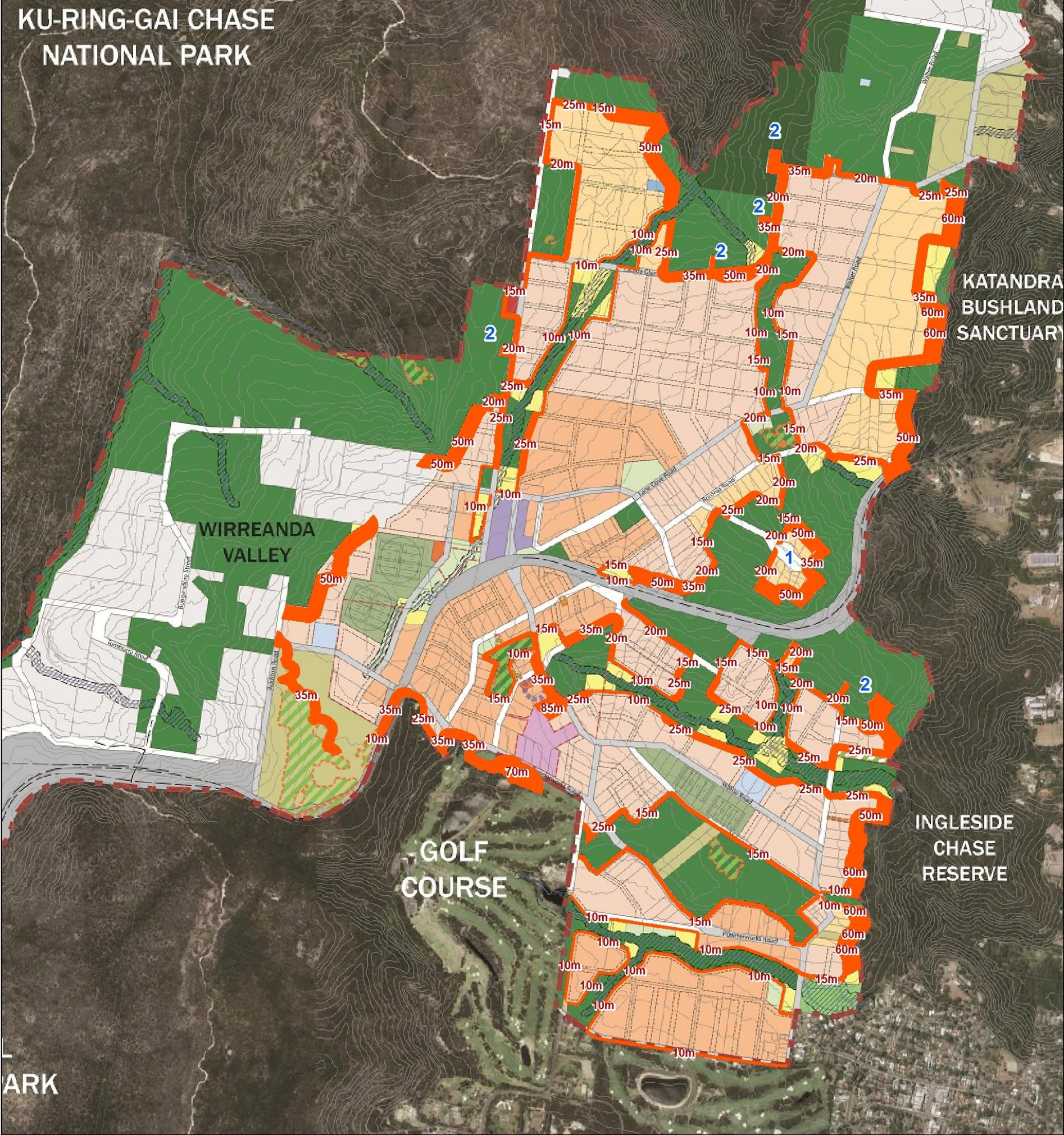
Table 3: Asset Protection Zone (APZ) calculation

| Predominant Vegetation | Effective Slope | APZ width* | BAL-29 APZ** | SFPP APZ width |
|------------------------|-------------------|------------|--------------|----------------|
| Forest | Upslope/Flat | 20 m | 25 m | 60 m |
| Forest | >0-5° downslope | 25 m | 32 m | 70 m |
| Forest | >5-10° downslope | 35 m | 39 m | 85 m |
| Forest | >10-15° downslope | 50 m | 49 m | 100 m |
| Forest | >15-18° downslope | 60 m | 61 m | 100 m |
| Woodland | Upslope/Flat | 10 m | 16 m | 40 m |
| Woodland | >0-5° downslope | 15 m | 21 m | 50 m |
| Woodland | >5-10° downslope | 20 m | 26 m | 60 m |
| Woodland | >10-15° downslope | 25 m | 33 m | 70 m |
| Woodland | >15-18° downslope | 30 m | 41 m | 75 m |
| Tall Heath | Upslope/Flat | 15 m | 13 m | 45 m |
| Tall Heath | >0-5° downslope | 15 m | 15 m | 50 m |
| Tall Heath | >5-10° downslope | 20 m | 17 m | 55 m |
| Tall Heath | >10-15° downslope | 20 m | 19 m | 60 m |
| Tall Heath | >15-18° downslope | 20 m | 21 m | 65 m |
| Freshwater Wetland | Upslope/Flat | 10 m | 13 m | 35 m |
| Freshwater Wetland | >0-5° downslope | 10 m | 15 m | 35 m |
| Low hazard | Upslope/Flat | 10 m | 11 m | 30 m |
| Low hazard | >0-5° downslope | 10 m | 14 m | 40 m |
| Low hazard | >5-10° downslope | 15 m | 18 m | 50 m |
| Low hazard | >10-15° downslope | 20 m | 23 m | 60 m |
| Low hazard | >15-18° downslope | 25 m | 23 m | 65 m |

* PBP 2006 based assessment (29kW/m²); ** AS 3959-2009 assessment of BAL29

Indicative Minimum Asset Protection Zone (APZ) Width and Zoning

- | | |
|-------------------------------------|--|
| Precinct Boundary | Neighbourhood Centre |
| Houses | Proposed School |
| Low Rise Apartments / Townhouses | Major Road |
| Houses on Larger lots | Proposed Mona Vale Road Corridor |
| Environmental Management | Proposed Mona Vale Road Alignment |
| Rural | Water Management |
| Parks | Water Reservoir |
| Sporting Field | Sewer Pump Station |
| Private Open Space | Rural Fire Service Station |
| Environmental Conservation | Creek Corridor |
| Road within Ingleside Chase Reserve | Heritage Curtilage |
| National Park | Community Centre |
| Endangered Ecological Community | Preferred Location for Neighbourhood Shops |



Minimum Required Asset Protection Zone Width (for new development)

Structure_Plan_Oct_2016.jpg
RGB
Red: Band_1

0 0.25 0.5 1
Kilometres
Datum/Projection: GDA 1994 MGA Zone 56

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Figure 7: Indicative Asset Protection Zones (APZ) requirements for existing and future vegetation based on the requirements of PBP 2006.

3.1.2 Vegetation Management within APZ

The management of vegetation within the APZ is to achieve the specifications of an Inner Protection Area (IPA) and Outer Protection Area (OPA) as described by PBP. As such, future APZs should be managed as follows:

- Within an IPA:
 - No tree or tree canopy is to occur within 2 - 5 m of future dwelling rooflines;
 - The presence of a few shrubs and/or trees in the APZ is acceptable provided that they:
 - 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 or in a danger period
 - are located far enough away from the building so that they will not ignite the building by direct flame contact or radiant heat emission.
 - Any landscaping or plantings should preferably be low flammability species; and
 - The ground fuel is to be maintained to less than 4 tonnes per hectare of fine fuel (4 t/ha is equivalent to a 1 cm thick layer of leaf litter and fine fuel means any dead or living vegetation of less than 6 mm in diameter, e.g. twigs less than a pencil in thickness).
- In the OPA, the ground fuel may have up to 8 tonnes per hectare of fine fuel and a 30% canopy cover may be present.

3.1.3 Perimeter Access within APZ

A perimeter road is the preferred option in bushfire prone areas, however in some limited situations a perimeter road may not be required depending on the significance of the bushfire threat. A more detailed consideration of perimeter access is provided in the following **Section 3.4**.

3.1.4 Staging of development for APZ

Staging of future development should give consideration to the provision of an APZ to manage any potential bushfire hazard within adjoining future development areas to ensure that future dwellings are not impacted by unnecessary construction standards. This could occur through the provision of DA approved temporary APZ for earlier stages which will be automatically extinguished once the land where the APZ operates is developed and the hazard is permanently removed.

3.2 BUILDING CONSTRUCTION STANDARDS

The application of building construction standards for bushfire protection under *AS 3959-2009 Construction of buildings in bushfire-prone areas* (Standards Australia 2009) is to be considered at the development application stage for individual dwellings and buildings. An assessment under AS 3959-2009 is not required at the rezoning or subdivision stages. The following is a brief introduction on AS 3959-2009.

AS 3959-2009 contains six Bushfire Attack Levels (BAL) each with a prescribed suite of design and construction specifications aimed at preventing ignition during the passing of a bushfire front. The BALs are introduced below:

- BAL-Low: The threat does not warrant application of construction standards. Developments with BAL-Low are generally not within bushfire prone land (greater than 100 m from bushland);

- BAL-12.5: Addresses background radiant heat at lower levels and ember attack;
- BAL-19: Addresses mid-range radiant heat and ember attack;
- BAL-29: Addresses high range radiant heat and ember attack;
- BAL-40: Addresses extreme range of radiant heat and potential flame contact and ember attack; and
- BAL-FZ: Addresses construction within the flame zone. New subdivided lots are not permitted within the flame zone in NSW.

NSW has a minor variation to AS 3959-2009 which requires consideration in future development applications. The variation is contained within the document 'PBP Appendix 3 Addendum' (RFS 2010) which stipulates additional specific BAL 12.5 and BAL 19 construction requirements for sarking, sub floor screening, floors, verandas, decks, steps, ramps and landings.

3.3 WATER SUPPLY AND OTHER UTILITIES

3.3.1 Water Supply and Hydrants

Future lots are to be serviced by reticulated water infrastructure suitable for fire fighting purposes. With the exception of rural residential subdivision, the furthest point from any future dwellings to a hydrant is to be less than 90 m (with a tanker parked in-line) in accordance with *AS 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (Standards Australia 2005). The reticulated water supply is to comply with the following acceptable solutions within Section 4.1.3 of PBP:

- Reticulated water supply to use a ring main system for areas with perimeter roads;
- Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005;
- 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; and
- The PBP provisions of parking on public roads are met.

Future dwellings on rural residential lots will require a static water supply at time of development application as the dwellings will be beyond the hydrant distances required by PBP.

3.3.2 Electrical and Gas Supplies

In accordance with PBP, electricity should be underground wherever practicable. Where overhead electrical transmission lines are installed:

- Lines are to be installed with short pole spacing, unless crossing gullies, and
- No part of a tree should be closer to a powerline than the distance specified in *Vegetation Safety Clearances* issued by Energy Australia (NS179, April 2002).

Any gas services are to be installed and maintained in accordance with *AS/NZS 1596-2008 The storage and handling of LP gas* (Standards Australia 2008).

3.4 ACCESS

PBP requires an access design that enables safe evacuation away from a bushfire prone area whilst facilitating adequate emergency and operational response to the area requiring protection. The following sections present the bushfire planning requirements for access in bushfire prone land.

3.4.1 Safe Access and Egress

All bushfire prone areas should have an alternative access or egress option. This is usually achieved by providing more than one public road into and out of a precinct. The need for an alternative road and its location depends on the bushfire risk, the density of the development, and the chances of the road being cut by fire. Given the high level of bushfire risk posed by large expanses of vegetation, all precincts within the site should allow for an alternative public access road.

3.4.2 Perimeter Roads

Depending on the bushfire risk, all bushland interface areas containing an APZ for a significant bushfire hazard should feature a perimeter public road within the APZ. In exceptional circumstances it may be possible for some areas not to have a perimeter road, and have a perimeter trail instead. These include areas of lower bushfire risk (such as adjoining low hazard areas), rural residential areas with large lot sizes whereby perimeter access can be provided within each lot, or areas where it may not be feasible to provide a continuous road due to the shape of the interface or the terrain. These areas should have some other access strategy such as trails or regular access points including access to a hydrant network.

The design details (PBP acceptable solutions) of public perimeter roads and fire trails are listed in Section **3.4.3** below.

3.4.3 Road Design and Construction Standards

Public roads and perimeter fire trails are to comply with the PBP acceptable solution design standards as listed in **Table 4** and **Table 5** respectively. Future residential subdivision within the site will be able to comply with these standards.

Table 4: Design and construction for public roads (RFS 2006; pg 21)

| Performance Criteria | Acceptable Solutions |
|---|--|
| <ul style="list-style-type: none"> • Firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources) | <ul style="list-style-type: none"> • Public roads are two-wheel drive, all weather roads |
| <ul style="list-style-type: none"> • Public road widths and design that allows safe access for firefighters while residents are evacuating an area | <ul style="list-style-type: none"> • Urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres 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 by emergency services vehicles • Public 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 metres 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 • Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient • There is a minimum vertical clearance to a height of four metres above the road at all times |
| <ul style="list-style-type: none"> • The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles | <ul style="list-style-type: none"> • 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 9 tonnes per axle for all other areas). Bridges clearly indicated load rating |
| <ul style="list-style-type: none"> • Roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered | <ul style="list-style-type: none"> • Public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression • Public roads between 6.5 metres 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 |
| <ul style="list-style-type: none"> • There is clear access to reticulated water supply | <ul style="list-style-type: none"> • Public roads up to 6.5 metres wide provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression • One way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression |
| <ul style="list-style-type: none"> • Parking does not obstruct the minimum paved width | <ul style="list-style-type: none"> • Parking bays are a minimum of 2.6 metres wide from kerb to 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 |

Table 5: Design and construction for fire trails (RFS 2006; pg 25)

| Performance Criteria | Acceptable Solutions |
|--|--|
| <ul style="list-style-type: none"> <i>The width and design of the fire trails enables safe and ready access for firefighting vehicles</i> | <ul style="list-style-type: none"> <i>A minimum carriageway width of four metres with an additional one metre wide strip on each side of the trail (clear of bushes and long grass is provided)</i> <i>The trail is a maximum grade of 15 degrees if sealed and not more than 10 degrees if unsealed</i> <i>A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches is provided</i> <i>The crossfall of the trail is not more than 10 degrees</i> <i>The trail has the capacity for passing by:</i> <ul style="list-style-type: none"> <i>- 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</i> <i>- A passing bay every 200 meters, 20 metres long by three metres wide, making a minimum trafficable width of seven metres at the passing bay</i> <p><i>Note: Some short construction 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> |
| <ul style="list-style-type: none"> <i>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 authorised persons</i> | <ul style="list-style-type: none"> <i>The fire service is accessible to firefighters and maintained in a serviceable condition by the owner of the land</i> <i>Appropriate drainage and erosion controls are provided</i> <i>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</i> <i>Fire trails do not traverse a wetlands or other land potentially subject to periodic inundation (other than a flood or storm surge)</i> <i>Gates for fire trails are provided and locked with a key / lock system authorized by the local RFS</i> |
| <ul style="list-style-type: none"> <i>Fire trails designed to prevent ween infestation, soil erosion and other land degradation</i> | <ul style="list-style-type: none"> <i>Fire trail does not adversely impact on natural hydrological flows</i> <i>Fire trail design acts as an effective barrier to the spread of weeds and nutrients</i> <i>Fire trail construction does not expose acid-sulphate soils</i> |

4 Structure Plan Assessment

The Structure Plan identifies landuse outcomes for the Precinct. Future development of the Precinct will need to be consistent with this Plan. The Structure Plan can generally accommodate the required minimum asset protection zone widths based on the expected bushfire hazard after vegetation is removed, retained or revegetated as shown in **Figure 7**. Additionally, the structure plan is able to accommodate perimeter roads between future developments and retained or revegetated bushland.

There are two key considerations (marked on **Figure 7**) for development within the Precinct:

- 1- The area accessed via Laurel Road contains a number of existing residences and is currently accessed by a single road greater than 200 m in length and surrounded by vegetation on both sides (marked as '1' on **Figure 7**). There is no plan to provide alternative access to this area. However, the proposed Large Lot zoning which specifies a minimum lot size of 2000m² combined with limited developable area outside of the minimum required APZ setbacks will limit any increase in residential density in this area.
- 2- Due to the nature of the existing zoning, there are a number of single isolated lots containing existing residences adjacent to bushland areas which cannot accommodate the minimum required APZs (marked as '2' on **Figure 7**). These areas will either remain rural or become 'large lot residential' and future intensification of these lots is not anticipated as future subdivision is unlikely to comply with PBP.

5 Vegetation Management within conservation areas

At this stage, details of the management and ownership of the conservation areas have not been outlined. As such, it is not possible to specify suitable management practices within these areas as part of the rezoning process. However, where relevant, bushfire management in the broader area will need to be considered including the designation of appropriate management zones for inclusion within the *Warringah Pittwater Bushfire Risk Management Plan (2008)* and *Ingleside / Bayview / Elanora Heights Bush Fire Preparation Maps (RFS 2013)*. In this respect ongoing consultation with the NSW Rural Fire Service and other relevant stakeholders is to be undertaken throughout the planning and development process and relevant documents updated as development occurs.

6 Recommendations and conclusion

6.1 RECOMMENDATIONS

Bushfire hazard has been assessed across the study area with future development able to provide compliant APZ within individual property boundaries. On the basis of this assessment, indicative asset protection zone requirements have been mapped across the proposed rezoning area.

A number of strategies have been provided in the form of planning controls so the risk from bushfire can be minimised and future rezoning or development approval processes can be streamlined. Further, it has been found that development of the future land uses within the subject study area, from a bushfire planning perspective, are considered suitable.

A number of recommendations have been provided in this report to mitigate against bushfire and ensure compliance with bushfire planning controls:

- The provision of APZs in accordance with **Section 3.1** of this report
- Water supply for future development is to be in accordance with **Section 3.3** of this report
- Road layout and design is to be in accordance with **Section 3.4** of this report
- The Structure Plan is to account for the key considerations outlined in **Section 4** of this report
- Vegetation management within conservation areas is to be considered in accordance with **Section 5** of this report.

To achieve these recommendations the following provisions are suitable for inclusion in a DCP or other planning instrument:

- Subject to detailed design at DA stage, the indicative location and widths of APZs are to be provided generally in accordance with **Figure 7**. APZs:
 - are to be located wholly within lot boundaries and not burden public lands
 - may incorporate non-combustible infrastructure within APZs such as roads, easements and parking areas. The majority of APZs should be contained within perimeter roads and front yard setback
 - may be used for open space and recreation subject to appropriate fuel management
 - must not allow the placement of combustible materials within them
 - are to be maintained in perpetuity in accordance with *Planning for Bushfire Protection 2006*
 - are to be generally bounded by a perimeter road that is linked to the public road system at regular intervals in accordance with *Planning for Bushfire Protection 2006*
- Where an allotment fronts and partially incorporates an APZ it shall have an appropriate depth to accommodate a dwelling with private open space and the minimum required APZ.
- Temporary APZs, identified through a Section 88B instrument, will be required where development is proposed on allotments next to undeveloped land. Once the adjacent stage of development is undertaken, the temporary APZ will no longer be required and shall cease.
- Ensure adequate access and egress through a well-designed road system
- Consider the adequacy of water supply for firefighting purposes and the delivery of other services (gas and electricity) and
- Consider construction standards (AS3959) implications for future developments depending on development type. Buildings adjacent to APZs are to be constructed in accordance with the

requirements of Appendix 3 of *Planning for Bushfire Protection 2006* and *Australian Standard 3959-1999 -Construction of Building in Bushfire Prone Areas*.

6.2 CONCLUSION

The rezoning has been proposed based on the advice and constraints contained within this report to ensure compliance with relevant bushfire planning controls (e.g. PBP and AS3959). In relation to the furthering of the planning processes as they relate to the future uses of the study area, it is considered appropriate that more detailed assessment and consideration of the relevant bushfire protection strategies should be undertaken at the development application stage. This further assessment should include a more comprehensive review of the road and lot layout and subsequent planning controls, to ensure they are well designed in terms of bushfire protection outcomes.

6.3 STATEMENT OF CAPABILITY

This bushfire assessment demonstrates that the subject land is capable of accommodating future development and associated land use with the appropriate bushfire protection measures and bushfire planning requirements prescribed by s.117 (2) Direction 4.4 – ‘*Planning for Bush Fire Protection*’ and PBP.

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