



Bushfire Assessment

**Mooney Mooney &
Peat Island
Planning Proposal**

**Government Property NSW
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1 Introduction

1.1 Background

Government Property NSW commissioned Peterson Bushfire to investigate the bushfire protection requirements associated with rezoning surplus government land at Mooney Mooney and Peat Island for the purpose of a Planning Proposal. This technical report is the result of an iterative process of identifying development constraints amongst a wider planning team of many disciplines to inform the preparation of a Concept Plan. This report demonstrates compliance with the relevant bushfire protection legislation and policy.

1.2 Location and description of study area

The land that is subject of the Planning Proposal is shown in Figure 1, referred to as the study area for the purposes of this report. The study area consists of government owned land on either side of the M1 Motorway corridor at Mooney Mooney. It also includes Deerubbun Reserve and boat ramp facilities north to Cabbage Point including Peat Island on the western side of the corridor, and existing residential lands and bushland areas on the eastern side.

Significant tracts of bushland exist on the steep slopes of the northern section of the study area which are linked to Popran National Park further north. Other areas of bushland include a large remnant on the hill of Deerubbun Reserve overlooking the boat ramp in the south as well as mangroves and small patches of roadside vegetation. The remainder of the site has been cleared and under occupation, dissected by many roads mainly due to the M1 Motorway and Old Pacific Highway interchange. Photographs of the study area are included in Appendix 1.

1.3 Proposed Concept Plan

The proposal is to rezone surplus government land to facilitate the future development of a mix of residential, community, recreation and employment generating land uses. The site is currently zoned SP2 Special Uses (Hospital), SP2 Educational Establishment, SP2 Water Storage Facility, RE1 Public Recreation and W2 Recreational Waterways (relating to the Hawkesbury River and Mooney Mooney Creek).

The Concept Plan (Figure 2) developed for the Planning Proposal introduces R2 Low Density Residential and R3 Medium Density Residential in unconstrained locations either side of the M1 corridor, SP3 Tourist on Peat Island, B2 Neighbourhood Centre at the interchange, RE1 Public Recreation for the majority of the western foreshore lands and E1 National Parks and Nature Reserves for the bushland areas in the north of the study area.

Constraints mapping identified areas where bushfire planning constraints could not be mitigated without potentially significant impact. These areas include the steep, forested areas in the northern and southern parts of the site. Consequently, the Concept Plan identifies these areas as National Park and public reserve.

The Concept Plan is indicative only and further assessment of bushfire protection matters will be required at subsequent planning stages such as subdivision and development application.

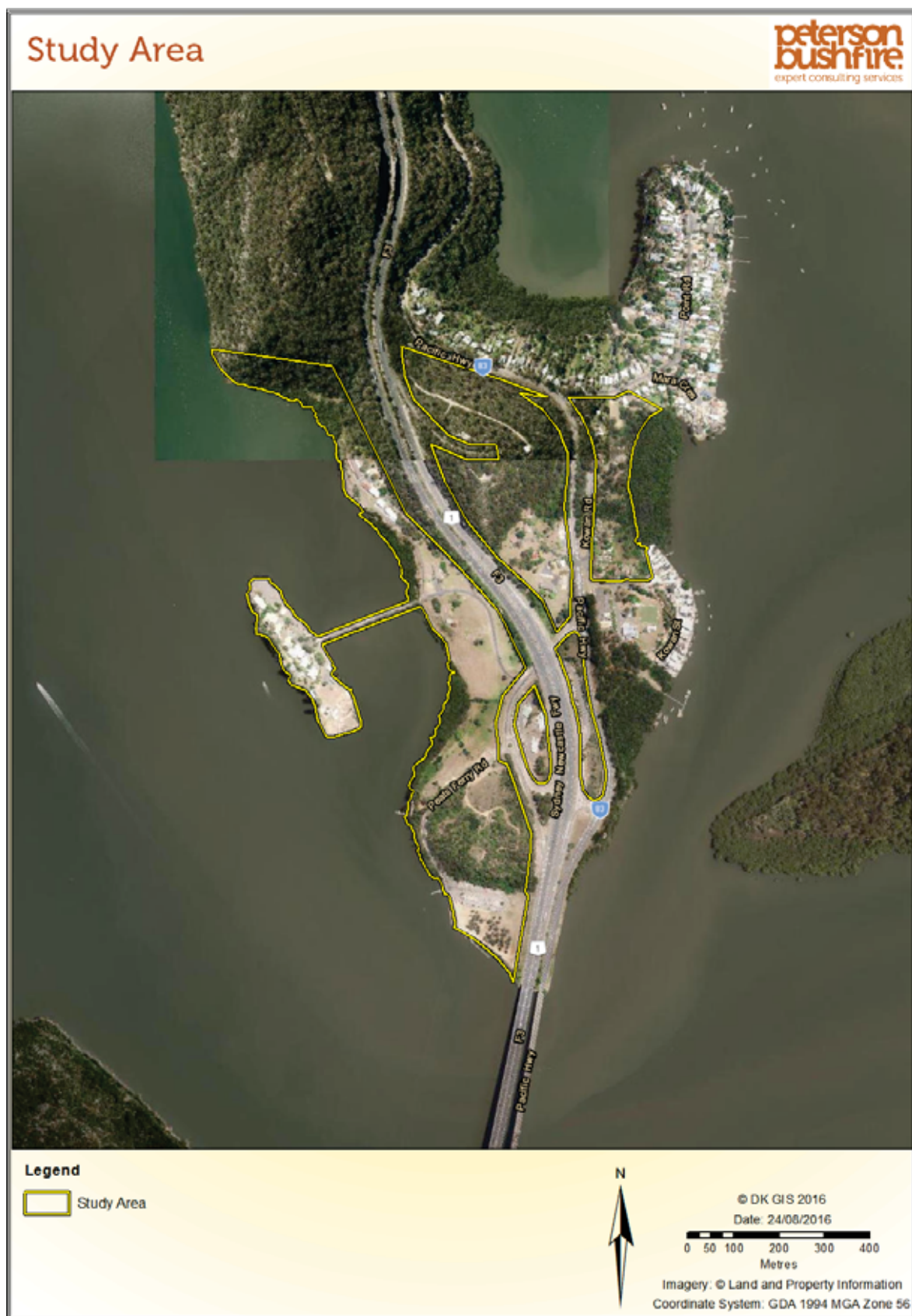


Figure 1: Planning Proposal study area

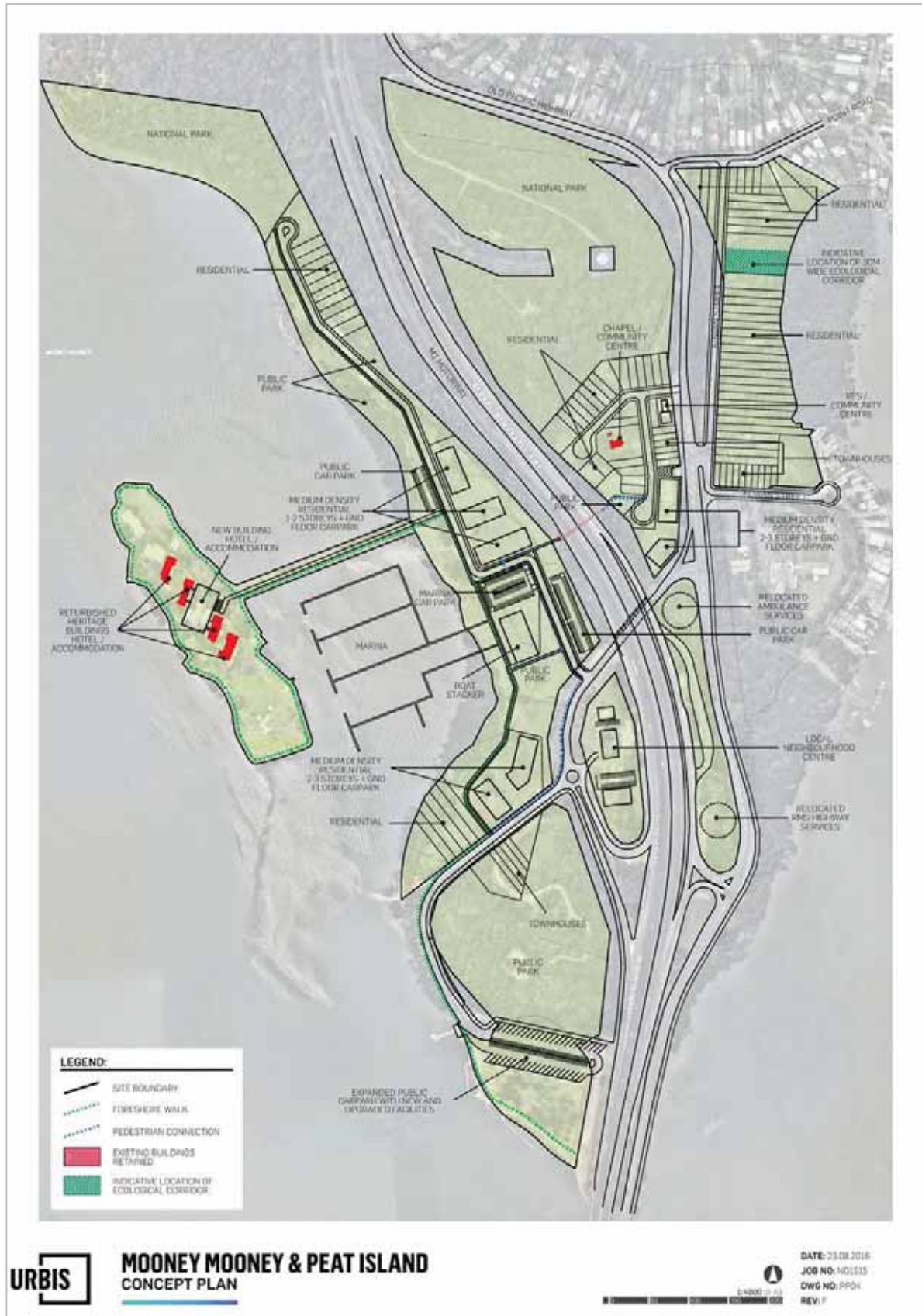


Figure 2: Concept Plan

1.4 Assessment requirements

The study area is identified as bushfire prone land by Gosford City Council as it contains or is within 100 m of stands of bushland that have the potential to sustain a bushfire or contribute to bushfire attack. Figure 3 is an excerpt of the Gosford Bushfire Prone Land Map.

When investigating the capability of bushfire prone land to be rezoned, local councils must have regard to s.117 (2) *Direction 4.4 – ‘Planning for Bush Fire Protection’* of the *Environmental Planning and Assessment Act 1979*. The objectives of Direction 4.4 are:

- *To protect life, property and the environment from bushfire hazards, by discouraging the establishment of incompatible land uses in bushfire prone areas; and*
- *To encourage sound management of bushfire prone areas.*

Direction 4.4 instructs councils on the bushfire matters which need to be addressed when drafting and amending Local Environmental Plans (LEP). This includes:

- Consultation with the Commissioner of the NSW Rural Fire Service (RFS) under s.62 of the *EPA Act*, and take into account any comments so made;
- Draft LEPs shall have regard to the document *Planning for Bushfire Protection 2006* (PBP); and
- Compliance with numerous bushfire protection provisions where development is proposed.

After the rezoning stage, any future subdivision of land and the construction of buildings will also require an assessment in accordance with PBP.

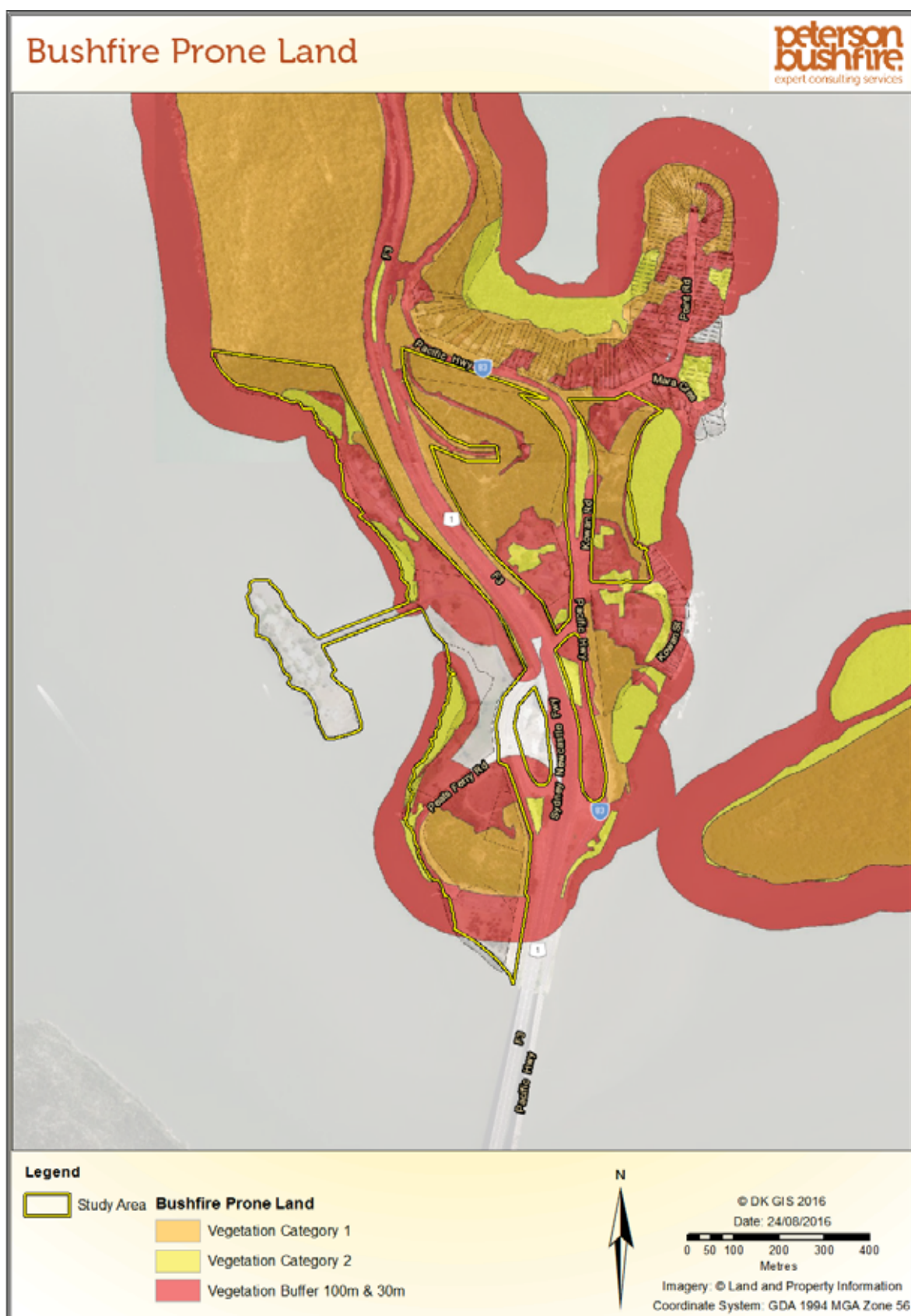


Figure 3: Gosford Bushfire Prone Land Map as it relates to the study area

2 Methodology

Assessment of the study area was conducted in accordance with the site assessment methodology prescribed within *Planning for Bushfire Protection 2006* (PBP).

This technical report is the result of a detailed investigation and review including site inspection, examination of desk-top mapping, modelling and analysis of geographical information systems (GIS) and consultation with the planning team. Table 1 below summarises the tasks undertaken.

Table 1: Methodology

Methodology	Task	Considerations
Desk-top review	A brief desk-top review of available mapping was undertaken to guide the field work	Familiarisation of terrain and vegetation communities
Site inspection	Inspection of study area and surrounding bushfire hazard	The inspection ground-truthed the desk top review and gathered site specific data on slope and vegetation that informs determination of asset protection zones.
Detailed desk-top analysis	Review and analysis of all available mapping layers relevant to bushfire hazard.	Mapping layers include recent aerial imagery from Nearmap, vegetation mapping from Gosford City Council online mapping and SIX Maps, and topographical data and models provided by the client.
Determination of constraints	Determine requirements of <i>Planning for Bushfire Protection 2006</i> related to the site and development potential.	Protection requirements relating to rezoning consist of Asset Protection Zones and access for fire-fighting.
Site inspection with planning team	A second site viewing with all technical disciplines in attendance occurred to discuss the primary constraints and identify developable areas.	The focus of the second site inspection was the bushland areas particularly in the northern part of the site on steep lands.
Workshop	A planning workshop was convened to discuss Concept Plan options.	Three Concept Plan options were discussed and worked up into one preferred version.
Concept Plan review	The preferred Concept Plan was finalised through an iterative process.	Final adjustments were made on detailed planning matters.
Reporting	Preparation of technical bushfire assessment report.	Report prepared to address EP&A Act s.177 (2) Direction 4.4.

3 Bushfire hazard assessment

An assessment of the bushfire hazard is necessary to determine the application of bushfire protection measures such as Asset Protection Zone location and dimension to future developable areas. The following sub-sections provide a detailed account of the vegetation communities (bushfire fuels) and the topography (slope influencing fire behaviour) that combine to create the bushfire hazard that may affect bushfire behaviour across the study area.

3.1 Vegetation

The 'predominant vegetation' influencing fire behaviour within and approaching the study area has been assessed in accordance with the methodology specified within PBP. A description of the vegetation communities and hazard is provided below and the PBP predominant vegetation classifications are mapped on Figure 4. Photographs of the vegetation communities and study area are included in Appendix 1.

The northern end of the study area is characterised by dry sclerophyll forest in good condition on steep slopes. The lower slopes support Dharug Footslopes Apple Redgum Forest (OEH 2013) and the higher slopes and more exposed aspects support Exposed Hawkesbury Woodland (OEH 2013).

The southern end supports a large disturbed remnant of Dharug Footslopes Apple Redgum Forest in Deerubbun Reserve.

The eastern margins of the study area support small, patchy and disturbed remnants of Dharug Footslopes Apple Redgum Forest grading into significant areas of Mangrove Estuarine Complex along the waters edge of Mooney Mooney Creek and associated low-lying wetlands. Mangrove and saltmarsh are not deemed a bushfire hazard by PBP. Similarly, the western foreshore supports fringing Mangrove Estuarine Complex and small fragmented patches of scrub along the waters edge, followed by predominantly cleared open space. Peat Island does not support classified vegetation and is not considered bushfire prone.

Roadside corridors of vegetation in varying conditions are found along most roads and some of these corridors and remnants are classified as 'low hazard vegetation' due to their width being less than 50 m and/or size less than 1 hectare in size. Some smaller and fragmented patches of roadside vegetation are not considered a bushfire hazard.

3.2 Effective slope

The 'effective slope' influencing fire behaviour has been assessed in accordance with the methodology specified within PBP. This is conducted by measuring the slope that would most influence fire behaviour where the vegetation occurs over a 100 metre transect measured outwards from the proposed development boundary.

In relation to the hazards identified on Figure 4 and the Concept Plan in Figure 2, two effective slope classes exist; 'upslope/flat land' and 'downslope 0-5 degrees'. Figure 4 indicates the effective slope classes.



Figure 4: Bushfire hazard analysis (vegetation classification and effective slope class)

4 Bushfire protection measures

This section details the bushfire protection measures required by PBP for rezoning proposals and demonstrates that the study area can accommodate the required measures. Table 2 summarises the measures, which are discussed in detail in the following subsections.

Table 2: PBP bushfire protection measures

Bushfire protection measures	Considerations
Asset Protection Zones (APZ)	Location and dimension of APZ building setbacks from vegetation including guidelines on vegetation management within the APZ.
Access	Access and egress in and out of a developable area and design standards for public roads.
Water supply and other utilities	List requirements for reticulated water supply and hydrant provisions, and the installation of electricity and gas.
Building construction standards	Guidelines on construction provisions for future buildings.

4.1 Asset protection zones

Using the vegetation and slope data discussed in Section 3, APZs have been determined and accommodated within the Concept Plan where required. The APZ layer is shown on the Master Plan (Figure 5).

There are five areas that will require an APZ at an interface with a bushfire hazard that will not be provided by roads or open space. These are listed in Table 3 below. The Concept Plan has been designed to accommodate the required APZ dimensions.

Table 3: APZ determination

Location ¹	Slope ²	Vegetation ³	PBP APZ ⁴	Comment
North-east	Downslope 0-5°	Low hazard	10 m	Ecological corridor and buffer to mangroves less than 50 m in width
North-west	Upslope/Flat	Forest	20 m	Forest corridor alongside M1 wider than 50 m and directly linked to bushland
Central	Upslope/Flat	Forest	20 m	Forest on steep upslopes
M1	Upslope/Flat	Low hazard	10 m	Narrow corridors or roadside vegetation
South	Upslope/Flat & Downslope 0-5°	Forest	20-25 m	Large remnant patch of forest in Deerubbin Reserve

¹ Location in the study area.

² Effective slope assessed over 100 m from edge of developable area where the bushfire hazard occurs.

³ Predominant vegetation classification over 140 m from developable area.

⁴ Asset Protection Zone (APZ) required by Table A2.4 of Planning for Bushfire Protection 2006



Figure 5: Master Plan showing Asset Protection Zone layer

The APZ is to be managed to comply with the performance objective of an Inner Protection Area (IPA) as prescribed by PBP. The following guiding principles can be used to achieve the objectives:

- No tree or tree canopy is to occur within 2 m of buildings;
- The presence of a few scattered trees in the APZ is acceptable provided that they are well spread out, do not form a continuous canopy, and are located far enough away from future buildings so that they will not ignite the buildings by direct flame contact or radiant heat emission;
- Shrubs and understorey vegetation should not be within the APZ. Any landscaping or garden beds should be located within defined, discrete and well-managed garden beds separated from the hazard and buildings;
- The ground fuel is to be maintained to less than 4 tonnes per hectare of fine fuel by regular mowing or slashing.

4.2 Access

PBP requires an access design that enables safe evacuation away from an area whilst facilitating adequate emergency and operational response. All bushfire prone areas should have an alternate access or egress option depending on the bushfire risk, the density of the development, and the chances of the road being severed by fire for a prolonged period.

Some areas of the existing road layout will be modified slightly to accommodate future development within the rezoned areas, however the layout across the study area will largely remain unchanged. The following road changes are proposed:

- An extension of Kowan Street in the north-east of the study area to provide a through road back to the Old Pacific Highway;
- A reconfiguration of the cul-de-sacs in the central part of the study area. All cul-de-sacs will be less than 200 m from the connecting through road; and
- The construction of a public road along the eastern foreshore lands. This road will culminate in a cul-de-sac longer than 200 m from the connecting through road, however the road traverses cleared lands with only mangroves and roadside vegetation in proximity until the northern end where the road will come in to contact with bushland.

The public roads are required to be constructed in accordance with the PBP design standards as repeated in Table 4 on the following page.

The proposed layout as shown in the Concept Plan satisfies PBP objectives in relation to access and egress.

Table 4: Design and construction for public roads

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 allows 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 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), which is a minimum of 6.5 metre carriageway for two-way road with inside edge curve radius >100 and swept path 2.5 metres. - 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
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 9 tonnes per axle for all other areas). Bridges clearly indicated load rating
Roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered	- 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
There is clear access to reticulated water supply	- 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
Parking does not obstruct the minimum paved width	- 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

4.3 Water supply and utilities

Water supply

Future development will require fire hydrants to be installed to comply with *AS 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (AS 2419) so that all sides of a building are within 70 m of a hydrant by lay of the hose (or 90 m with a tanker parked in-line maximum 20 m from the hydrant). The Concept Plan can accommodate compliant hydrant installation.

Electricity supply

In accordance with PBP, electricity should be underground wherever practicable. Where overhead electrical transmission lines are installed, the vegetation clearance distances are to comply with *ISSC 3 Guideline for Managing Vegetation Near Power Lines* (Industry Safety Steering Committee 2005). The Concept Plan can accommodate compliant installation of electricity.

Gas supply

Any gas services are to be installed and maintained in accordance with *AS/NZS 1596-2008 The storage and handling of LP gas*. The Concept Plan can accommodate compliant installation of gas.

4.4 Construction standards for future buildings

Buildings proposed within bushfire prone land are required to be assessed to ascertain the Bushfire Attack Level (BAL) in order to design and construct the building in compliance with the corresponding suite of construction specifications listed within *AS 3959-2009 Construction of buildings in bushfire prone areas* (AS 3959). Such an assessment does not occur until development application stage.

Based on the minimum APZ listed in Table 3, those buildings closest to the hazard will have a BAL-40 rating. This can be reduced to BAL-29 with the addition of approximately 5 m to the APZ dimension. The BAL continues to reduce to BAL-19, BAL-12.5 and BAL-LOW (no requirements) the further a building is located from a hazard.

Prior to development, it is recommended that the Gosford Bush Fire Prone Land Map is revised and updated to reflect the recent *Guide for Bush Fire Prone Land Mapping* (Version 5b) released by RFS in November 2015 which will remove many small remnant parcels from the map as well as the mangrove and estuarine areas which should not be identified as bushfire prone vegetation. A map revision will reduce the amount of future bushfire and BAL assessment for development within study area.

5 Conclusion

The Concept Plan has been developed via an iterative process involving constraints analysis and consultative workshops with bushfire protection requirements in mind. As demonstrated by this technical report, the proposal to rezone the study area accommodates the necessary protection measures as required by EP&A Act s.117 (2) Direction 4.4 – 'Planning for Bush Fire Protection' and *Planning for Bushfire Protection 2006*. Measures include the provision of Asset Protection Zones, adequate access for fire-fighting, specifications on the installation of utilities and construction standards for future development.

The Concept Plan addresses all bushfire protection related matters required for consideration at the pre-gateway stage, and therefore can proceed through to the next stage of the rezoning process.

After rezoning, future stages such as subdivision will require further assessment of the proposed design against *Planning for Bushfire Protection 2006*.



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References

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Standards Australia. 2008. *The storage and handling of LP Gas*, AS/NZS 1596-2008, Fourth edition 2005, Standards Australia International Ltd, Sydney.

Standards Australia. 2009 (Amendment 3). *Construction of buildings in bushfire-prone areas*, AS 3959, Third edition 2009, Standards Australia International Ltd, Sydney.

Appendix 1 – Site photographs



Photograph 1: View from northern section towards the south showing forest on steep slopes



Photograph 2: Large forest remnant in Deerubbun Reserve



Photograph 3: Forest leading upslope to M1 corridor in the north-west section of study area



Photograph 4: Exotic roadside vegetation along M1 within central section of study area



Photograph 5: Narrow foreshore scrub with Peat Island in the background



Photograph 6: Western foreshore showing cleared land with mangrove scrub at the waters edge

