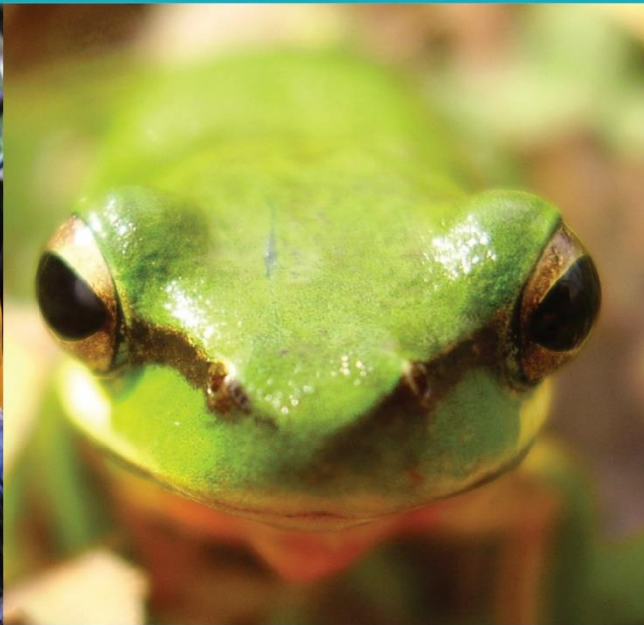




# TRIVERS BUSHFIRE & ECOLOGY

A TBE ENVIRONMENTAL COMPANY



## **STRATEGIC BUSHFIRE STUDY**

### Patyegarang Project Planning Proposal

Morgan Road,  
Belrose

Under Section 9.1(2) Direction No. 4.4 of the EP&A Act

26 July 2023  
(REF: 18CR39)

# STRATEGIC BUSHFIRE STUDY

Proposed residential subdivision

Patyegarang Project

Morgan Road, Belrose

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*The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.*

## EXECUTIVE SUMMARY

*Travers bushfire & ecology* has been engaged to undertake a strategic bushfire study for the Patyegarang Project development proposal located at Morgan Road, Belrose. The proposal will involve a rezoning of the site to support future medium density residential housing and recreational open space.

This report identifies matters for consideration for the planning proposal and highlights the required bushfire protection measures (including asset protection zones (APZs)) required for the future development of the site against Planning for Bush Fire Protection (PBP) 2019.

A strategic bushfire study (SBFS) has been conducted in conjunction with a bushfire protection assessment (BPA). The SBFS has analysed the potential and historic threats to the site, the current and projected access provisions and any adverse impacts on the existing and projected infrastructure serving the community.

Further information has been sourced from the *Deferred Lands Strategic Bushfire Risk Assessment*, prepared by Meridian Urban (March 2022). The Meridian Urban study analyses and identifies high bushfire risk localities based on potential fire intensity. The proposed Patyegarang project site is located within an area described as predominately in the lower range of potential fire intensity.

Our assessment found that bushfire attack can potentially affect the development site from the Coastal Floodplain Wetland and Coastal Swamp Forest (endangered ecological community (EEC)) located within Warriewood Wetlands to the west, the retained Coastal Swamp Forest to the south and to a lesser extent the Coastal Swamp Forest associated with the creek line beyond Boondah Road to the east, resulting in possible ember and radiant heat attack.

The SBFS concludes that infrastructure is suitable for the expansion of residential development in the area. Demand on services is not considered to exceed the current provisions and will, in the future, be improved by natural growth, in response to projected increases in demand.

In recognition of the bushfire risk posed to the site by the surrounding bushland, *Travers bushfire & ecology* propose the following combination of bushfire measures;

- APZs in accordance with the acceptable solutions outlined within PBP 2019;
- Provision of access in accordance with the performance requirements outlined in PBP 2019;
- Water, electricity and gas supply in compliance with the acceptable solutions outlined in PBP 2019;
- Future dwelling construction in compliance with the appropriate construction sections of AS3959-2018, and PBP 2019.

# GLOSSARY OF TERMS

AHIMS	Aboriginal Heritage Information System
APZ	asset protection zone
AS1596	<i>Australian Standard – The storage and handling of LP Gas</i>
AS2419	<i>Australian Standard – Fire hydrant installations</i>
AS3745	<i>Australian Standard – Planning for emergencies in facilities</i>
AS3959	<i>Australian Standard – Construction of buildings in bushfire-prone areas 2018</i>
BAL	<i>bushfire attack level</i>
BCA	<i>Building Code of Australia</i>
BSA	bushfire safety authority
DA	development application
DLUP	Development Land Use Plan
EEC	Endangered ecological community
<i>EP&amp;A Act</i>	<i>Environmental Planning &amp; Assessment Act 1979</i>
<i>EP&amp;A Regulation</i>	<i>Environmental Planning and Assessment Regulation 2000</i>
FFDI	forest fire danger index
IPA	inner protection area
LEP	Local Environmental Plan
LGA	local government area
m	metres
NCC	<i>National Construction Code</i>
OPA	outer protection area
<i>PBP 2019</i>	<i>Planning for Bush Fire Protection 2019</i>
<i>RF Act</i>	<i>Rural Fires Act 1997</i>
RFS	NSW Rural Fire Service
SFR	short fire run
SFPP	special fire protection purpose
TBE	<i>Travers bushfire &amp; ecology</i>

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# 1. INTRODUCTION

*Travers bushfire & ecology* has been requested to undertake a Strategic Bushfire Study (SBFS) for the Patyegarang project planning proposal associated with multiple lots in an area bounded generally by Morgan Road and Forest Way Belrose NSW.

The proposal is located on land mapped by Northern Beaches Council as being bushfire prone.

A multi lot residential (capped at 450 Dwellings) subdivision of the site is proposed.

The proposal is subject to the requirements of Section 9.1(2) of the Environmental Planning and Assessment Act 1979 (EP&A Act) which requires Council to consult with the Commissioner of the NSW Rural Fire Service and to take into account any comments by the Commissioner.

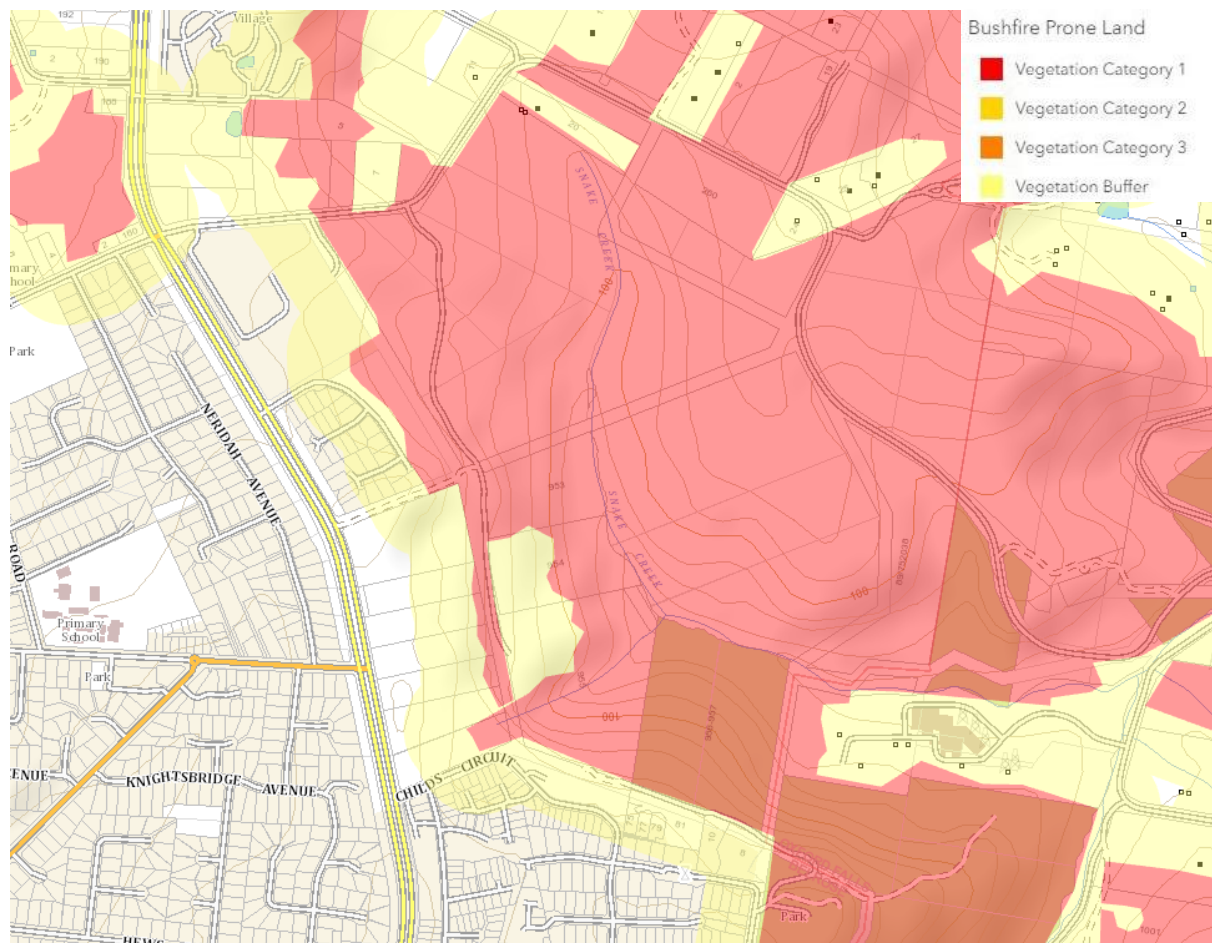


Figure 1- 1 – Bushfire Prone Land Map

(Source: Planning Portal, 2022)

## 1.1 Aims of the assessment

The aims of the SBFS are to:

- review the bushfire threat to the landscape
- assess current and proposed bushfire protection measures

- Assess the capacity of the site and surrounding area, including services, to accommodate increased development
- Determine the overall suitability of the planning proposal from a bushfire protection viewpoint.

## 1.2 Proposed development

The current proposal involves the creation of four hundred and fifty (450) capped new residential dwellings.

A cultural interpretive centre is also planned for the site. At this stage of the proposal, it is assumed that the interpretative centre will not include development uses that would determine the use as Special Fire Protection Purpose and as such, that usage is not considered within this study.

The site contains native vegetation and a cultural site of indigenous significance. Snake Creek traverses the site in an approximate north to south orientation. The land to the North West and west contains existing residential development and the Uniting Wesley Gardens Aged Care Facility.

Land to the east consists of bushland and rural residential land. A major Telstra Telecommunication facility is located to the south. The remaining land to the south comprises of gentle to steep sloping sandstone escarpments that consist of varying vegetation formations.

The proposal is to rezone the central development area as R2 low density residential whilst maintaining the land surrounding the development as an offset area which will be rezoned as E3 – Environmental Management. The proposal also includes the rezoning of a small parcel of land to RE1 – Public Recreation





**Figure 1-2 – Proposed Layout**

(Source: Cox 2021)

## 1.3 Information collation

Information sources reviewed for the preparation of this report include the following:

- *NearMap* aerial photography
- *Deferred Lands Strategic Bushfire Risk Assessment*, Meridian Urban, March 2021
- Topographical maps DLPI of NSW 1:25,000
- *Australian Standard 3959 Construction of buildings in bushfire-prone areas (2018)*
- *Planning for Bush Fire Protection 2019 (PBP)*

An inspection of the proposed development site and surrounds was undertaken by Tony Hawkins on several occasions during autumn 2022. The inspection comprised an assessment of the topography, slopes, aspect, vegetation and adjoining land use. The identification of the wider landscape bushfire risk and existing protection measures was also conducted.

## 1.4 Legislation and planning instruments

Is the site mapped as bushfire prone?	Yes
Proposed development type	Residential subdivision
Is the development considered integrated for the purposes of Section 100B of the <i>Rural Fires Act 1997</i> ?	Yes
Is the proposal located in an Urban Release Area as defined under Clause 273 of the EP&A Regulations?	No
Zoning	Deferred Matter
Significant environmental features	Yes – the proposed development (including APZs) will involve the removal of native vegetation.
Details of any Aboriginal heritage	Aboriginal sites and places have been recorded on the site and are well known. An AHIMS report is attached in Appendix 1.

### ***Environmental Planning and Assessment Act 1979 (EP&A Act) and bushfire prone land***

The *EP&A Act* governs environmental and land use planning and assessment within New South Wales. It provides for the establishment of environmental planning instruments, development controls and the operation of construction controls through the *National Construction Code (NCC)*. The identification of bushfire prone land is required under Section 10.3 of the *EP&A Act*.

Bushfire prone land maps provide a trigger for the development assessment provisions. The proposed rezoning is located on land that is mapped by Northern Beaches Council as being bushfire prone – Category 1 vegetation (depicted red) and its associated buffer (depicted yellow) Figure 1- 1.

*PBP* stipulates that if a proposed amendment to land use zoning or land use affects a designated bushfire prone area then the Section 9.1(2) Direction No 4.4 of the *EP&A Act* must be applied. This requires Council to consult with the Commissioner of the RFS and to take into account any comments by the Commissioner and to have regard to the planning principles of *PBP* (detailed within Section 1.5.3).

## ***Local Environmental Plan (LEP) and Development Control Plan (DCP)***

An LEP provides for a range of zonings which list development that is permissible or not permissible, as well as the objectives for development within a zone. The proposal is to proceed as an amendment to the current *Warringah LEP 2011*.

The site is currently zoned Deferred Matter (DM) (refer Figure 1.1). The proposal seeks a rezoning of the site to allow residential development under a suitable zoning.

The proposal is to rezone the central development area as R2 low density residential whilst maintaining the land surrounding the development as an offset area will be rezoned as E3 – Environmental Management. The proposal also includes the rezoning of a small parcel of land to RE2 – Private Recreation.

## ***Planning for Bush Fire Protection 2019 (PBP)***

Bushfire protection planning requires the consideration of the RFS planning document entitled *PBP*. *PBP* provides planning principles for rezoning to residential land as well as guidance on effective bushfire protection measures.

The proposed concept masterplan has been assessed in compliance with *PBP 2019*. This includes a strategic bushfire study (Section 3 of this report) and assessment against the following bushfire protection measures to ensure that future development is capable of complying with *PBP 2019*:

- asset protection zones
- building construction and design
- access arrangements
- water supply and utilities
- landscaping
- emergency arrangements

## ***National Construction Code (NCC) and the Australian Standard AS3959 Construction in bushfire-prone areas 2018 (AS3959)***

The *NCC* is given effect through the *EP&A Act* and forms part of the regulatory environment of construction standards and building controls.

The *NCC* outlines objectives, functional statements, performance requirements and deemed to satisfy provisions. For residential dwellings these include Classes 1, 2 and 3 buildings. The construction manual for the deemed to satisfy requirements is *AS3959*.

Although consideration of *AS3959* is not specifically required in a rezoning proposal, this report (Section 3.3) provides the indicative bushfire attack level (BAL) setbacks based on the current concept plan to guide future planning within the site.

## ***Planning Systems State Environmental Planning Policy 2021 (Aboriginal Land).***

The site is identified in a Development Delivery Plan (DDP) under the Planning Systems State Environmental Planning Policy 2021 (Aboriginal Land).

The DDP initiates a framework for identified development sites and pathway to investigation and potential approval, including rezoning if required.

## 2. BUSHFIRE STRATEGIC STUDY

PBP 2019 includes the requirement to prepare a strategic bushfire study for rezoning applications. The level of information required is dependent upon the nature of the scale of the proposal, the bushfire risk and its potential impact upon the wider infrastructure network.

The Strategic Bushfire Study is designed to assess whether new development is appropriate in the bushfire hazard context. It also provides the ability to assess the strategic implications of future development for bushfire mitigation and management.

The following Table 2.1 assesses the proposed development in terms of the broader bushfire landscape, land use, access and egress and associated infrastructure.

The following Sections 3-5 outline the relevant performance criteria to be achieved for future development in accordance within PBP 2019.

*Table 1: PBP 2019 SBFS requirements*

Issue	Detail	Assessment considerations
Bushfire landscape assessment	A bushfire landscape assessment considers the likelihood of a bushfire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	<p>The bushfire hazard in the surrounding area, including:</p> <ul style="list-style-type: none"> <li>vegetation</li> <li>topography</li> <li>weather</li> </ul> <p>The potential fire behaviour that might be generated based on the above</p> <p>Any history of bushfire in the area</p> <p>Potential fire runs into the site and the intensity of such fire runs.</p>

Issue	Detail	Assessment considerations
Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	<p>The risk profile of different areas of the development layout based on the above landscape study;</p> <p>The proposed land use zones and the resultant permitted land uses;</p> <p>The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site);</p> <p>The impact of the siting of these uses on APZ provision.</p>
Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	<p>The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile;</p> <p>The location of key access routes and direction of travel;</p> <p>The potential for development to be isolated in the event of a bushfire.</p>
Emergency services	An assessment of the future impact of new development on emergency services provision.	<p>Consideration of the increase in demand for emergency services responding to a bushfire emergency (including the need for new stations / bridges);</p> <p>Impact on the ability of emergency services to carry out fire suppression in a bushfire emergency.</p>

Issue	Detail	Assessment considerations
Infrastructure	An assessment of the issues associated with infrastructure provision.	<p>The ability of the reticulated water system to deal with a major bushfire event (particularly in terms of water pressure);</p> <p>Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.</p>
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bushfire management.	<p>Consideration of the implications of a change in land use on adjoining land including;</p> <p>The ability of adjoining and nearby land to carry a bushfire;</p> <p>Consideration of increased pressure on adjoining landowners to introduce or increase BPMs through the implementation of Bushfire Management Plans as a result of the changes in land use.</p>

## 2.1 Bushfire landscape assessment

The development site is located within the local government area (LGA) of Northern Beaches Council and situated to the south of the Patyegarang project in the north, east and west of Patyegarang project site in the central area; and north of the Telstra Satellite facility in the south. (Refer Figure 1.7).

The site is predominately covered in native vegetation with varying levels of disturbance. Several identified (AHIMS report, Appendix 1) Aboriginal cultural sites are located within and adjacent to the proposal area.

Snake Creek flows through the site in an approximate north to south orientation. Existing development to the west includes residential development and the Uniting Wesley Gardens Aged Care Facility. To the north and east a mixture of bushland and rural residential land is existing. An existing Telstra Satellite Telecommunication facility is located further to the south.

The remaining southern edge of the proposal area comprises gentle to steep sloping sandstone escarpments that consist of a variety of vegetation formations ranging from forest to heathland communities.

### 2.1.1 Vegetation

A vegetation survey prepared by *TBE* (dated 2007/8) has been undertaken. The findings of that survey were supported by a subsequent Biodiversity Development Assessment Report conducted by Hayes Environmental in 2021.

The following vegetation communities have been identified on the proposal site by Hayes environmental. (Table 2)

**Table 2: Identified Vegetation Communities (Hayes Environmental 2021)**

Vegetation PCT	Vegetation formation	Vegetation classification
1783	Sydney North exposed sandstone woodland	Dry Sclerophyll Forests (Shrubby sub-formation)
1250	Coastal sandstone gully forest	Dry Sclerophyll Forests (Shrubby sub-formation)
1824	Coastal sandstone Heath Mallee	Heathland
1803	Coastal upland damp heath swamp	Freshwater Wetland (PBP-short heath)

The communities identified by Hayes Environmental do not align precisely with those shown on the State Vegetation Type Map (SVTM) provided by the NSW Department of Planning and Environment (DPIE 2021). The communities identified by the SVTM are shown in Table 3.

**Table 3: SVTM Vegetation Communities**

Vegetation PCT	Vegetation formation	Vegetation classification
Sydney Coastal Sandstone Gully Forest (PCT 3595)	Dry Sclerophyll Forests (Shrubby sub-formation)	Sydney Coastal Dry Sclerophyll Forests
Woronora Plateau Heath-Mallee (PCT 3814)	Heathlands	Sydney Coastal Heaths
Sydney Coastal Coachwood Gallery Rainforest (PCT 3038)	Rainforests	Heathland Northern Warm Temperate Rainforests
Sydney Coastal Upland Swamp Heath (PCT 3924)	Freshwater Wetlands	Coastal Heath Swamps



Sydney Enriched Sandstone Moist Forest (PCT 3176)	Wet Sclerophyll Forests (Shrubby sub-formation)	North Coast Wet Sclerophyll Forests
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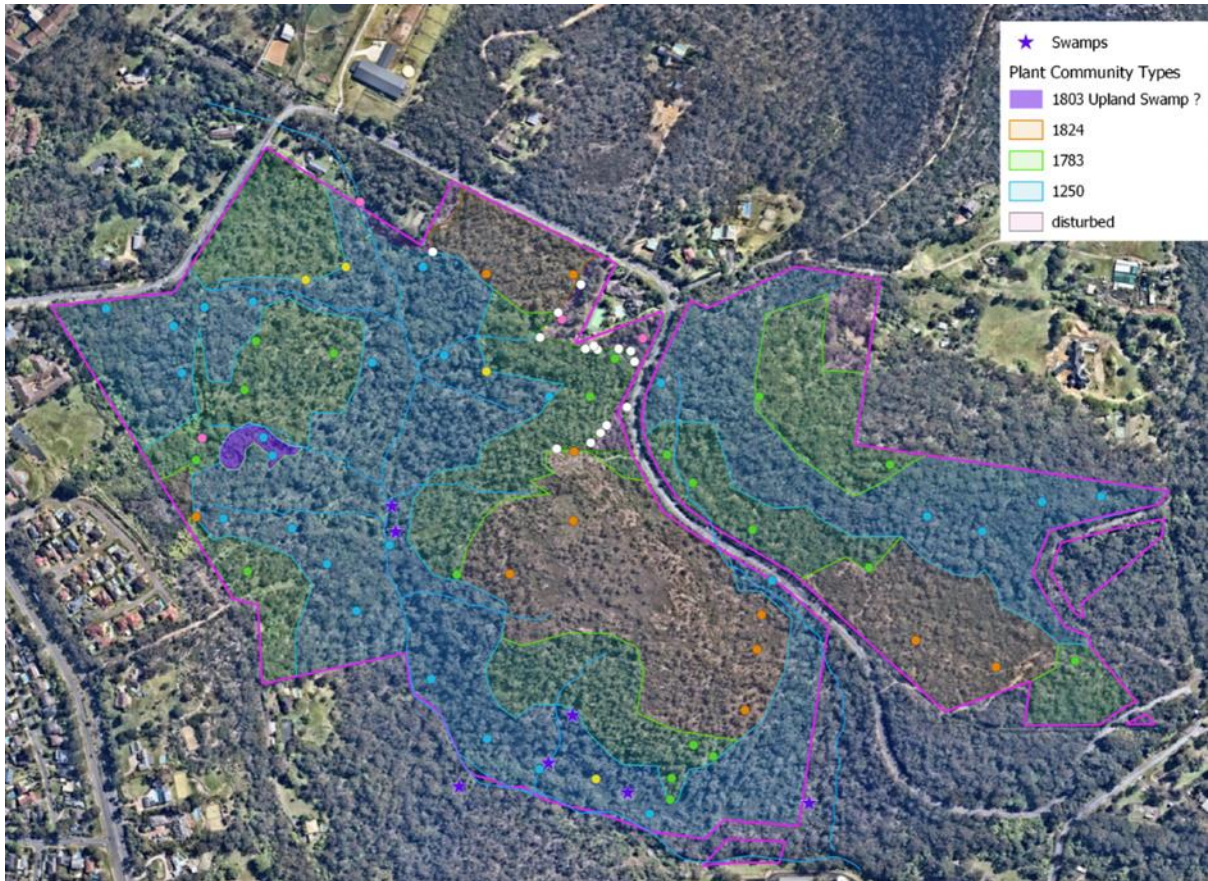


Figure 2-1: Vegetation Communities

(Source: Hayes environmental 2021)

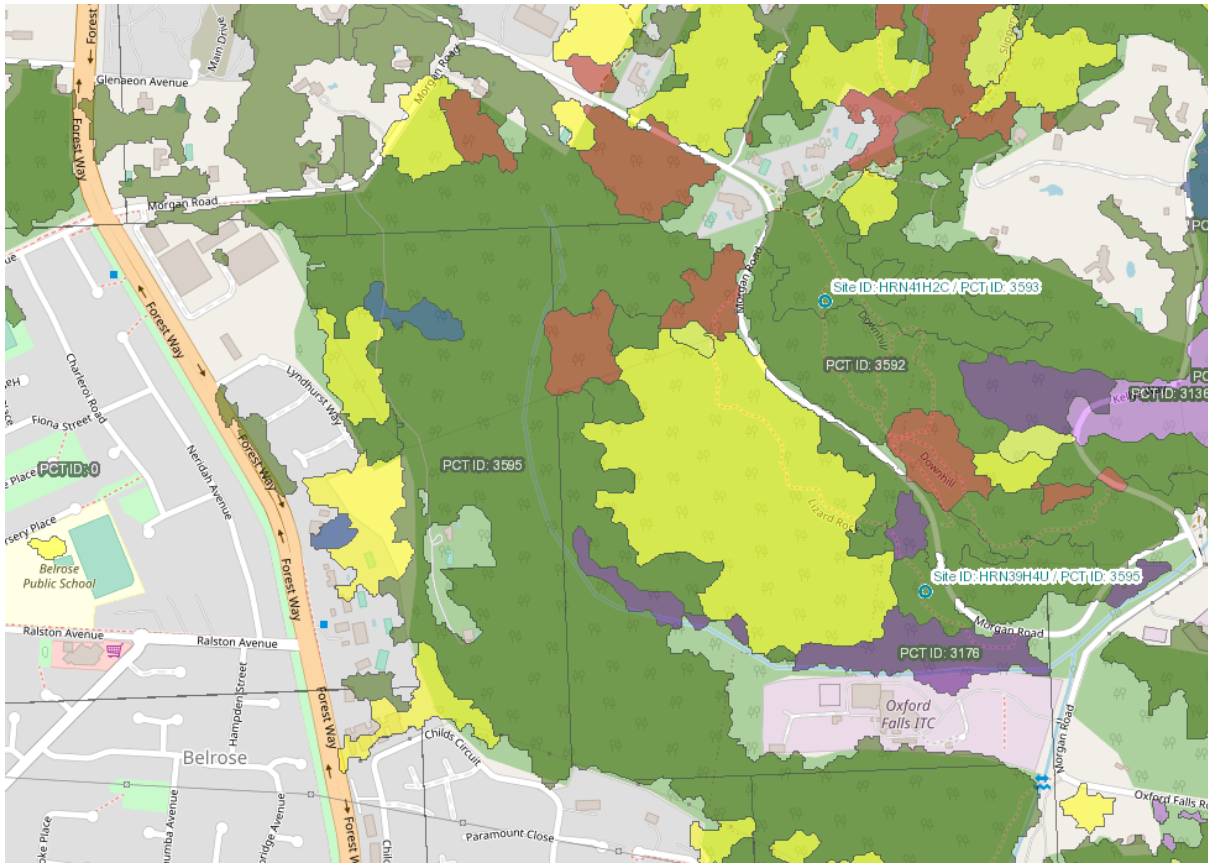


Figure 2-2: Vegetation Communities

(Source: SVTM 2021)

## 2.1.2 Climate and weather

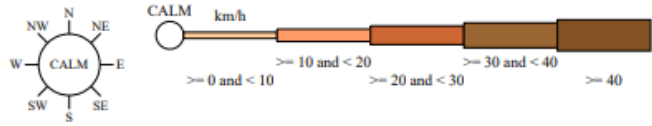
Long term climate and weather data has been provided by the Bureau of Meteorology (BOM) for the Sydney (Observatory Hill)' [066062] for the period 1858 - 2020. The Sydney weather Station is the closest station (approx. 14.5 km south) to the site with full records of weather and climate.

BOM data for station 066062 is shown in Table 4.

Table 4: Long Term climate and weather data for Sydney (Observatory Hill)' [066062] station (source: BOM)

Statistic Element	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Mean max temp (° C) 1859 to 2020	26	25.8	25	23	19.5	17	16	17.9	20.1	22	23.7	25.2	21.8
Mean min temp (° C) 1859 to 2020	19	18.9	18	15	11.6	9.3	8.1	9	11.1	14	15.7	17.6	13.8
Mean rainfall (mm) 1858 to 2020	101	119	132	127	117	133	96	80.2	68.1	77	83.8	77.1	121 3.4
Max wind gust speed (km/h) 1955 to 1992	150	111	97	106	135	135	106	113	131	113	118	121	150

Mean 9am temp (° C) 1955 to 2010	23	22.3	21	18	14.6	12	11	12.5	15.7	19	19.9	21.6	17.5
Mean 9am rel humidity (%) 1955 to 2010	71	74	74	72	74	74	71	66	62	61	66	67	69
Mean 9am wind speed (km/h) 1955 to 1992	8.6	8.2	7.9	8.8	10.5	12	13	13.3	12.4	12	11	9.8	10.6
Mean 3pm temp (° C) 1955 to 2010	25	24.9	24	22	19.4	17	16	17.5	19.2	21	22.1	23.8	21
Mean 3pm rel humidity (%) 1955 to 2010	62	64	62	59	57	57	51	49	51	56	58	59	57
Mean 3pm wind speed (km/h) 1955 to 1991	18	16.8	15	14	12.7	14	15	17.6	18.3	19	19.4	19.5	16.6



9 am  
13502 Total Observations

Calm 13%

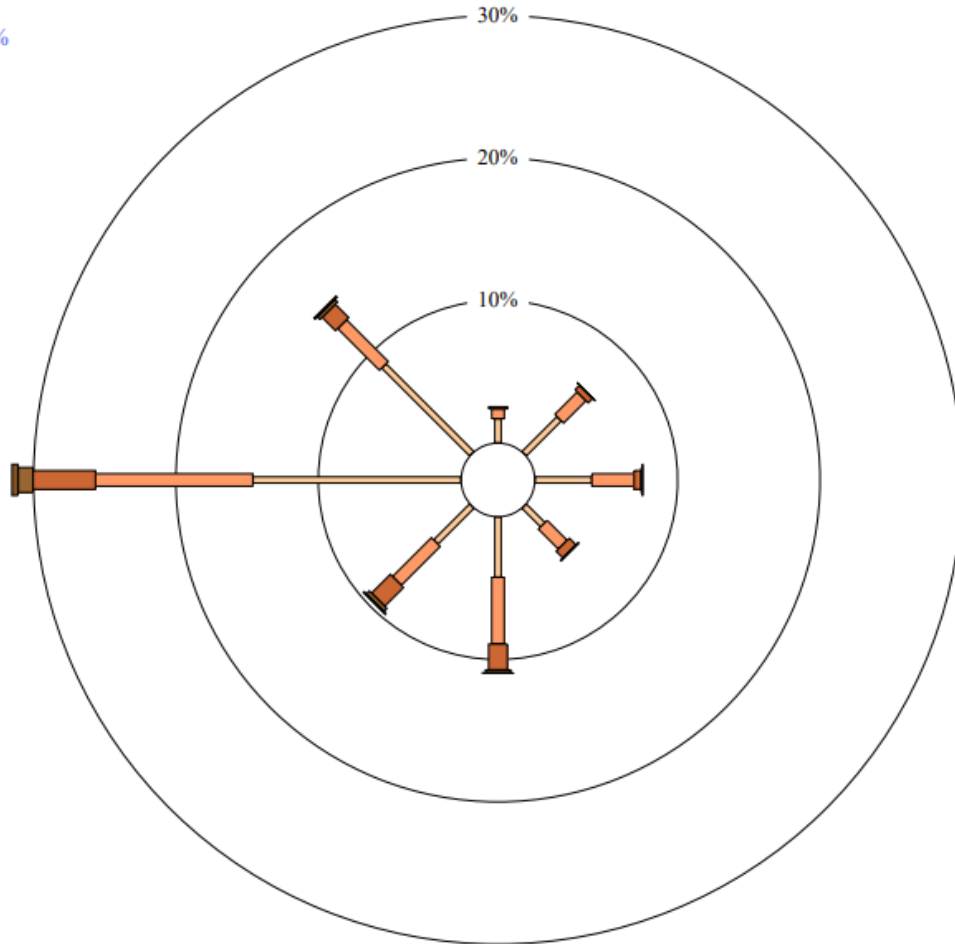
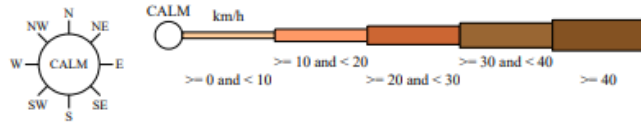


Figure 2-3: Annual wind speed/Direction 9am. 1955 - 1992 (Source BOM)



3 pm  
13347 Total Observations

Calm 3%

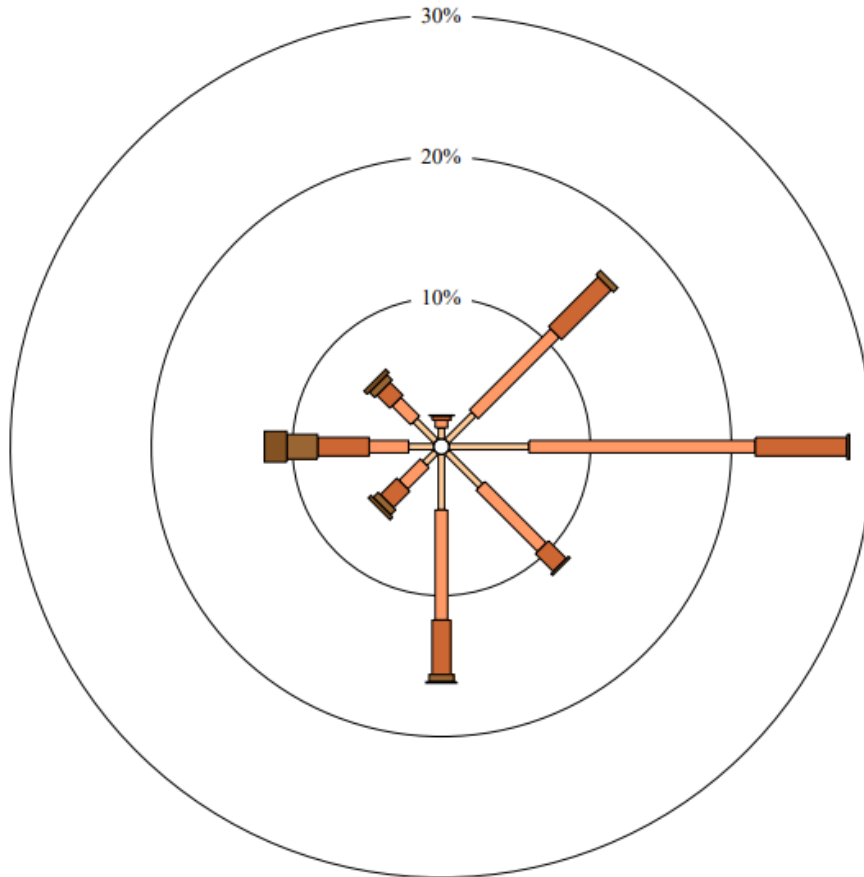


Figure 2-4: Annual wind speed/Direction 3pm. 1955 - 1992(Source BOM)

The Warringah Pittwater Bushfire Risk Management Plan 2010 (BFRMP), prepared by the Warringah Pittwater Bushfire Management Committee, provides the following description of weather and climate for the wider northern beaches area.

*The typical / average climate in the Warringah Pittwater BFMC area is for uniform rainfall throughout the year, although higher rainfall can be experienced in the months of February to March and the bushfire season generally runs from October to March.*

*Prevailing weather conditions associated with the bushfire season in the Warringah Pittwater BFMC area are North-westerly winds accompanied by high daytime temperatures and low relative humidity.*

The data retrieved from station 066062 differs from the BFMC description in that wind direction during the fire season (generally October to March) is predominately from the east and with the highest wind speeds.

The BFMC description refers to low relative humidity during the fire season, however this should be understood within the context of the coastal influenced location, which combined with predominate easterly winds, ranges from long terms averages of between 56% and 62% during the fire season. These figures are relatively high in terms of fire intensity potential, and not consistent with high intensity, difficult to control fire events.

It should not be accepted that this commentary would preclude the possibility of a high intensity fire occurring, from any direction. However, the historical data shows that the most likely highest fire threat would occur from the east, north-east of the site, during the October to December period in the latter part of the day, where wind speeds and temperatures are (relative to the location and annual averages) high, and relative humidity low.

### **2.1.3 Potential fire threats**

The proposed site is located downhill of fire threats and potential fire runs located to the north west, north and north east. Following a general principle of fires gaining intensity and rate of spread when travelling uphill, the siting of the proposal downhill of fire runs should in theory mitigate the most intense fires.

The possibility of ember attack from fires emanating from the North West, North and North East is not eliminated however and embers may land within the proposed site from fires several kilometres away.

The existing landscape fire risk, that is, with no development on the proposed location, would possibly result in fire igniting from ember attack on the slopes below the existing residential and SFPP developments located along Forest Way and Morgan Road. In that the proposal would result in the removal of vegetation from a significant portion of the site and that development would result in APZ and property management, the risk to existing development would be significantly reduced.

As stated, the general principle of increased intensity and rate of spread of fires travelling uphill is not universal. The possibility of vortex winds, resulting in vorticity driven lateral spread on the lee side of a landscape rise, such as south east of the Morgan road / Forest Way intersection, cannot be completely discounted. However, given the disconnection of vegetation provided by the road network and existing development, combined with the vegetation reduction provided by the proposed development, the risk of increased downhill fire spread is heavily reduced.

To the south, potential fire runs are reduced by the presence of existing cleared areas (Telstra telecommunications facility) and a reduced width potential fire front. Further mitigation is provided by the presence of Morgan Road, acting as a fire break to the south east and east.

#### **Potential fire runs to site**

Potential fire runs to the site from adjoining bushland have been identified and shown in Table 5. The identification of these potential fire runs is a broad assessment and should not be relied upon as a final, more detailed assessment of specific area APZ requirements.

The potential fire runs are shown in Figure 2- 5.

**Table 5: Potential fire runs.**

Fire run ID	Slope	Vegetation classification (PBP 2019)	PBP Table A1.12.5 BAL levels and APZ widths	Impact on site
FR1	Flat to upslope	Forest	BAL FZ; <18m BAL 40; 18 - <24m BAL 29; 24 - <33m BAL 19; 33 - <45m BAL 12.5; 45 - <100m	North western corner of proposed site is located > 250m from head of FR1.
FR2	5-10° Downslope	Forest	BAL FZ; <22m BAL 40; 22 - <29m BAL 29; 29 - <40m BAL 19; 40 - <54m  BAL 12.5; 54 - <100m	FR2 has been calculated in a broad fashion and does not account for the reduced flame width or irregular shape of the vegetation within the fire run. It could be expected that an impact would be received by the far north western corner of the site from this fire run, however a more detailed assessment would most likely find that this impact is minimal.
FR3	Flat to upslope	Forest	BAL FZ; <18m BAL 40; 18 - <24m BAL 29; 24 - <33m BAL 19; 33 - <45m BAL 12.5; 45 - <100m	FR3 Consists of an upslope rising to the north for approximately 90m followed by a downslope beyond that point. Shielding is provided by the higher land, reducing the intensity of a fire from the north. APZs would be required along the site boundary impacted by this fire run, however would include the Morgan Road reserve and should be easily incorporated into the final site layout.
FR4	Flat to upslope	Forest	BAL FZ; <18m BAL 40; 18 - <24m BAL 29; 24 - <33m BAL 19; 33 - <45m BAL 12.5; 45 - <100m	FR4 is shown as occurring to the north east of the site, outside the area understood to be retained as a fuel managed landscape. Assuming that this management will serve the purpose of an APZ,

				acceptable separation distances are provided by the proposal.
FR5	5-10° Downslope	Forest	BAL FZ; <22m BAL 40; 22 - <29m BAL 29; 29 - <40m BAL 19; 40 - <54m BAL 12.5; 54 - <100m	FR5 is similar to FR4 in that development would be separated from bushland by a fuel managed landscape, albeit with a higher BAL rating in FR5. Again, it is considered that dependent on final layout design, APZs can be provided within the site.
FR6	5-10° Downslope	Forest	BAL FZ; <22m BAL 40; 22 - <29m BAL 29; 29 - <40m BAL 19; 40 - <54m BAL 12.5; 54 - <100m	As per FR5
FR7	5-10° Downslope	Forest	BAL FZ; <22m BAL 40; 22 - <29m BAL 29; 29 - <40m BAL 19; 40 - <54m BAL 12.5; 54 - <100m	As per FR5
FR8	Flat to upslope	Forest	BAL FZ; <18m BAL 40; 18 - <24m BAL 29; 24 - <33m BAL 19; 33 - <45m BAL 12.5; 45 - <100m	APZs can be accommodated within the site.
FR9	10-15° Downslope	Forest	BAL FZ; <36m BAL 40; 36 - <45m BAL 29; 45 - <60m BAL 19; 60 - <77m BAL 12.5; 77 - <100m	

Figure 2- 5: Potential Fire Runs

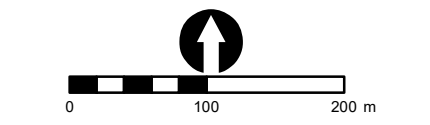




**Legend**

- Precinct boundary (source:CAD)
- Contour (Source: LiDAR)

Aerial source: Nearmap



Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

**PROJECT & MXD REFERENCE**  
 Morgan Road, Belrose  
 18CR39\_BF002

**DATE & ISSUE NUMBER**  
 6/09/2022  
 Issue 1

**SCALE & COORDINATE SYSTEM**  
 1:5,500 @A3  
 GDA 1994 MGA Zone 56

**TITLE**  
**Schedule 1 - Bushfire Protection Measures**

Document Path: N:\GIS STORAGE\IN Drive\18CR39\_MorgansRd\_Belrose\MXD\18CR39\_BF002.mxd



## **2.1.4 Fire History**

Fire history has been assessed using the resources supplied by the National Parks and Wildlife Service mapping data available from the NSW Government SEED website (NPWS 2022).

The site and surrounding area has a history of regular and widespread hazard reduction burns having been conducted. Bushland in the surrounding area has been burnt in a mosaic pattern over an extended period.

Uncontrolled fire in the surrounding area has predominately consisted of two major fires which occurred to the east in 1994 and 2006/07.

A major fire occurred on the site in 2014 as a result of an escaped hazard reduction.

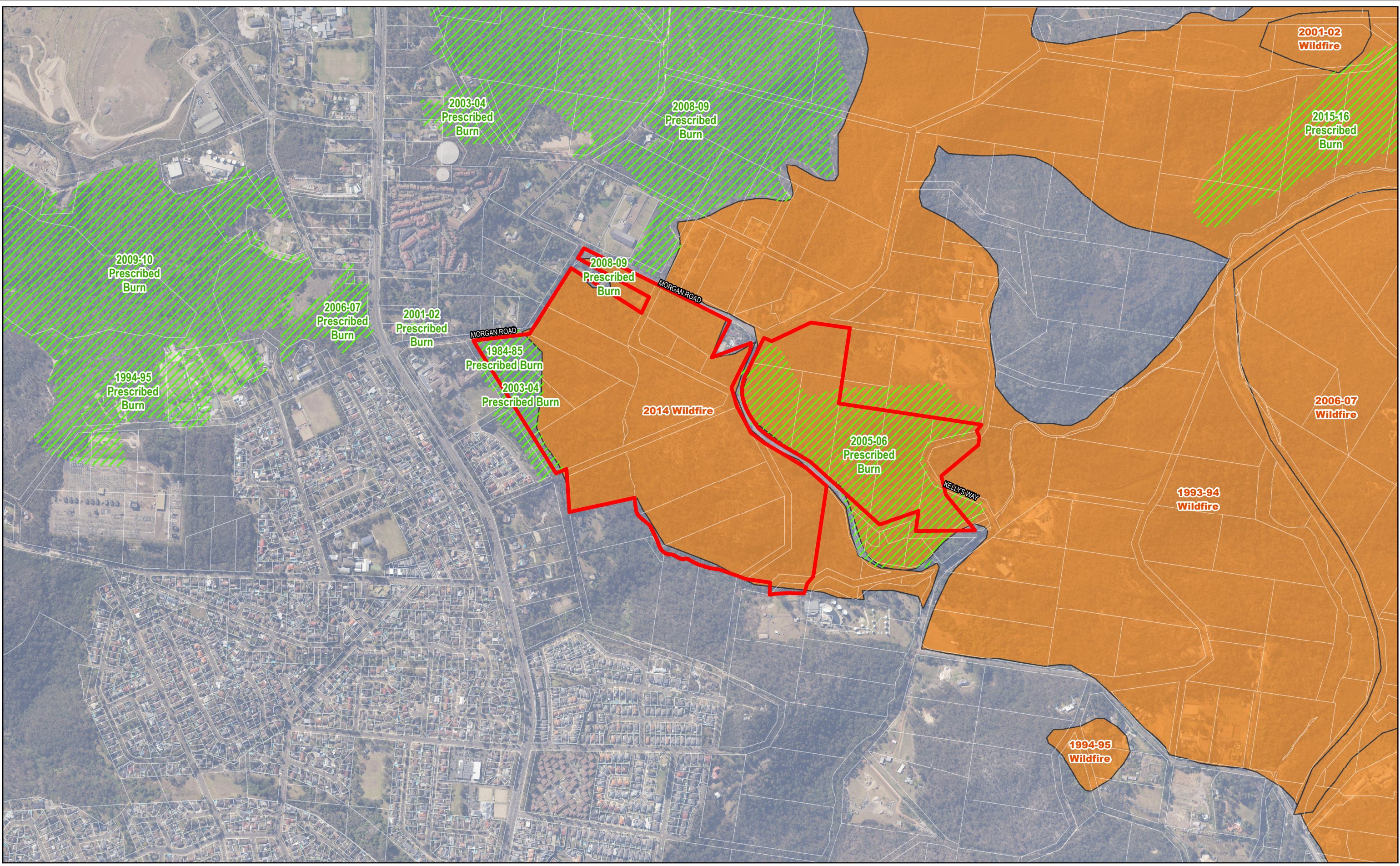
The major fires which occurred to the east of the site did not directly threaten the site, and were either the result of a flank impact (1994) or from suppression actions (aerial backburning 2006).

As seen in the fire history mapping, the site does not have a recorded history of major unplanned fire. The continuation of the current prescribed burn regime should maintain the current major uncontrolled burn pattern frequency.

Analysis of the fire threat has been conducted in surrounding areas for similar proposals. The Meridian Urban Bushfire Risk Assessment for the Ingleside Planned Precinct 2018 (Meridian) concluded that while the 1994 fire event was a serious threat to life and property in the Northern Beaches area, many aspects of the response to the 1994 fire have been analysed and lessons learnt. Major changes in firefighting technique, coordination, communications and land use planning to name a few have occurred and there is an expectation that fires such as the 1994 event, should they reoccur, would be managed and controlled in a more effective fashion, leading to a reduced community threat.

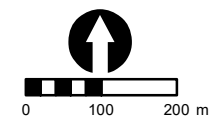
The available fire history mapping is shown in Figure 2- 6.

*Figure 2- 6: Fire History (Source NPWS/RFS)*



- Legend**
- Study Area (Source: CAD)
  - Fire history (source: NPWS 2021)**
  - Wildfire
  - Hazard reduction (HR)

Aerial source: Nearmap



Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

**PROJECT & MXD REFERENCE**  
 Morgan Road, Belrose  
 18CR39\_FH001

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 Issue 1  
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**SCALE & COORDINATE SYSTEM**  
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 GDA 1994 MGA Zone 56

**TITLE**  
 Fire History

Document Path: N:\GIS STORAGE\IN Drive\18CR39\_MorgansRd\_Belrose\MXD\18CR39\_FH001.mxd



## 2.2 Land use assessment

The proposed layout is consistent with the pattern of development to the west and south of the site.

The strategic plan for the area is undefined as the site and much of the surrounding area is currently zoned as deferred matter. With the withdrawal of the Ingleside draft structure plan, planning

The site is identified in a Development Delivery Plan (DDP) under the Planning Systems State Environmental Planning Policy 2021 (Aboriginal Land).

The DDP initiatives a framework for identified development sites and pathway to investigation and potential approval, including rezoning if required.

The site is as far as practicable, located away from potentially dangerous situations, in that it is not located on a ridgetop, is located in a position sheltered from the identified major fire threat potential from the north west and where potential uphill fire runs are limited in width and length.

The Deferred Lands Strategic Bush Fire Risk Assessment prepared by Meridian Urban for Northern Beaches Council (March 2022) analyses and identifies land within the deferred matter zoning of the area base on potential fire intensity and inferred fire risk. The Patyegarang project site is located within an area mapped by the study as being of lower potential fire intensity and by inference, lower fire risk.

The Patyegarang project site is, of all potential development sites identified within the deferred matter zoning area, a preferred site for development in that it is located in an area identified as lower potential fire risk.

The potential fire risk, based on modelled fire intensity is shown in the following figures, xxxx, xxx and xxx, under an assumed continuation of hazard reduction works.

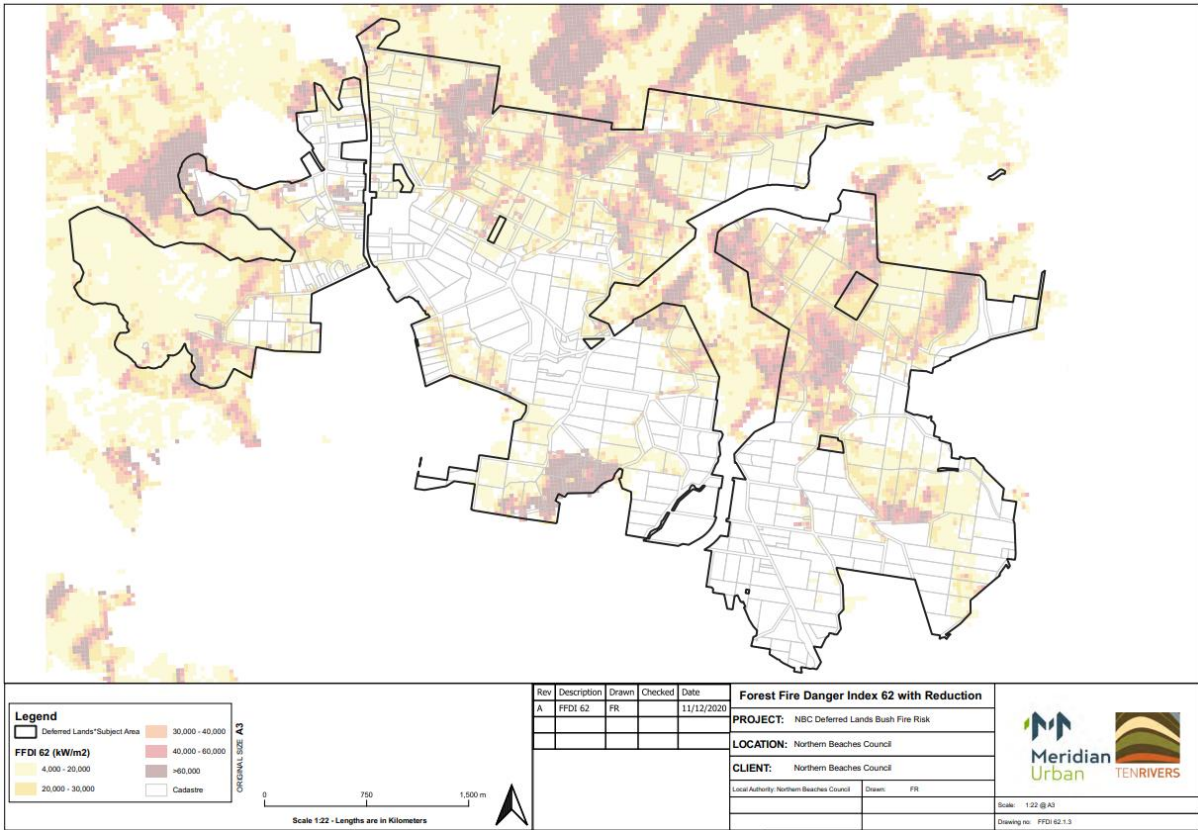


Figure 2- 7: Potential fire intensity under Forest fire danger index 62 (with hazard reduction)

(Source; Meridian Urban 2022)

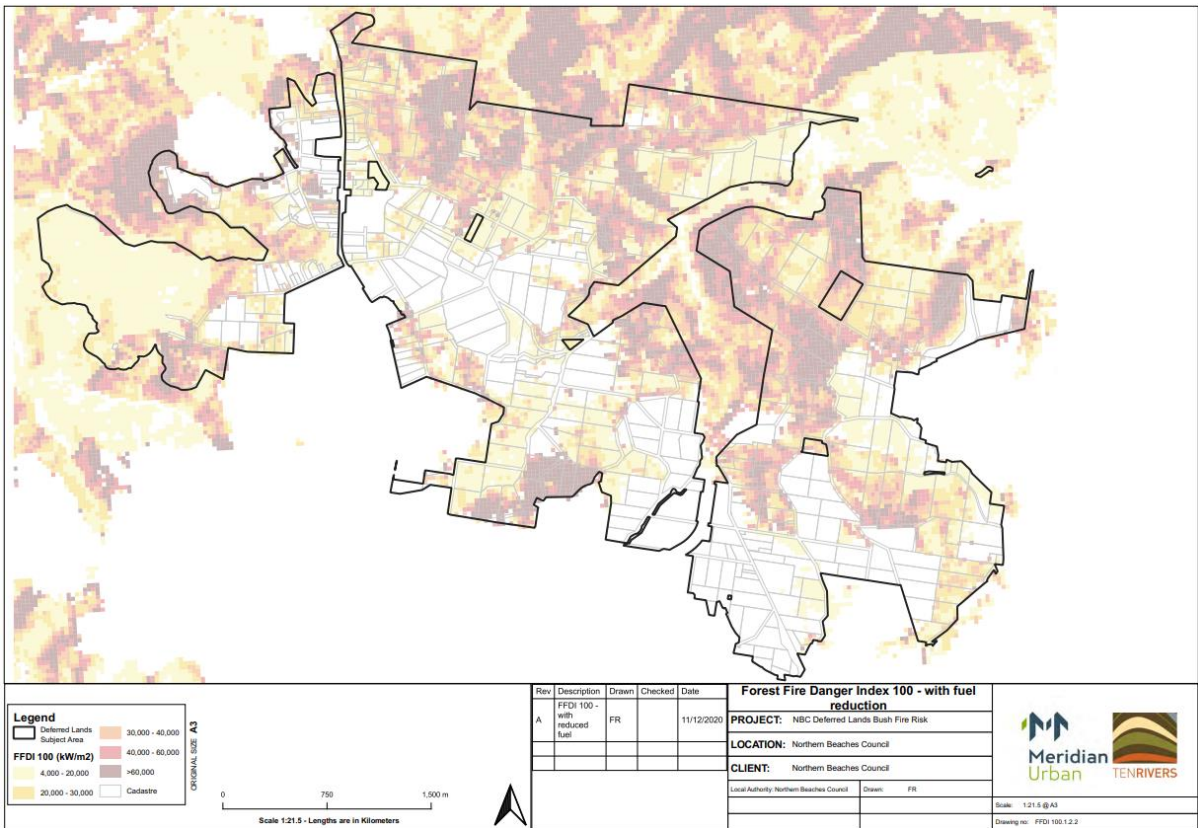


Figure 2- 8: Potential fire intensity under Forest fire danger index 100 (with hazard reduction)

(Source; Meridian Urban 2022)

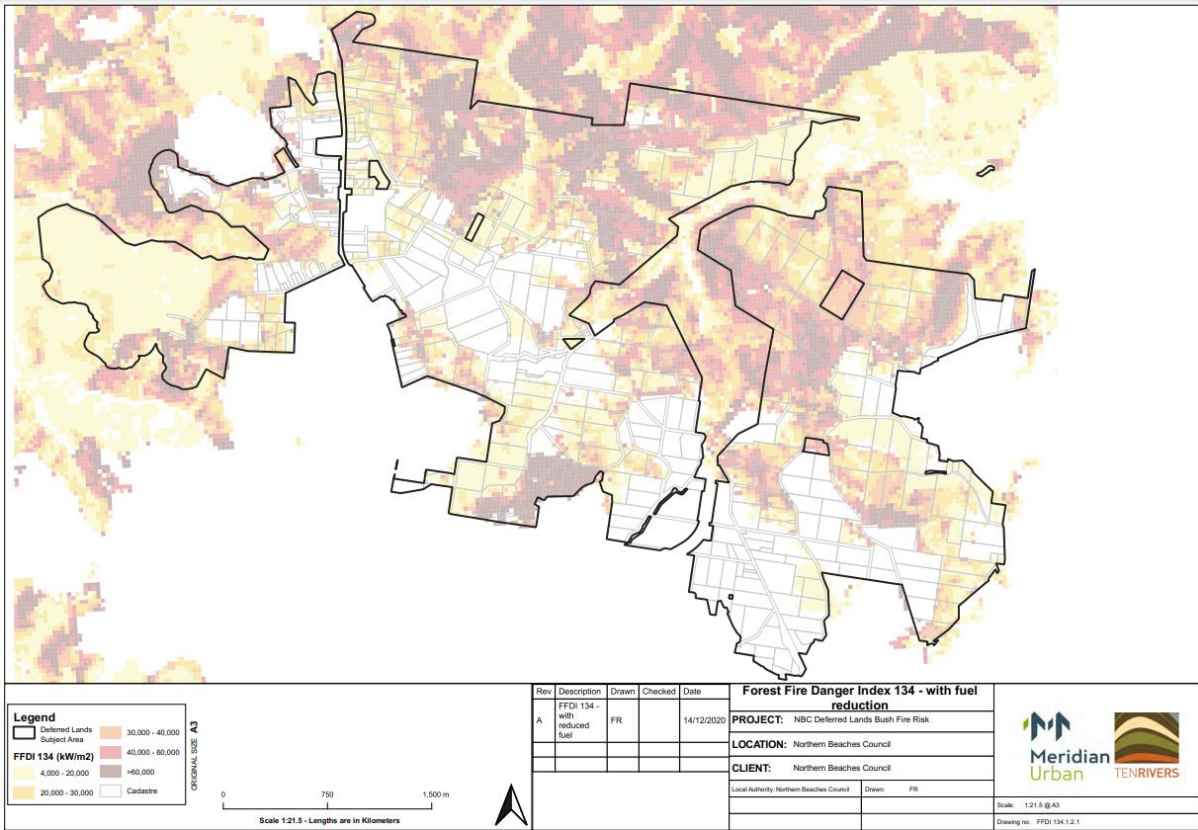


Figure 2- 9: Potential fire intensity under Forest fire danger index 134 (with hazard reduction)

(Source; Meridian Urban 2022)

### 2.3 Access and egress

It is recognised that access to and egress from the site will be critical for the safety of attending emergency services and residents.

To this end, the provision of significantly enhanced access infrastructure is proposed. This upgrade includes the provision of a slip lane allowing traffic to turn unhindered by traffic management devices from the northern end of the Patyegarang project site to a southerly direction along forest way.

Radiant heat impact (Bushfire Attack Level – BAL) has been calculated using the acceptable solutions tables of PBP 2019; Table A1.12.5.

Currently, the intersection of Forest way and Morgan road is potentially impacted by a fire emanating from the North West. The current situation could potentially result in direct flame impact on the western most lane of Forest Way in a northerly direction and both lanes of Wyatt Avenue. The radiant heat impact reduces in a south easterly direction from the North West corner of the intersection, culminating in a BAL rating of 12.5 potentially impacting on the proposed slip lane location. A BAL contour map of the Forest way intersection is shown in Figure 2-10.

It is considered reasonable to assume that evacuating persons at this location would be travelling by vehicle and given that assumption, a BAL rating of 12.5 provides an acceptable protection outcome in the event that fire coincided with evacuation.

Secondary access in the north west of the site would be provided by a junction with Lyndhurst Way. This link would provide an advantage for existing residents to evacuate via a route to the east, avoiding interaction with fires emanating from the North West.

Access to and egress from the southern end of the Patyegarang project site is limited by a load limited bridge, not suitable for heavy vehicles. Discussions with Northern beaches fire control staff have indicated that Northern Beaches Council have granted permission for NSW RFS heavy tankers to use the bridge despite the load limit in emergency situations. Discussions and planning for the replacement of the bridge are ongoing.

It is recommended that the replacement of the load limited bridge on Morgan road be made a priority, noting that current arrangements do not significantly hinder emergency response.

It is further recommended that the current potential scenario for evacuating residents from Wyatt Avenue in particular through a zone of potential direct flame impact be assessed and where possible and practicable, mitigation measures implemented.



*Figure 2-10: Forest Way intersection radiant heat impact*



**Legend**

Precinct boundary (source:CAD)

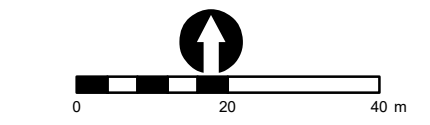
Contour (Source: LiDAR)

**Bushfire Construction Standards AS3959 2018\***

- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- Flame zone

\* Please refer to additional construction requirements for BAL levels which are contained in Addendum Appendix 3 of 'Planning for Bushfire Protection' (2019).

Aerial source: Nearmap



Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

**PROJECT & MXD REFERENCE**  
 Morgan Road, Belrose  
 18CR39\_BF003

**DATE & ISSUE NUMBER**  
 6/09/2022  
 Issue 1

**SCALE & COORDINATE SYSTEM**  
 1:1,000 @A3  
 GDA 1994 MGA Zone 56

**TITLE**  
 Schedule 1 - Bushfire Protection Measures



## 2.4 Emergency services

Analysis of the existing emergency services capacity shows a high density of NSW Rural Fire Service (RFS) Brigades operating in the area surrounding the site. Outside of the Northern Beaches Fire District are similar high densities of NSW RFS and Fire and Rescue NSW brigades which would presumably be in a position to support local resources in the event of a major fire.

Discussions with Northern Beaches fire control staff indicate that the current capacity of local RFS Brigades is sufficient to meet the increased demand posed by the addition of the proposed development.

Travel time from local RFS stations to the site is shown in Table 6.

*Table 6: Travel time from local RFS stations to the Patyegarang project site (source; Google maps)*

RFS Station	Travel time to site
Belrose	<5 minutes
Terrey Hills	<8 minutes
Davidson	<11 minutes
Narraweena	<11 minutes
Tumbledown Dick	<12 minutes
Coal and Candle	<12 minutes
Duffys Forest	<16 minutes
Kuringai	<20 minutes

## 2.5 Infrastructure

The Sydney Water network capacity report for the Warringah water distribution area (30 June 2021) identifies the Belrose water supply zone as having limited capacity (Figure 2-11).

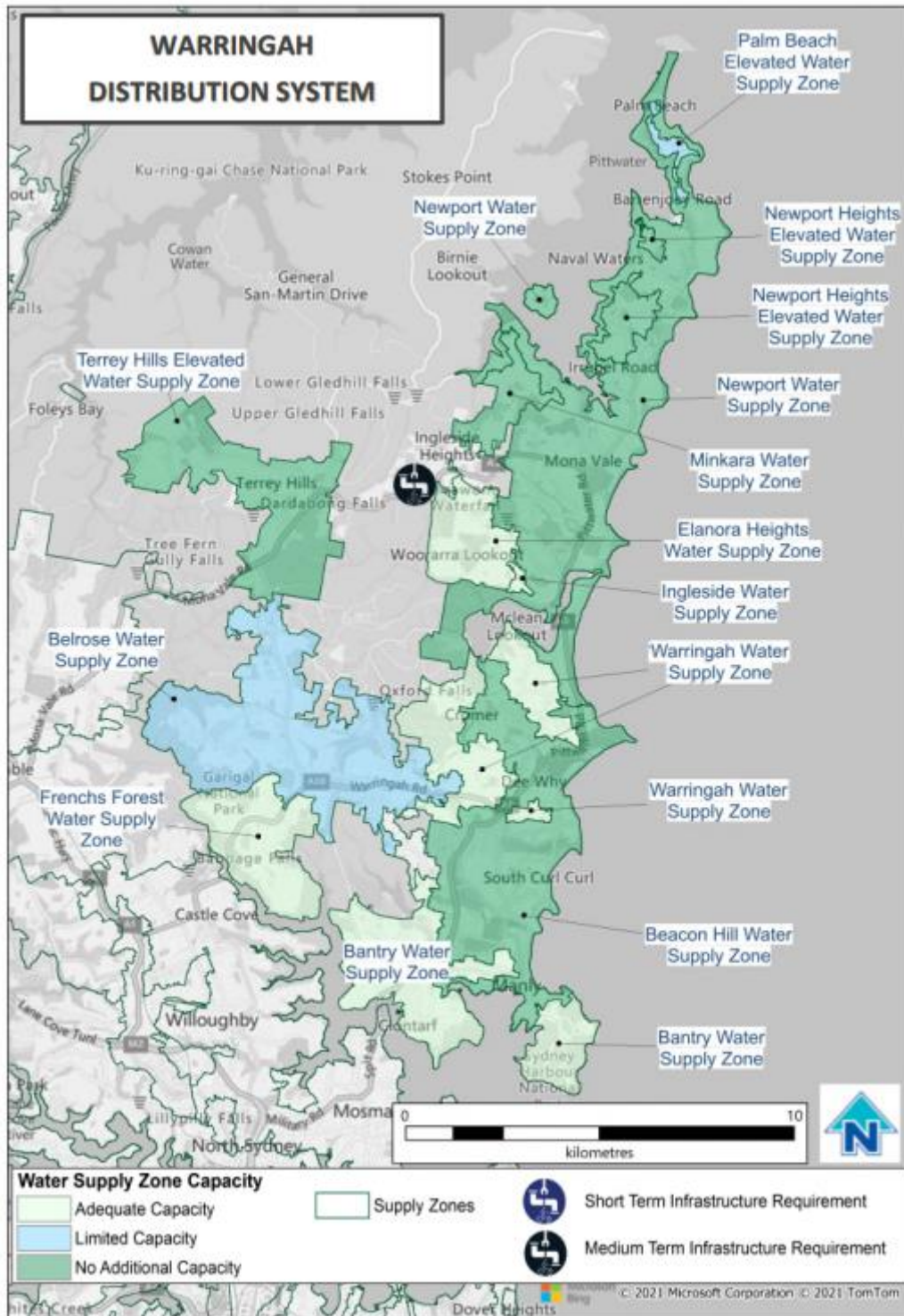


Figure 2-11: Warringah water distribution system (Source; Sydney Water Warringah Water Distribution Network Capacity Report)

The capacity report does not identify a projected demand for the Belrose zone, however surrounding areas do show an increase in projected demand (Figure 2-12).

System Summary	Projected			
	2021	2026	2036	2046
<b>Demand MDD (ML/d)</b>				
Bantry Bay	17.8	18.0	18.4	18.8
Beacon Hill	49.3	50.6	51.4	52.4
Belrose	14.5			
Frenchs Forest	5.8			
Minkara Bayview	1.2	1.7	2.2	2.6
Newport, Elanora Heights, and Ingleside	35.2	36.7	37.4	38.1
Newport Heights Elevated	2.5			
Palm Beach Elevated	0.8	0.8	0.8	0.8
Terrey Hills	5.5	7.8	8.7	9.1
Warringah	11.7	11.7	11.7	11.8

Figure 2-12: Projected water supply demand. (Source; Sydney Water Warringah Water Distribution Network Capacity Report)

The Sydney Water Growth Servicing Plan 2020 – 2025 does not specifically identify the Belrose area as a priority for supply upgrades.

It is recommended that further study be conducted to analyse the capacity of the existing water supply network and what upgrades may be necessary to cater for the increased demand posed by the proposal.

An existing high voltage transmission line traverses the site. It is understood that the line is proposed to be relocated to a more appropriate site or preferably, underground.

The existing capacity of the natural gas network is unknown. No major natural gas lines within or adjacent to the site are known.

## 2.6 Adjoining land

Currently, existing development on the eastern side of Forest Way and north of the Patyegarang project site are posed with a bushfire threat from vegetation within the proposal site. Removal of a proportion of this vegetation for development will significantly reduce the bushfire threat to these assets.

The existing development comprises a mixture of development types and of construction standards, reflecting a pattern of development carried out over an extended period of time, some pre dating the requirement for bushfire protection measures. Improving the bushfire protection outcome for these properties would be difficult from logistical, financial and legal reasons.

By effectively relocating the bushfire threat to the periphery of the proposed development, an opportunity arises to provide current best practice measures for the proposed development, providing an acceptable outcome for new development and significantly better outcome for existing assets.

### 3. CONCLUSION

This strategic bushfire study has been undertaken for the planning proposal to rezone land located to the south of and east / west of the Patyegarang project site.

The proposed subdivision will involve the creation of four hundred and fifty (450) capped new residential dwellings.

This study has found that bushfire can potentially affect the proposed development from the extensive bushland vegetation surrounding the development resulting in future buildings being exposed to potential radiant heat and ember attack. Nine potential fire runs of significance towards the site have been identified. All potential fire runs area capable of having impacts mitigated or do not pose a significant potential impact.

Previous fire history does not indicate likely fire paths that may affect the site. That this may be the result of significant past hazard reduction burning suggests that this activity should continue for the benefit of all residents, current and future.

The proposed layout of the development, including the proposed provision of Asset Protection Zones and fuel managed areas, in combination with the natural topography can achieve the aims and objectives of *Planning for Bush Fire Protection 2019*.

Existing emergency services capacity is capable of servicing the proposed increase in assets and population.

Local zoning is currently undecided, although development on the site is supported by State Government Planning and Policy.

The surrounding area is one of significant fire potential. Past fires in the wider area have resulted in significant threat to life and property. It is recognised that many aspects of fire control, passive and active, have improved since those past fires but a relatively high residual risk remains.

This analysis of the surrounding area is supported by the Deferred Lands Strategic Bushfire Risk Assessment prepared by Meridian Urban (March 2022) for Northern Beaches Council which concludes by inference that the proposed Patyegarang project development site is one of lower potential fire intensity risk and therefore a preferred site for development.

The selection of the proposed site is in balance with the aims and objectives of *Planning for Bush Fire Protection 2019* in providing a relatively safe location not exposed to high bushfire risk, capable of providing bushfire protection measures appropriate to the assessed risk and which improves the current bushfire protection for existing development.

## 4. REFERENCES

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- State Government of NSW 2021. *State Environmental Planning Policy (Planning Systems) 2021*. Retrieved from; <https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0724>
- Sydney Water 2020. *Growth servicing Plan 2020 – 2025*. Retrieved from; <https://www.sydneywater.com.au/content/dam/sydneywater/documents/growth-servicing-plan-2020-2025.pdf>

## **APPENDIX 1. AHIMS REPORT**



TBE

Date: 25 August 2022

52 The Avenue,  
 Kariong New South Wales 2250

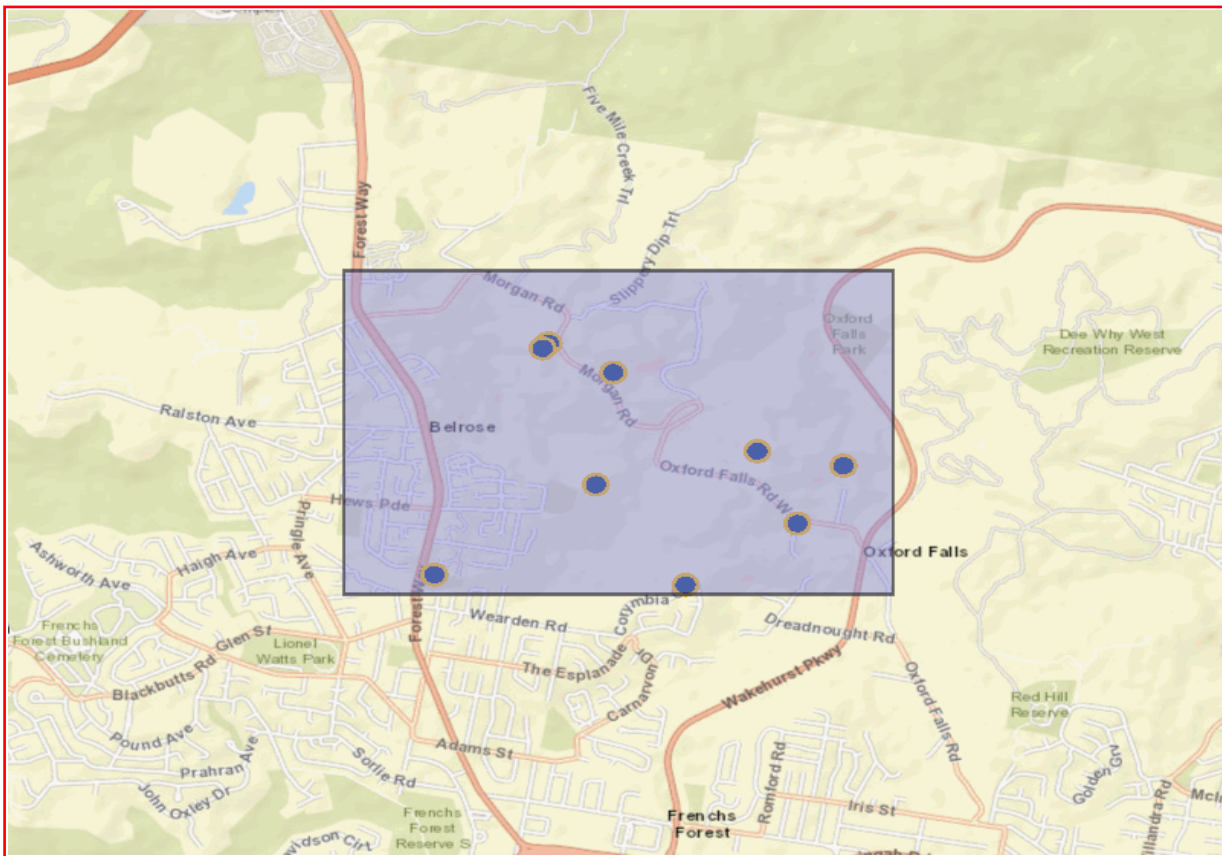
Attention: Tony Hawkins

Email: thawkins@traverseecology.com.au

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lat, Long From : -33.7374, 151.2162 - Lat, Long To : -33.7196, 151.2471, conducted by Tony Hawkins on 25 August 2022.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

<b>9</b>	<b>Aboriginal sites are recorded in or near the above location.</b>
<b>0</b>	<b>Aboriginal places have been declared in or near the above location. *</b>

### **If your search shows Aboriginal sites or places what should you do?**

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the [NSW Government Gazette \(https://www.legislation.nsw.gov.au/gazette\)](https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

### **Important information about your AHIMS search**

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not to be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.