

# Bushfire Assessment

In relation to

**Upper Australia Exhibit Redevelopment**

**Taronga Zoo**

Prepared for:

**Taronga Conservation Society Australia**



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Project: 20115

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## 1. Introduction

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ABAC Australian Bushfire Assessment Consultants have been commissioned by Taronga Conservation Society Australia (TCSA) to carry out a bushfire assessment in relation to the proposed redevelopment of the Upper Australia exhibit at Taronga Zoo.

Secretary's Environmental Assessment Requirements (SEARs) were issued for the project and Item 16 of the Key Issues listed in the SEARs is entitled "Bushfire & Safety", with the requirements listed as:

- *Demonstrate compliance with the relevant provisions of Planning for Bushfire Protection (PBP) 2006 and detail any bushfire management and/or mitigation measures; and*
- *Prepare an assessment on the emergency planning and management measures required to facilitate an emergency services response and the other obligations imposed by clause 43 of the Work Health and Safety Regulation 2000.*

The scope of this assessment is limited to the consideration of the proposed redevelopment of the Upper Australia exhibit.

The following matters, inter alia, are outside the scope of this assessment:

- maintenance of vegetation on the site;
- emergency evacuation procedures (except as outlined below); and
- compliance or otherwise of the works with the relevant provisions of the Building Code of Australia (BCA).

The land within the site and surrounds is mapped as bushfire prone land for the purposes of Section 10.3 of the *Environmental Planning & Assessment Act 1979* (EP&A Act).

In relation to the first item of the SEARs above, it is noted that *Planning for Bushfire Protection 2006* has now been replaced by *Planning for Bushfire Protection 2019* (PBP19). This assessment considers PBP19.

As the land within the site is mapped as bushfire prone land, the purpose of this Bushfire Assessment is to assist in the planning process, to identify the proximity of the proposed

development to any potential bushfire threat and the relationship of the proposal with the aim and objectives of PBP19.

The proposed work is subject to a Review of Environmental Factors and this assessment is to be referred to the NSW Rural Fire Service (RFS) to satisfy consultation procedures identified in the SEARs.

### **1.1 Comment on Bushfire Evacuation Procedures**

In relation to the second item of the SEARs above, the consideration of matters such as obligations imposed by the *Work Health and Safety Regulation 2000* is outside the scope of the bushfire assessment and is a matter for other disciplines.

At the request of the client, the following sets out a brief discussion of matters relating to bushfire evacuation, noting that the exhibit which is the subject of this assessment is a small component of the overall Taronga Zoo.

The Taronga Zoo site is subject to a range of emergency management procedures. The existing emergency management procedures for the Zoo, which also include a range of potential events unrelated to bushfire, include measures for the evacuation and relocation of patrons within the Zoo generally, and these include those patrons visiting any of the exhibits.

The Upper Australia exhibit is one of several exhibits within the Zoo and is only accessible by the public during the hours that the Zoo is open to the public. In circumstances where it is deemed unsafe to open the Zoo to the public for whatever reason, then the exhibit will be inaccessible. In the event of a bushfire impacting on the Zoo, emergency procedures will apply to ensure the safety of any patrons present in the Upper Australia exhibit, and patrons present within the overall Zoo site.

If evacuation of patrons was necessary during the times that the Zoo was open to the public, because of bushfire or any other relevant trigger, then the existing emergency management procedures establish how and where those patrons would be evacuated to. If a bushfire event occurred outside opening hours, then the Zoo would remain closed to the public meaning that access would not be available to the Zoo grounds and/or exhibits be prevented for the duration of the emergency event.

Where appropriate, the procedures should be updated at the relevant time to consider the redeveloped Upper Australia exhibit so that the proposal is integrated into the emergency and evacuation procedures for the overall site.

Operational access and egress for emergency service personnel is discussed in relation to the objectives of PBP19 in Section 6.

## 2. The Proposal

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The proposal is for the redevelopment of the Upper Australia exhibit at Taronga Zoo. The project is shown on plans prepared by *lahznimmo architects* (Project: 18-16) entitled *Taronga Zoo – Upper Australia Exhibit* (Rev 02: Issue for SSDA Submission dated 15.06.20).

The *Proposed Site Plan* (Drawing A-DA-021) is reproduced in Figure 2.1 on the previous page.

The intent for the redevelopment of the Upper Australia exhibit is to update the existing exhibit and to create a new exhibit that reflects the Australian bushland environment by recreating habitat elements of the animals that will be housed in the exhibit.

Planting of the area as required, and retention of as many existing trees as possible, is proposed to create this environment.

The types of building materials proposed for use will be variable and will include materials that are typical of the character sought to be achieved by the exhibit. With respect to bushfire matters, this will include timber boardwalks and a tree house.

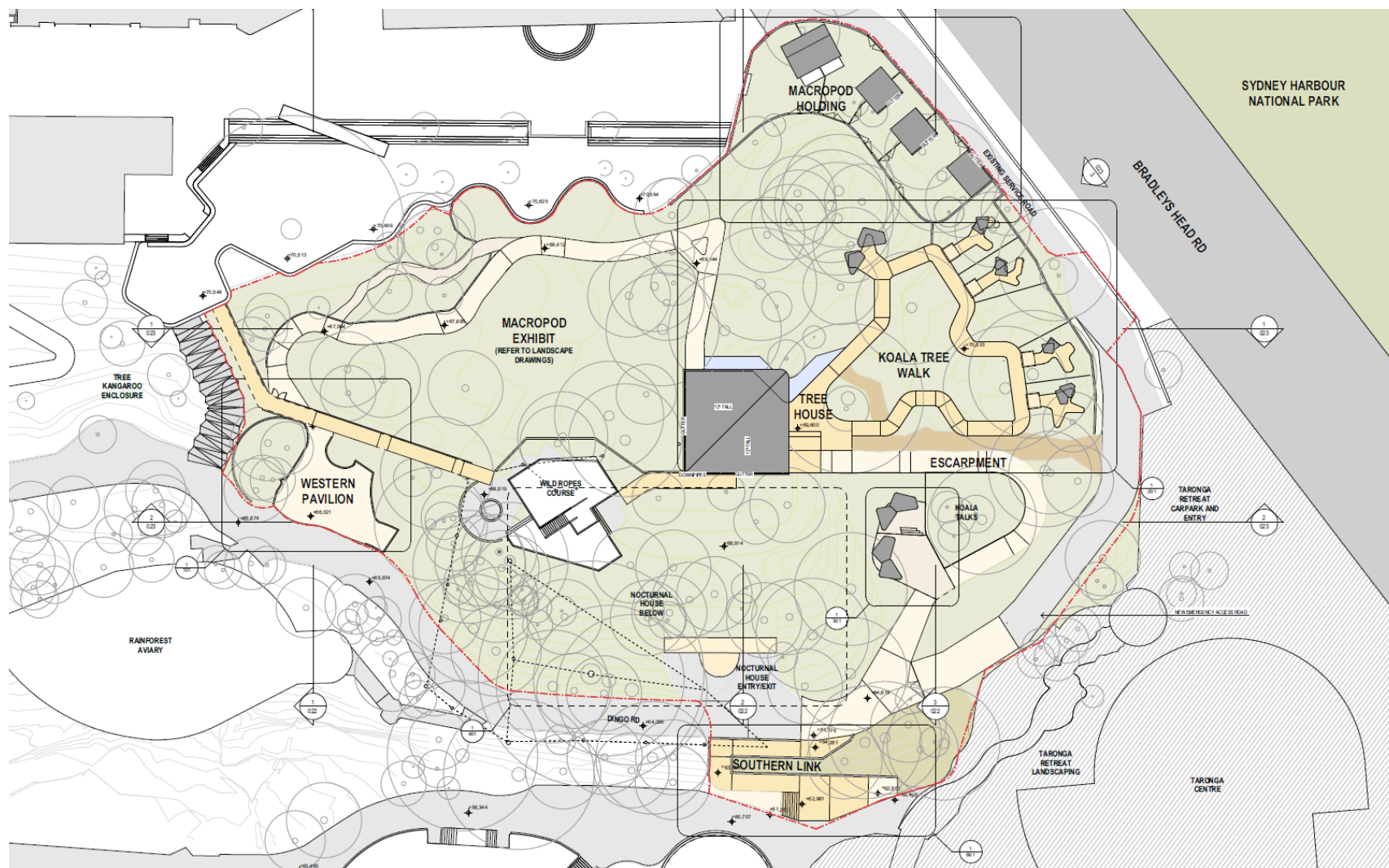


Figure 2.1: Site Plan Extract (Source: Client). North (approx.) to top of page.



### 3. The Site

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The Upper Australia exhibit is in the north-eastern part of the overall Zoo site.

The existing Upper Australia exhibit is characterised by several large trees and most or all of these are proposed to be retained as part of the proposal.

The exhibit is to the north of the existing Taronga Centre and west of the Taronga Wildlife Retreat carpark and entry. The main entry concourse for the Zoo is to the north/north-west of the exhibit.

The eastern extent of the Upper Australia exhibit is separated from Bradleys Head Road by an internal service road and a low stone wall along the western side of the road. An access driveway to the carpark for the Taronga Centre and Wildlife Retreat is south-east of the exhibit.

The following photographs show the area on and around the existing Upper Australia exhibit within Taronga Zoo.



**Photo 2.1: View of existing areas within the Upper Australia exhibit.**





**Photo 2.2: View of existing areas within the Upper Australia exhibit.**



**Photo 2.3: View of the south-eastern part of the Upper Australia exhibit with Bradleys Head Road and vegetation in the background.**





**Photo 2.4: View of the entry structure to the Taronga Wildlife Retreat (WR).**  
The Upper Australia exhibit is to the right of this area and the Taronga Centre is to the left.



**Photo 2.5: View looking generally north-east from the WR entry structure (shown in Photo 2.4).**  
The cars in the central and right hand parts of the photo are parked along the eastern/opposite side of Bradleys Head Road, with vegetation beyond the road and parking areas.





**Photo 2.6: View looking east within the Zoo grounds towards the WR entry structure (in Photo 2.4). The Upper Australia exhibit is to the left of this area; the Taronga Centre is to the right.**



**Photo 2.7: Pathways, vegetation and existing elevated rope walk within the Zoo grounds adjacent to the existing Upper Australia exhibit. These areas will remain largely unchanged and the rope walk is to remain as part of the redevelopment of the Upper Australia exhibit.**





**Photo 2.8:** As for Photo 2.7. These areas will remain largely unchanged and the rope walk is to remain as part of the redevelopment of the Upper Australia exhibit.



**Photo 2.9:** As for Photos 2.7 and 2.8. The rope walk is to remain as part of the redevelopment of the Upper Australia exhibit.

#### 4. *Planning for Bush Fire Protection 2019*

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The NSW Rural Fire Service guideline, *Planning for Bush Fire Protection 2019* (PBP19), is applicable to all development on bushfire prone land.

The Upper Australia project is not development for a “*special fire protection purpose*” (SFPP) as defined under the provisions of Section 100B of the *Rural Fires Act 1997* or as listed under Clause 46 of the *Rural Fires Regulation 2013* and there are no specific controls applicable for the purposes of PBP19.

The aim and objectives of PBP19 apply to the proposal.

The aim of PBP19 is *to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.*

The objectives of PBP19 are to:

- i. afford buildings and their occupants protection from exposure to a bush fire;*
- ii. provide for a defensible space to be located around buildings;*
- iii. provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;*
- iv. ensure that appropriate operational access and egress for emergency service personnel and occupants is available;*
- v. provide for ongoing management and maintenance of BPMs; and*
- vi. ensure that utility services are adequate to meet the needs of firefighters.*

## 5. Assessment of vegetation and slope

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The Taronga Zoo site contains a considerable amount of vegetation mainly comprising landscaping and retained vegetation within the larger Zoo complex.

Overall, this vegetation comprises maintained vegetation, managed as part of the operational procedures of the Zoo, and is fragmented by the constructed pathways, retaining structures, enclosures/displays and other structures and infrastructure associated with the Zoo and located within the site. As mentioned previously, the project site will also be subject to significant planting of the area to recreate an Australian bushland environment, characteristic of the habitat of animals to be housed within the Upper Australia exhibit.

The largest area of vegetation in relation to the project comprises a relatively large area of *forest* vegetation located outside the Zoo site, within an area of National Park on the eastern (opposite) side of Bradleys Head Road.

For the purposes of Section A1.4 of *PBP19*, the effective slope, that is, the slope under *forest* vegetation within the area of National Park on the eastern (opposite) side of Bradleys Head Road, is at least  $>10-15^{\circ}$  downslope within the area of vegetation to the east of the footpath along the eastern side of Bradleys Head Road.

The easternmost part of any structures associated with the Upper Australia Exhibit redevelopment project will be about 30-35 metres from the western extent of the nearest forest vegetation within the area of National Park on the opposite/lower side of Bradleys Head Road.



## 6. Objectives of *Planning for Bush Fire Protection 2019*

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In relation to the objectives of *Planning for Bush Fire Protection 2019*, the following points are relevant:

**Objective (i):** *afford buildings and their occupants protection from exposure to a bush fire*

**Comment:** The proposal does not involve the erection of any buildings that will be 'occupied'. It is noted that the Upper Australia exhibit is one of the many exhibits within the Zoo that patrons will pass through while within the grounds and will not facilitate the accommodation of large numbers of people for any extended period of time.

As noted previously, the types of building materials proposed for use will be variable and will include materials that are typical of the character sought to be achieved by the exhibit. With respect to bushfire matters, this will include timber boardwalks and a tree house.

It is to be recommended that, wherever possible, consideration should be given to any structural elements that are not critical to the aesthetic of the exhibit being constructed of non-combustible materials.

Also, while outside the scope of this assessment, where any of the structures included in the project are subject to the National Construction Code/Building Code of Australia (NCC/BCA), then those works are to be consistent with any applicable requirements of the NCC/BCA.

Additionally, in the event of a bushfire, emergency procedures for the overall Zoo site will facilitate the initial evacuation of patrons from the exhibit (and eastern part of the Zoo generally) into the Zoo site and away from the potential bushfire hazard vegetation.

**Objective (ii):** *provide for a defensible space to be located around buildings*

**Comment:** The proposal does not reduce the extent of defensible space available around the existing Upper Australia exhibit. The exhibit is in the eastern part of the Zoo site, north of the Taronga Centre, and just inside the boundary of the Zoo site with the western side of Bradleys Head Road.

To the east of the Upper Australia exhibit, the existing constructed roadway in Bradleys Head Road and footpath along the eastern side of the road provides a defensible space for emergency services to undertake property protection after the passage of a bushfire.

**Objective (iii):** *provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings*

**Comment:** As mentioned previously, the proposed redevelopment of the Upper Australia exhibit will not reduce the extent of defensible space available around the existing Upper Australia exhibit. Also, the redeveloped exhibit will not contain buildings that will be occupied for any extended period.

The exhibit, following redevelopment, will retain its primary function of providing a number of walking and viewing structures intended to enable visitors to the Zoo the ability to wander through the exhibit and to view the animals in an Australian bushland setting.

The easternmost part of any structures associated with the Upper Australia Exhibit redevelopment project will be about 30-35 metres from the western extent of the nearest forest vegetation within the area of National Park on the opposite/lower side of Bradleys Head Road. This separation distance is generally the same as for structures within the existing exhibit in relation to vegetation to the east of the overall Zoo site.

**Objective (iv):** *ensure that appropriate operational access and egress for emergency service personnel and occupants is available*

As mentioned previously, the overall Zoo site is subject to detailed operational procedures and is stringently managed and monitored to ensure public safety and the safe and efficient operation of the Zoo. Egress/evacuation from the exhibit area by staff and visitors is subject to emergency management and response procedures for the overall Zoo site.

To the east of the Upper Australia exhibit redevelopment area, access for emergency services personnel will be available for the purposes of an emergency response in the event of a bushfire – via the existing constructed roadway in Bradleys Head Road and the existing driveway/car park serving the Taronga Centre (immediately south-east of the exhibit area).

Internally, the Zoo also has its own firefighting capability and access to the southern and eastern parts of the exhibit area by staff undertaking fire suppression activities is via internal roadways shown on the proposed site plan at Figure 2.1. This is the same arrangement as for emergency access for the existing Upper Australia exhibit, along with other exhibits in this part of the Zoo. The condition and width of the internal roadways in the area south of the exhibit areas are shown in Photos 2.7 to 2.9.

**Objective (v):** *provide for ongoing management and maintenance of bushfire protection measures*

**Comment:** The ongoing management and maintenance of the land within the area of the proposed Upper Australia exhibit redevelopment area will be subject to the management procedures for the overall Zoo, including maintenance of the vegetation within the exhibit (in conjunction with maintenance of vegetation within the entire Zoo site and monitoring areas to limit accumulation of debris around structures which might include combustible materials (such as timber boardwalks).

The main bushfire protection measure in relation to the project is the separation distance between the eastern boundary of the site and any vegetation on the eastern/opposite side of Bradleys Head Road. This was discussed in relation to Objective (ii) in relation to its availability of potentially defensible space to the east of the Zoo site.

**Objective (vi):** *ensure that utility services are adequate to meet the needs of firefighters*

**Comment:** Existing utility services are available to the Zoo site – including mains water, fire services to existing buildings and hydrants – to meet the needs of fire fighters.

## 7. Conclusion

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The Taronga Zoo site contains a considerable amount of vegetation, mainly comprising landscaping and retained vegetation within the larger Zoo complex. The Zoo site is subject to detailed operational procedures and is stringently managed and monitored to ensure public safety and the safe and efficient operation of the Zoo. Aspects of this management include maintenance of the vegetation within the site and numerous exhibits.

Overall, vegetation within the existing Upper Australia exhibit (and other exhibits throughout the Zoo) comprises areas of remnant vegetation, fragmented by constructed pathways, retaining structures, enclosures/displays and other structures and infrastructure associated with the respective exhibit. The effect of the above is that the context and setting of the exhibit and overall Zoo site is characterised by vegetation interspersed throughout the site. This vegetation establishes the character of the site and provides the backdrop for the displays and exhibits that comprise the Zoo.

Vegetation within the existing Upper Australia exhibit is maintained and managed as part of the operational procedures of the Zoo. This will remain the case following redevelopment of the Upper Australia exhibit.

The project area will contain vegetation to depict the typical habitat and environment of the Australian bush and animals. This vegetation will be managed as part of the redeveloped Upper Australia exhibit and within the context of the overall vegetation management regime within the Zoo site.

Aside from managed areas of vegetation within the project area and adjacent and nearby exhibits/enclosures, the nearest potential bushfire hazard vegetation is that located outside the Zoo site, on the eastern/opposite side of Bradleys Head Road and within the area of National Park on the eastern side of Bradleys Head Road, in the area between the road and the western foreshore of Taylors Bay.

If a fire was to occur in the vegetation on the eastern/opposite side of Bradleys Head Road, then the area occupied by the Upper Australia exhibit will be subject to radiant heat levels which would potentially exceed  $40\text{kW/m}^2$  in, at least, the eastern part of the Upper Australia exhibit area (as it is near the eastern boundary of the Zoo with Bradleys Head Road). While it

is noted that the Upper Australia will include and/or retain some combustible elements, including timber boardwalks and a tree house, it is recommended that any elements that are not critical to the aesthetic of the exhibit be constructed of non-combustible materials wherever possible. For example, this could include walls to the eastern extent of the overall exhibit and any main structural supports for structures within the Upper Australia exhibit.

It is noted that the Upper Australia exhibit is not, and will not, facilitate the accommodation of large numbers of people for any extended period of time, being one of the many exhibits within the Zoo that patrons will pass through while within the grounds. In this regard, it is important that emergency procedures for the overall Taronga Zoo incorporate measures to include the evacuation and/or relocation of patrons in the event of a bushfire occurring in vegetation within the area of National Park on the eastern/opposite side of Bradleys Head Road.

## 8. Recommendations

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The following recommendations are made in relation to bushfire protection measures for the Upper Australia Exhibit redevelopment project at Taronga Zoo:

- A Where possible, consideration should be given to any structural elements that are not critical to the aesthetic of the exhibit being constructed of non-combustible materials. For example, this could include walls to the eastern extent of the overall exhibit and any main structural supports for structures within the Upper Australia exhibit.
- B Emergency management and response procedures for the overall Zoo site be updated to clearly document the evacuation procedures for the redeveloped Upper Australia exhibit in the event of a bushfire and emphasise that evacuation routes are to be into the Zoo site towards the west (and away from the potential bushfire hazard vegetation outside the eastern boundary of the site).

## References

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NSW Rural Fire Service (2019)

*Planning for Bush Fire Protection 2019*

Standards Australia (2018)

*Australian Standard 3959-2018: Construction of buildings in bushfire-prone areas*

### **NOTE & DISCLAIMER:**

1. *Only the plans referenced in this Assessment have been considered in relation to the aim and objectives of Planning for Bush Fire Protection 2019.*
2. *Notwithstanding the precautions recommended, it should always be remembered that bushfires burn under a range of conditions and an element of risk, no matter how small, always remains.*
3. *This Assessment makes no conclusion or inference as to the measures required for the compliance of the proposed additions with the relevant provisions of the Building Code of Australia (BCA). Issues related to compliance of the building with the BCA are outside the scope of this Assessment.*