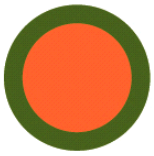
total earth care

Bush Fire Assessment Report

Allambie Heights Village Project 2

181 Allambie Road, Allambie Heights, NSW 2100



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Total Earth Care Pty Ltd

May 2018

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Allambie Heights Village Project 2

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Prepared for:	Allambie Heights Village Ltd.			
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Bush Fire Assessment Report

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1 EXECUTIVE SUMMARY

The proposal is for two new residential and an ancillary non-residential building (class 5-9) swimming pool building within a Retirement Village on Bushfire prone lands.

The new residential buildings being within a “retirement village” must be considered a Special Fire Protection Purpose Development (SFPP) as described in Planning for Bush Fire Protection (PBP).

SFPP developments require approval by the Rural Fire Service under section 100B of the EPA Act and concurrence by the Consent Authority, The Northern Beaches Council.

The swimming pool building can be assessed under the provisions of section 79BA of the Environmental Planning and Assessment Act, 1979.

The proposal at 181 Allambie Road is contiguous with and managed concurrent to the Allambie Heights Village Residential Aged Care Facility and the AHV Retirement Village and is governed by a 50 year lease and as such can be considered to be an extension of the AHV and the proposed development is, to all intents and purposes, an infill development and has been treated as such within this report. The proposed residential buildings are compliant with the requirements of PFBFP.

The location of the Class 10 Building does not comply with provisions of section 79BA of the Planning for Bush Fire Protection. However this buildings fabric, design, fire protection assets and its purpose provide exceptional circumstances for its approval by the relevant consent authorities.

The proposed development is also restricted by the Warringah Council Local Environment Plan 2011 and in particular Part E The Natural Environment Development Control Plan has seven aspects which will require addressing through the Approval process. These have been included in the Appendices.

Although no waterways have been mapped on site by the NSW Office of Environment and Heritage (NSW Office of Water), a large part of the site has been mapped as riparian lands by Council. Part E 8 Waterways and Riparian Lands. Part E 8 lands prescriptively must not have Asset Protection Zones located on them. A very large section of the site is E8 mapped lands. Northern Beaches Council has made a concession at a pre-Development Application meeting that the extent of the mapped waterway be reduced by the exclusion of a man made drain. The reduced APZ (20-25metres) for the Class 10 building is set within the E8 Waterways and Riparian lands. This riparian land has been previously cleared and currently supports a depleted native plant community and substantial weed infestations.

The Manly Warringah War Memorial Park (MWWMR) trust, Sydney Water and the owners of an electrical Power easement all manage contiguous bushland for fire protection purposes including APZ's within the E8 Waterways mapped lands.

Importantly the site is located between the fire threat and several existing Special Purpose Developments which were built prior to PBP and which consequently have no APZ or other PBP mandated Fire Management obligations. Managed APZ's and an Ecologically Sound Bushfire Management Plan upon the site will significantly reduce the fire threat to these vulnerable properties while protecting ecologically important features.

All other relevant aspects of Part E have been addressed in other reports.

2 INTRODUCTION

2.1 Background

Allambie Heights Village Ltd (AHV), a retirement Village organisation, has taken a lease over Crown lands at 181 Allambie Rd, Allambie Heights (William Charlton Village) (Deposited Plan 752038 lot number 2615). These lands are contiguous to the south with a property that they currently own at Martin Luther Place, Allambie Heights. AHV intend to develop this leased land to expand upon their facilities by building a Retirement Village. Development of the land was substantially started by the past lessees and it is the intention of the new current lessees to continue with what they consider to be an existing use right. It should also be noted that the Rural Fires Act (Planning for Bush Fire Protection) specifically discourages locating Special Purpose Developments within Fire prone land, consequently the existing use right has added importance to the proponent.

2.2 Statutory Context

The Local Government Planning Instruments create Development Controls which regulate the use of the site. Additionally State Government agencies have jurisdiction over other values / aspects. In particular Archaeology, Biodiversity, Waterways and Bushfire parameters are not within the jurisdiction of Local Government as Consent Authority and trigger the need for Integrated Development "concurrence" by the relevant Government agencies.

The *NSW Rural Fires Act 1997* (RFA Act) and the *NSW Environmental Planning & Assessment Act 1979* (EP&A Act) were amended in 2002 to improve planning for bushfire protection within NSW. Section 79BA of the EP&A Act establishes the requirement for development on bushfire prone land to conform to the guidelines of the NSW Rural Fire Service (RFS) published in *Planning for Bushfire Protection* ('PBP' - RFS 2006).

PBP forms the basis for all planning and development control measures regarding building in bushfire prone areas. Under PBP, development within a designated bushfire prone area, as mapped by the RFS and Local Government Authorities, requires a bushfire hazard assessment and the implementation of measures to control the bushfire threat. Bushfire prone areas are defined in PBP as those lands within 100 metres of high or medium bushfire hazards or lands within 30 metres of low bushfire hazard.

Development proposals must satisfy the broader aims and objectives of PBP, which are to construct buildings within fire safe locations. If buildings are proposed for construction within locations that may experience bushfire i.e. in potentially unsafe locations then approval will only be given to the development proponent if performance criteria for each of the Bushfire Protection Measures in sections 4.1 and 4.2 of PBP can be met. The measures may include construction requirements set out in the Building Code of Australia (BCA) which is a performance based code related to the

construction of buildings. The code contains 'deemed to satisfy' provisions which are the construction requirements contained in AS3959-2009.

For Residential Subdivision, the Asset Protection Zones (APZ) distances are designed to meet the deemed-to-satisfy provisions, and the calculation is based on the modelled radiant heat exposure that buildings are likely to experience in the event of a bushfire. Corresponding AS3959-2009 construction levels, known as Bushfire Attack Levels (BAL), are required as part of the deemed to satisfy provisions.

Special Fire Protection Purpose (SFPP) developments, including Retirement Villages are required to obtain a Bush Fire Safety Authorities (BFSA) from the RFS under section 100B of the RF Act. Such developments are also "integrated developments" under section 91 of the EP&A Act.

This bush fire assessment, completed in accordance with PBP and clause 44 of the RF Regulation provides information to support the BFSA application.

The Northern Beaches Council (Warringah Council LEP 2011) is an additional Planning Instrument which might impact on the permissible land uses on site.

2.3 The Site and Proposed Development

AHV has leased a 3.72 Hectare property at 181 Allambie Road, Allambie Heights (The Site). A master plan is being produced by AHV with the intention of building a retirement village adjacent to its existing Retirement Village, at Martin Luther Place. The development will be a state-of-the-art retirement village infrastructure precinct which will augment its current capacity, and service a burgeoning need for retirees. The site is currently being used as a Retirement Village however the western end of the property has not been fully developed and a significant portion of the site is remnant bushland.

It should be noted that the remnant bushland section of the site has been partially developed by the past lessee. A sealed road has been built on cut and filled soil through the centre of the site. Two drains have been excavated into solid rock which have created de-facto creeks neither of these drains have been mapped by the office of water. Walking tracks have also been installed and the site has been cleared and burned.

Historical documents demonstrate a willingness of the past consent authority and the Crown to develop the land. These historical works and the current use of the site do establish a basis of claim to existing use rights as a Retirement Village housing development.

2.4 Zoning

The site is Zoned as R2 Low Density Residential.

2.5 Adjacent land use

The northern boundary adjoins a Sydney Water (Water reticulation pipe) easement. The pipe is approximately 1500mm in diameter and is located downslope of a 4wd track. This pipe line easement is approximately twenty metres wide and two narrow weed infested bushland remnants grow along the edges of the easement.

Beyond the Sydney Water Easement are multiple aged care facilities and the Sunnyfield Cerebral Palsy treatment centre. The Allambie Heights Village has a common boundary on the development site's south eastern boundary. The eastern boundary is Allambie Road.

The sites south western and western boundary is contiguous with the Manly Warringah War Memorial Park (MWWMR). MWWMR is a 375 Hectare passive and active recreational bushland park.

Additionally it is also important to note that the Allambie Heights Village have an ongoing bushland /fire management agreement with the Manly Warringah War Memorial Park (MWWMR) trust the MWWMR undertake regular and routine management of the APZ and access tracks adjoining the Allambie Heights Village.

Adjacent to the southern and western boundaries of the site is an electrical power easement. The bushland below and within 10 metres of the power lines is slashed under a regular maintenance regime. This easement creates a 25 metre wide fuel reduced zone between the site and the dominant fire run.

Upslope of the site and with minimal separation from the bushland fire risk are several existing Special Purpose Developments.

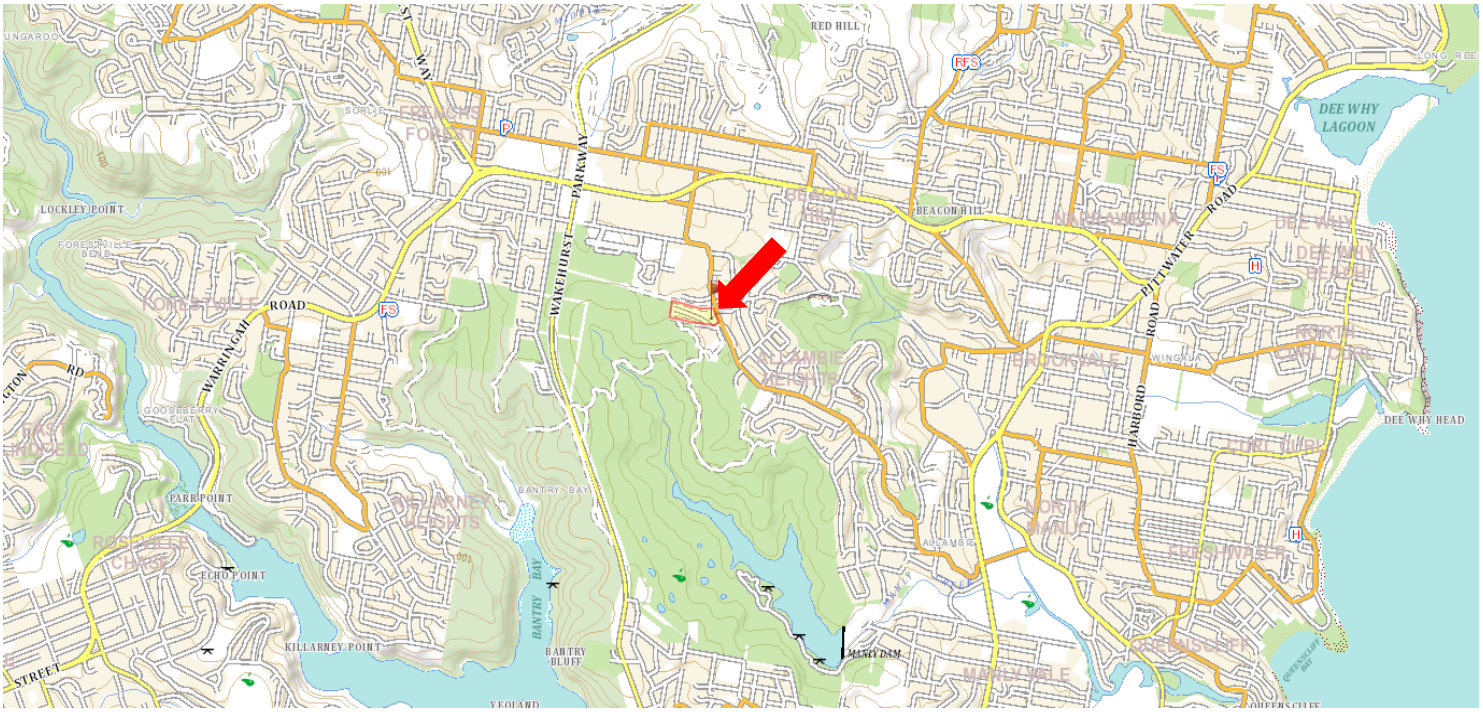


Figure 1: *Site Locality*

Figure 2: *Subject Site*

2.6 Statutory Context

In August 2002, both the *NSW Rural Fires Act 1997* (RFA Act) and the Environmental Planning and Assessment Act (EP&A Act) were amended to improve planning for bush fire protection within NSW. The changes were reflected in the *Rural Fires and Environmental Assessment Legislation Amendment Act 2002*, which includes a requirement for development on bush fire prone land to conform to the guidelines of the NSW Rural Fire Service (RFS) published in *Planning for Bush Fire Protection* ('PBP' - RFS 2001).

PBP (revised in 2006) forms the basis for all planning and development control measures regarding bush fire protection in NSW. Under PBP, development within a designated bush fire prone area, as mapped by the RFS and Local Councils, requires a bush fire assessment and the implementation of measures to control the bush fire threat. Bush fire prone areas are defined as those areas within, or within 100m of, high or medium bush fire hazards; or within, or within 30m of, low bush fire hazard.

Section 100B of the *Rural Fires Act 1997* (RF Act) states that the NSW Rural Fire Service Commissioner may be required to issue a *Bush Fire Safety Authority* for "a subdivision of bush fire prone land that could lawfully be used for residential or rural residential purposes, or development of bush fire prone land for a *Special Fire Protection Purpose*[1]". Developments requiring approval under Section 100B of the RF Act are referred to as "integrated development" under Section 91 of the EP&A Act. The property in question is to be used as a retirement village and would be classified as "Integrated Development", and as such must be referred to the NSW Rural Fire Service for approval and issue of a *Bush Fire Safety Authority.*

2.7 Bushfire Prone Land

Special Fire Protection Purpose means the purpose of the following:

(a) a school,

(b) a child care centre,

(c) a hospital (including a hospital for the mentally ill or mentally disordered),

(d) a hotel, motel or other tourist accommodation,

(e) a building wholly or principally used as a home or other establishment for mentally incapacitated persons,

(f) housing for older people or people with disabilities within the meaning of State Environmental Planning Policy No 5—Housing for Older People or People with a Disability,

(g) a group home within the meaning of State Environmental Planning Policy No 9—Group Homes,

(h) a retirement village,

(i) any other purpose prescribed by the regulations.

The property has been mapped as being bush fire prone by the Local Government Authority, the Northern Beaches Council and has been assessed as described below.

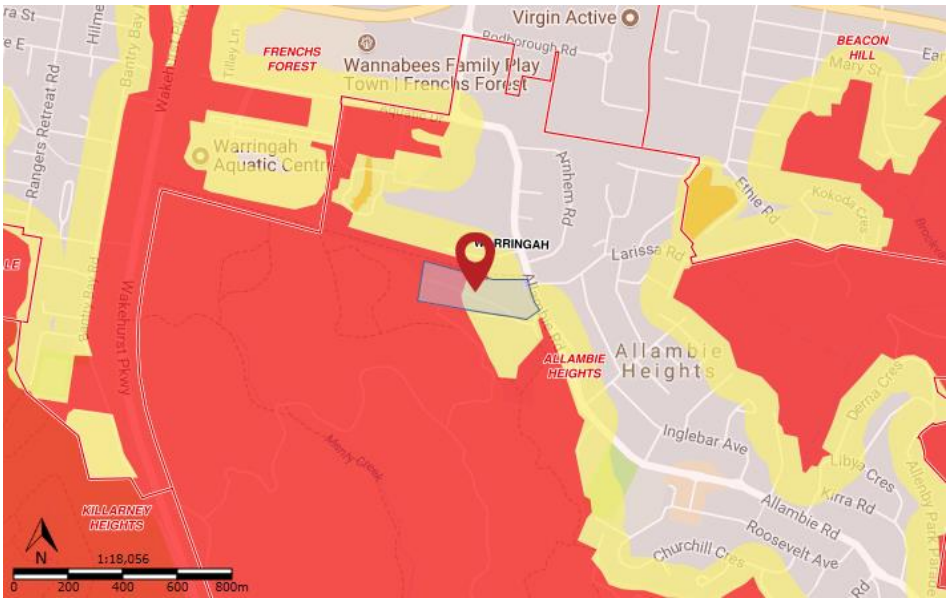


Figure 3: *Bushfire Prone Land Map 1*

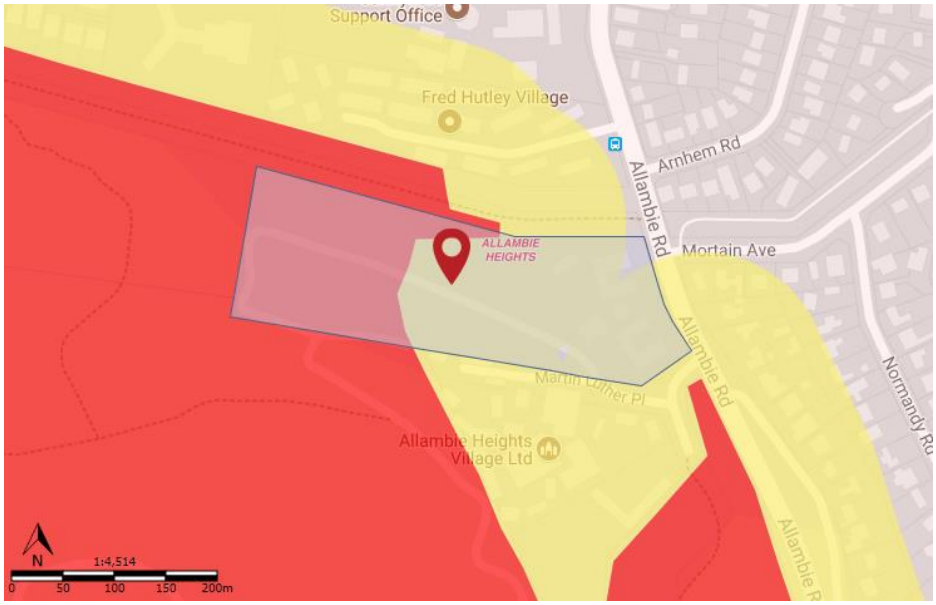


Figure 4: *Bushfire Prone Land Map 2*

2.8 Site Assessment

2.8.1 Topography and Aspect

The Site

The property is roughly rectangular in shape with the long axis orientated to the east and west. The western half of the site is substantially bushland (Mallee/woodland/forest) while the centre is open parkland and the eastern end contains two two-storey residential buildings and a number of smaller service buildings.

The site is spilt in half along the east-west access along the contour by level sealed 8 metre wide road. A weedy fill batter approximately 20 metre wide supports the road. This (30 metre wide) clearing reduces the width of the bushland (woodland) above the road to approximately 45 metres and the bushland (forest) is approximately 45 metres wide below the road.

The bushland remnant has a south facing aspect and is located on moderately sloping land with its highest point being 134 metres above sea level and its lowest point being 117 metres above sea level with 114 metres between these points, i.e. a 15% grade or 9 degree slope.

The land is evenly benched along the contour from west to east with the steepest possible grade of 5% grade or 3 degree slope.

Adjacent Bushland

Downslope

The majority of the bushland (heathland) immediately downslope and south of the site is situated on shallow soil on a 100m wide sandstone bench.

This is a managed landscape (a cleared power easement and access roads) and is consistent in its structure with an Outer Protection Area. This 100 metre wide/broad flat sandstone bench within MWWMR is the dominant fire run threatening the site. In light of the access tracks, power easements and the central road, the maximum un-interrupted fire run from this direction is less than 100m long. The managed bushland access track along the sites south-western boundary and the managed bushland beneath the power line easement has created a 50 metre wide fuel reduced zone along most of the interface with the MWWMR.

The southern eastern boundary is located on a 20 metre wide flat sandstone bench which extends beyond and along the southern eastern boundary of the bushland (forest) interface. At the

downslope edge of this bench is a 10 metre wide stepped broken scarp of sandstone that flattens after approximately 20 metres. This ground then flattens and meets a vehicle access road.

The 20 metre sandstone bench has been excavated at its eastern end to create an artificial wetland and narrow drain. This excavation is into solid rock and although it creates steeper ground it does not support vegetation and although this wetter gully is the steepest land adjacent to the site, 12% slope or 7 degrees, it is unlikely to be the direction of the fire threat and is also unlikely to have a strong influence to the fire run.

Upslope

A 5-10 metre wide strip of weedy bushland is located along the upslope northern boundary. It is not mapped as a fire risk and verbal communication with the Rural Fire Service at Terrey Hills confirmed that it does not pose a fire threat.

On Level

The western end of the site is bounded by a Bushland (woodland). The power easement runs diagonally away from the site through this remnant.

Bushland Management

All bushland within the site will be subject to a bush fire management plan which will maintain fire fuel levels at less than 10t/ha and will burn bushland in a mosaic pattern to encourage ecological diversity through multiple age classes of vegetation. The mosaic burn pattern will also mitigate the potential of a catastrophic fire event burning all bushland within the property, thereby providing fire refuge for native animals, particularly the Eastern Pygmy possum.

Special care will be taken to encourage the regeneration/growth of species which are the preferred food and refugia species for the Eastern Pygmy Possum. Horticulturally managed native plant species will be used in the landscape / bushland interface, eg pruned *Banksia ericifolia* will form hedges and hollow log nests will be installed within the manually fuel reduced riparian/drainage line interface.

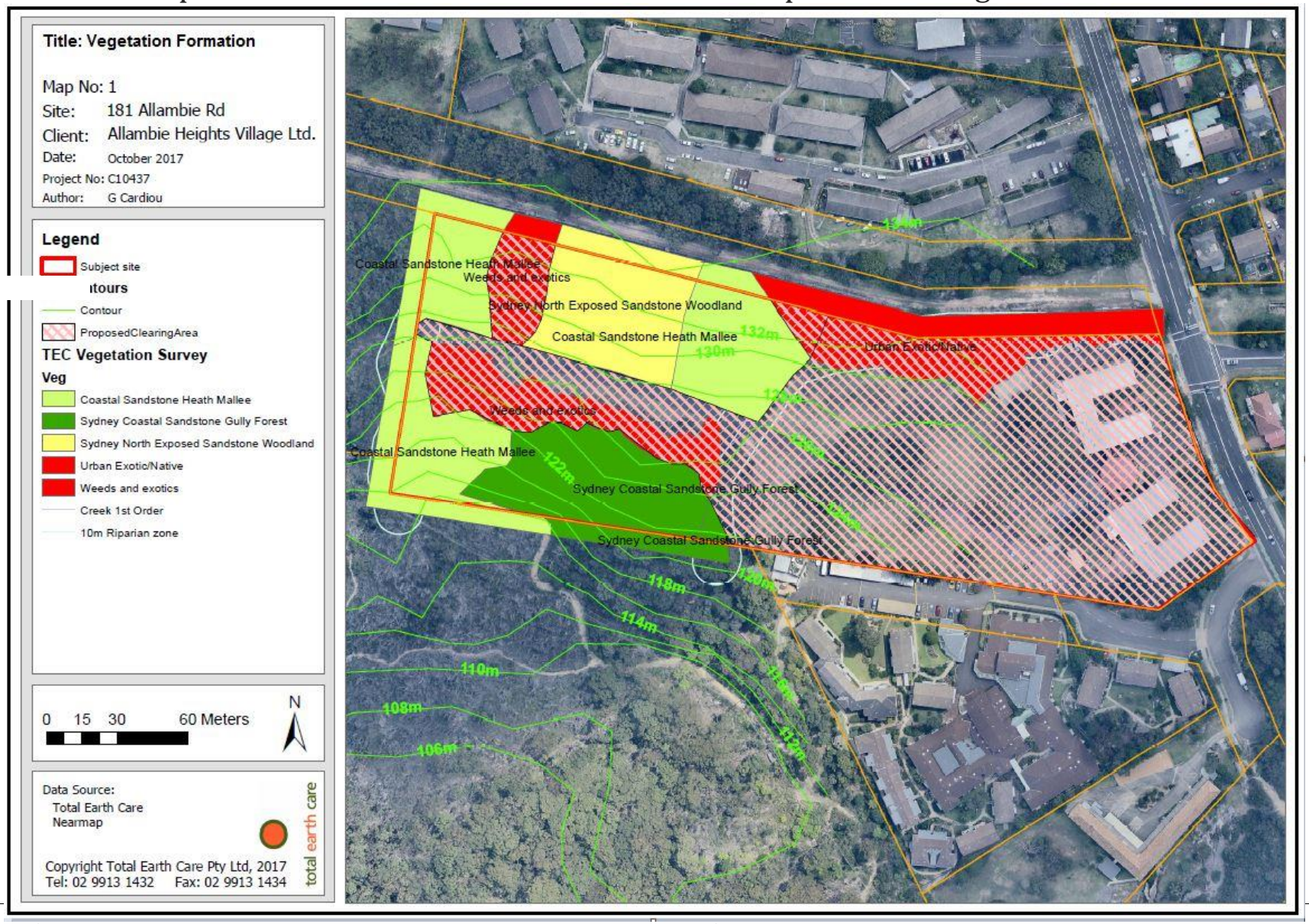
The shrub and small tree strata will be managed in the asset protection zones to maintain vertical separation of the fire fuels within the remnant.

All areas of exotic vegetation will be cleared of weeds and returned to native grassland (see Map 2 below).

2.8.2 Vegetation

Map 1 Vegetation Communities

Map 2 Native and Exotic Distribution + Proposed Clearing Area



Map 3 Bushfire Management Overview


Final_APZ_V2
50 m
50 m
50 m
50 m
25 m
25 m
Residential Units
Residential Units
Terrace
Swimming Pool Building
Existing Carpark Modified
Existing Carpark Retained
Proposed Driveway
Drop off Zone
Visitor Parking
Putting Golf Course
Bio-Filtration Zone
Bio-Filtration Zone
Activity Terrace
Seating Area
Pond
Existing Rock Out-Crop
Bush
Lawn
Garden
Courtyard
Courtyard
Courtyard
Courtyard
Courtyard
Courtyard
Courtyard
Courtyard
Courtyard
Courtyard
Courtyard
Courtyard
RFS Alternate Emergency Exit
Swale
Carpark
Western Landscape
Drainage Swale
On-Structure Courtyard
Boundary Hedge and Fencing
Retention of Existing Tree
Ramp
Accessible Pathway
Services
Community Building Landscape
Putting Golf Course
Entrance

Title: Topography

Site: 181 Allambie Rd
Client: Allambie Heights Village Ltd.
Date: July 2017
Project No: C10437
Author: G Goldin

Legend

SlopeAnalysisPoints
SlopeAnalysis

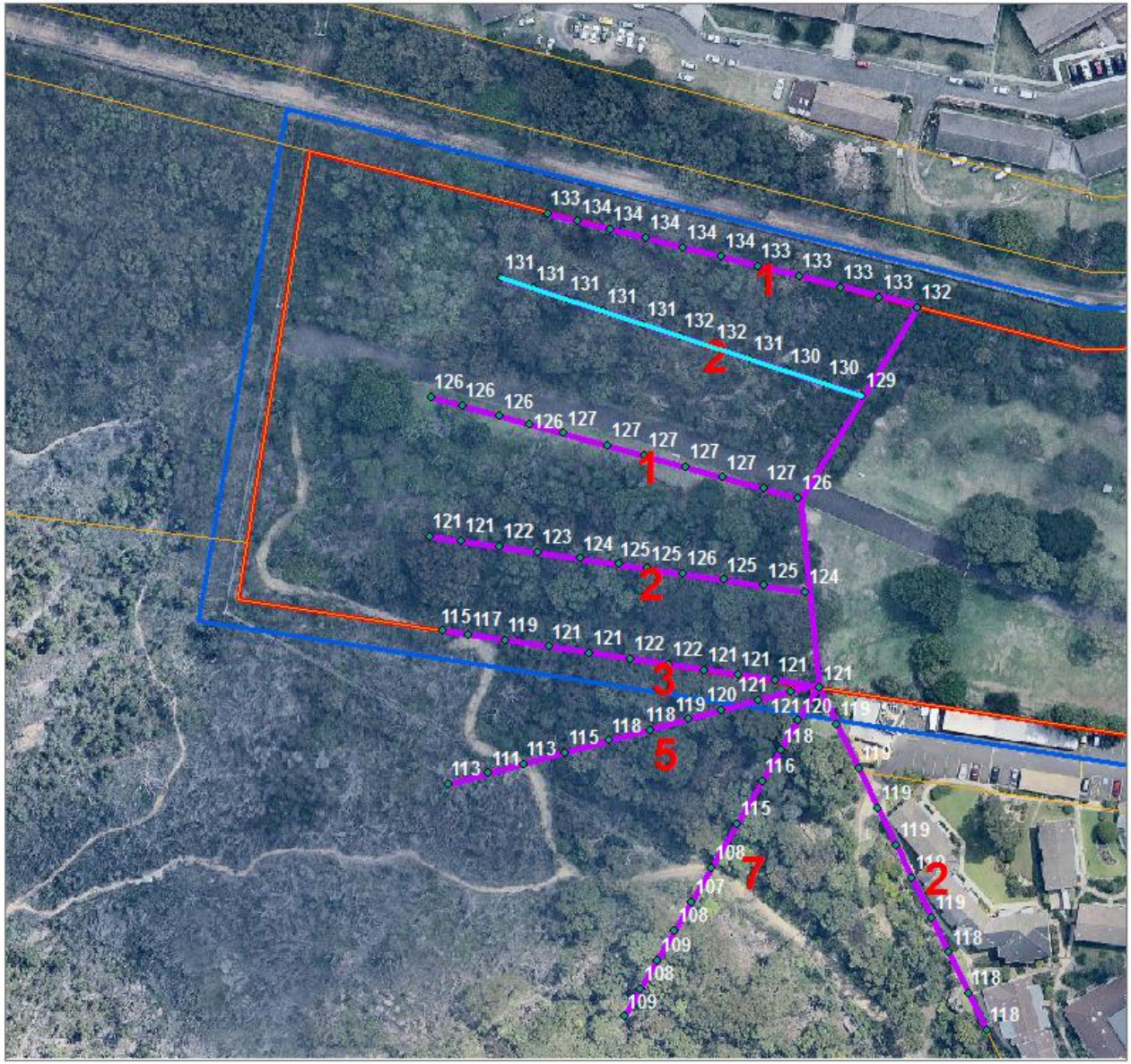
0 12.5 25 50 Meters

N

Data Source:
Total Earth Care
Nearmap

Tel: 02 9913 1432 Fax: 02 9913 1434

total earth care



2.8.3 Assessment of Effective slope and Bush Fire Attack level

An assessment of the vegetation and slope surrounding the proposed development is provided in Table 1 below. **Refer to Map 3 above**

Effective Slope & BAL calculation						
Building #	Vegetation Formation	Distance from building to hazard	Height change under vegetation	Distance under vegetation hazard	Effective Slope	Kw/m2 Radiant Heat
1	Mallee Mulga	50	upslope	50	upslope	3.29
2	Mallee Mulga	50	upslope	50	upslope	3.29
3	Managed forest Shrubland	19	12 metres	81	9 degrees	16.55

***Table 1*:** *Effective Slope and BAL Calculations*

2.8.4 Assessment of Environmental Issues

The FFA determined that there was one threatened species *Cercartetus nanus* (the Eastern Pygmy Possum) listed on Schedule 1 of the Biodiversity Conservation Act found on site. There are no known populations nor threatened ecological communities listed on Schedule 2 known or likely or with potential to occur in the subject site.

The FFA has concluded that, the proposed fire management plan will significantly reduce the impact of a catastrophic fire event on the ecological assets of the site.

At the time of assessment, there were no known Aboriginal relics that will affect or be affected by the bushfire protection proposals in this report.

Although no waterways have been mapped on site by the NSW Office of Environment and Heritage (NSW Office of Water), a large part of the site has been mapped as riparian lands by Council. Part E 8 Waterways and Riparian Lands. Part E 8 lands prescriptively must not have Asset Protection Zones located on them. The purpose of this use prohibition, it is assumed, is to ensure that land clearing and ongoing land management practices do not impact on the quality or speed of water entering

waterways. A very large section of the site is E8 mapped lands. Northern Beaches Council has made a concession at a pre-Development Application meeting that the extent of the mapped waterway be reduced by the exclusion of a man made drain. The reduced APZ (20-25metres) for the Class 5- 9 building is set within the E8 Waterways and Riparian lands. This riparian land has been previously cleared and currently supports a depleted native plant community and substantial weed infestations.

The Manly Warringah War Memorial Park (MWWMR) trust, Sydney Water and the owners of an electrical Power easement all manage contiguous bushland for fire protection purposes including APZ's within the E8 Waterways mapped lands.

3 ACCESS & SERVICE SUPPLY

3.1 Access

Road access to the property is proposed as; a private, sealed, 2 lane, 2 wheel drive, 350 metre long loop road which enters and exits from Allambie road and also from Martin Luther place.

The road will include passing bays and will be less than 5 degrees in grade. There will be no overhanging trees, bridges, or turning circles. It will comply with all of the design requirements of PBP. Negotiations with Sydney Water are currently underway to remove the bushland remnant downslope of the pipe line to reduce the chance of fire migrating along this corridor. Sydney Water are positively aligning with the proposal.

3.2 Services

3.2.1 Water Supply

It is proposed that a ring main water reticulation system will be installed along the outer alignment of the road verge, i.e. on the bushland side of the access road. Metal Storz valves / hydrants will be provided at intervals and with pressures and volumes in compliance with AS 2419.1 - 2005 and specifically in accordance with the performance criteria table for water supply services in PFBFP.

3.2.2 Gas and Electrical Supplies

Gas and electrical supply will also be located underground within the road corridor. All above ground gas take off points will be set outside the APZ. All gas services will be installed and maintained in accordance with AS 1596 and specifically in accordance with the performance criteria table for Gas supply services in PFBFP.

3.2.3 Swimming pool building

It is proposed that the swimming pool building (Class 5-8) be installed partially within the APZ. The building has been designed with a blank concrete wall facing the fire hazard and a concrete roof. No external detailing of the building within the APZ eg lights, or roof awnings etc will be made of flammable materials. Windows will be double glazed and toughened set in stainless steel frames. Window apertures will be screened and all doors will be ember proof.

The building has been designed to ONLY have access and egress doorways beyond the line of a compliant APZ width (50 metres from the dominant fire risk).

A **30,000** litre static water supply compliant with Table 4.2 PFBFP (an indoor swimming pool), will be installed in the basement of the swimming pool. This water will supply a roof mounted fire sprinkler pressurised by a diesel pump. This pump will have an automated ignition system and will pressurise the sprinkler system to spray water over the entrance onto the bushland side of the building to stop fire ignition.

The 50 metre APZ has been established in consideration of the multiple mitigating factors outlined in Map 3. In reiteration of these points:

1. The bushland margin to the east of the creek, (part of the APZ the OPA) has already been substantially cleared and is currently weed infested, this will be replanted as managed native grassland with sparse tree cover, The IPA will be mown grassland and narrow planter beds.
2. The site to the west of the creek will be managed under an ecological fire management plan and the shrub layer will be manually managed to reduce fuel connection between the ground and the canopy,
3. The neighbouring bushland has a twenty metre APZ along the adjoining boundary which is managed by Northern Beaches Council,
4. The bushland within the powerline easement is also managed as a fuel reduce zone,
5. Two fire trails which are regularly used as hazard reduction burn containment lines.
6. The pre-dominant fire fuel threat is to the west, which is along the contour not up it.
7. The pre-dominant fire carrying wind is a westerly wind along a manageable bushland interface on the same contour.
8. A south westerly wind which could drive a fire up hill at the property is very rarely a drying wind that significantly increases the FDI.

4 HAZARD ASSESSMENT

The Special Purpose (Retirement Village) requires a BAL- Low rating of 10kW/m2 or less to ensure that the safety of emergency personnel is not compromised during an evacuation. The proposed development includes both domicile and ancillary buildings. The proposed swimming pool building is located within the APZ and will not meet the BAL Low Rating. However the evacuation staging areas are situated outside the APZ.

4.1 Determination of Bushfire Attack

4.1.1 Overview

There are six Bushfire Attack Levels (BAL) that are used to determine the appropriate construction to be applied to a development:

- BAL-LOW
- BAL-12.5
- BAL-19
- BAL-29
- BAL-40
- Flame Zone (Alternative Solution required).

The categories of attack are determined by:

1. The type of vegetation
2. How close your building is to the vegetation
3. What the effective slope is (i.e. fire runs more readily and with greater intensity uphill).
4. The Fire Danger Index applicable to the region

The building requirements for house design and construction vary according to the bush fire attack level that a development falls into. The building requirements for each BAL are set out in *Australian Standard: 3959 Construction of buildings in bushfire-prone areas 2009 (AS3959).* A full version of this document can be purchased from Standards Australia.

The various bush fire attack levels and the associated construction requirements are outlined below.

In preparing a development application under section 79BA, an applicant may consider the provision of higher BAL as a level of equivalence for the inability to provide the required APZ. Consideration may also be given to additional measures such as drenching systems and radiant heat shields to satisfy the performance criteria.

Table 2: *Expected Fire Behaviour and Construction Level*

Heat Flux Exposure	Expected Fire Behaviour	AS 3959 – Level of Construction
N/A	Minimal attack from radiant heat and flame due to the distance of the site from the vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements	Bush Fire Attack Level – Low (BAL-LOW)
≤ 12.5	Attack by burning debris is significant with radiant heat (not greater than 12.5 kW/m_2). Radiant heat is unlikely to threaten building elements (e.g. unscreened glass). Specific construction requirements for ember protection and accumulation of debris are warranted.	Bush Fire Attack Level – 12.5 (BAL-12.5)
>12.5 ≤ 19	Attack by burning debris is significant with radiant heat flux (not greater than 19 kW/m_2) threatening some building elements (screened glass). Specific construction requirements for embers and radiant heat are warranted	Bush Fire Attack Level – 19 (BAL-19)
>19 ≤ 29	Attack by burning debris is significant and radiant heat flux (not greater than 29 kW/m_2) threaten building integrity. Specific construction requirements for ember and higher radiant heat are warranted. Some flame contact is possible.	Bush Fire Attack Level – 29 (BAL-29)
>29 ≤ 40	Radiant heat flux and potential flame contact could threaten building integrity.	Bush Fire Attack Level – 40 (BAL-40)
>40	Significant radiant heat and significant higher likelihood of flame contact from the fire front will threaten building integrity and result in significant risk to residents.	Bush Fire Attack Level – Flame Zone

4.1.2 Bushfire Attack Determination

Calculated October 25, 2017, 12:53 pm (BALc v.4.7)

Building 1

Bushfire Attack Level calculator - AS3959-2009 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	4.16 km/h
Vegetation classification	Malle	Flame length	6.88 m
Surface fuel load	8 t/ha	Flame angle	85 °
Overall fuel load	8 t/ha	Panel height	6.85 m
Vegetation height	3 m	Elevation of receiver	3.42 m
Effective slope	0 °	Fire intensity	17,221 kW/m
Site slope	0 °	Transmissivity	0.768
Distance to vegetation	50 m	Viewfactor	0.0564
Flame width	100 m	Radiant heat flux	3.29 kW/m²
Windspeed	45 km/h	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,090 K		

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Calculated October 25, 2017, 12:58 pm (BALc v.4.7)

Building 2B Woodland

Bushfire Attack Level calculator - AS3959-2009 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	3.12 km/h
Vegetation classification	Woodland	Flame length	23.31 m
Surface fuel load	15 t/ha	Flame angle	79 °
Overall fuel load	25 t/ha	Panel height	22.89 m
Vegetation height	n/a	Elevation of receiver	5.75 m
Effective slope	8 °	Fire intensity	40,378 kW/m
Site slope	5 °	Transmissivity	0.752
Distance to vegetation	65 m	Viewfactor	0.1299
Flame width	100 m	Radiant heat flux	7.42 kW/m²
Windspeed	n/a	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,090 K		

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Calculated October 25, 2017, 1:12 pm (BALc v.4.7)

Building 3C1 Shrubland

Bushfire Attack Level calculator - AS3959-2009 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	2.86 km/h
Vegetation classification	Shrubland	Flame length	7.73 m
Surface fuel load	15 t/ha	Flame angle	80 °
Overall fuel load	15 t/ha	Panel height	7.62 m
Vegetation height	1.5 m	Elevation of receiver	3.81 m
Effective slope	0 °	Fire intensity	22,207 kW/m
Site slope	0 °	Transmissivity	0.818
Distance to vegetation	25 m	Viewfactor	0.1488
Flame width	100 m	Radiant heat flux	9.26 kW/m²
Windspeed	45 km/h	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,090 K		

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Calculated October 25, 2017, 1:13 pm (BALc v.4.7)

Building 3C2

Bushfire Attack Level calculator - AS3959-2009 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	5.33 km/h
Vegetation classification	Shrubland	Flame length	10.29 m
Surface fuel load	15 t/ha	Flame angle	80 °
Overall fuel load	15 t/ha	Panel height	10.14 m
Vegetation height	1.5 m	Elevation of receiver	3.07 m
Effective slope	9 °	Fire intensity	41,324 kW/m
Site slope	6 °	Transmissivity	0.836
Distance to vegetation	19 m	Viewfactor	0.2602
Flame width	100 m	Radiant heat flux	16.55 kW/m²
Windspeed	45 km/h	Bushfire Attack Level	BAL-19
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,090 K		

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

4.2 Analysis of Fire Behaviour

Contiguous lands to the development site

South-Western Fire threat

The source of bushfire that might threaten the property would most certainly be the MWWMR.

This large urban parkland is contiguous to the lower boundary of the site and is substantially south-west of it. Hot drying winds are likely to be westerly and will cause a fire ignited to the west to run uphill and across the contour from the south-west.

Mitigating factors

The south-west aspect has several parameters, which will influence fire behavior.

- The MWWMR have a current fire management plan in place which includes a 30 metre wide APZ along the south and western boundaries of the site. The details of these management agreements will be provided as a condition of consent if required.
- Hazard reduction burns and manual clearing are regularly undertaken by the management authorities.
- An existing trail network has been used by the MWWMR trust to define and undertake hazard reduction burn areas. The details of these management agreements will be provided as a condition of consent if required.
- This trail network of trails is also available to emergency service personnel to contain wild fires. The details of these management agreements will be provided as a condition of consent if required.
- The western boundary, like the southern boundary, also has a power line easement running parallel to it. This power line easement is also cleared of tall trees and the shrub layer is reduced in height with each asset maintenance event. The details of these management agreements will be provided as a condition of consent if required.
- The Scalabrini Village approximately 450 to the south is also located on the MWWMR' eastern boundary. The MWWMR trust also manages an APZ along this interface. These managed lands significantly reduce the fire threat from the south east. The details of these management agreements will be provided as a condition of consent if required.
- The lands to the north and south have been substantially developed and are considered managed lands by PBP.
- The Allambie Heights Village (AHV) also provides threat mitigation to the proposed development. The recently approved developments within AHV has been deemed to satisfy the requirements of PBP and provides shielding from the south and east.
- The 20 metre wide rock outcropping and shallow soils provides a rock shield and reduced vegetation growth on the shallow soils. The connectivity of the fire fuels within vegetation strata is minimal along the southern boundary of the site.

Eastern Fire Threat

A narrow and small bushland remnant < 1 hectare, joins the MWWMR and wraps around the adjacent development AHV and is roughly located to the east of the property . This remnant, which separates

Allambie Road and Martin Luther Place, is too small and too isolated to constitute a fire threat.

Northern Fire Threat

The very narrow bushland corridor which runs along the northern boundary of the property.

Mitigating factors

The northern remnant is less than 1 Hectare and too narrow to constitute a fire run or pose a substantial fire threat.

The Sydney Water reticulation easement also provides emergency services the access required during an emergency to contain fires that approach from the west or the north. Sydney Water are likely to approve the use of their easement as driveway for the proposed development. This will require the removal of this weedy remnant and remove the minimal fire threat it posed.

Bush fire risk within the property boundaries

The structure of the Bushland within the property boundaries is Heath land, Woodland and Forest.

The bushland is comprised of two strips of bushland approximately 45 metres wide which are located on the lower and upper sides of a sealed access road. These two areas are currently approximately 120 metres long and being contiguous with the bushland to the west they are located at the end of a substantial, although partially managed, fire run. The eastern end of the bushland is a managed "parkland"/" grassland".

Mitigation

It is proposed that the weedy bushland be cleared of weed and or completely removed which will reduce the overall area of these two bushland components to less than 100 metres long and approximately 0.45 hectares in size. Both the upper and lower sections section will be further reduced in size by the management of a 20 meter wide weed infested wet "soak" that traverses the site near the western end of the bushland.

The weed clearing proposed in the centre of the site will separate the bushland remnants by approximately 50 metres. The two areas can be considered as two distinct Fire management units. The weedy area will be managed as an exotic turfed area. This will improve access to the remnant bushland areas for fire fuel management and for fire-fighting purposes.

The current management regime for the site includes the conduction of a hazard reduction burn of all remnants on site in Spring 2018.

The regenerating bushland will be managed in a fashion to remove the shrub and small tree layer to ensure that there is no connectivity between fire fuels in the Grass layer and the canopy layer.

4.3 Construction Standards and Building Design

Table 4: *Compliance with requirements for Bush Fire Protection Measures for Infill Development*

Performance Criteria	Proposal	Meets Performance Criteria?
In relation to Asset Protection Zones: • a defendable space is provided onsite. • an asset protection zone is provided and maintained for the life of the development.	A defendable space is provided on site, and is located within the north east section of the property away from the hazard. The vegetation within the developed area of the site will be managed as an Inner Protection Area (IPA). Canopy separation improved and selective clearing of ground fuels to occur. Fuel loadings within the IPA will be managed to ensure that (PBP - RFS 2001): ▪ there is minimal fine fuel at ground level which could be set alight by a bushfire; and ▪ any vegetation in the IPA does not provide a path for the transfer of fire to the development – that is, the fuels are discontinuous. The presence of a few shrubs or trees in the IPA is acceptable provided that they: ▪ do not touch or overhang the building within 5 metres; ▪ do not form a continuous canopy; ▪ are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and ▪ are located far enough away from the house so that they will not ignite the house by direct flame contact or radiant heat emission. Woodpiles, combustible materials, large areas/quantities of garden mulch, stacked flammable building materials etc will not be located in the IPA.] The APZ and all bushland on site will be managed in accordance with a proposed Vegetation/fire management Plan which meets these objectives.	Yes
In relation to siting and design: • Residential buildings are sited and designed to minimise the risk of bush fire attack.	The proposed building envelope have not sited closer to the hazard than the existing building at Allambie Heights Village. The elevation towards the hazard is relatively simple and constructed from non-combustible materials The roof cladding is most vulnerable and it will need to be securely fixed to account for increased winds during a fire event. Guttering and gutter valleys should have gutter guard with a flammability of not more than 5 installed.	Yes
In relation to siting and design: **• The Class 5-8 buildings has been sited and designed to minimise the risk of bush fire attack.**	The mitigating factors described above will reduce the impact of the hazard and so the BAL calculations provided above for building C (C1 and C2) have been based on the hazard being Forest Shrubland. The proposed swimming pool building envelope has not been sited closer to the hazard than the existing residential buildings in the adjacent AHV which have been approved by the RFS. It is assumed that the mitigating factors have been extrapolated to establish that these buildings have acceptable risk and so this Class 5-8 building should also comply. The building is essentially a concrete bunker with no apertures facing the direction of the hazard and without flammable fixtures. The access and egress points from the building are 50 metres from the fire risk ie in an area with a BAL of less than 10kwh/m2. The water tanks and sprinkler system will be designed to shower the access and egress points providing safety for emergency services.	Yes

Performance Criteria	Proposal	Meets Performance Criteria?
In relation to construction standards: for the Class 10 building• it is demonstrated that the proposed building can withstand bush fire attack in the form of wind, smoke, embers, radiant heat and flame contact.	BAL 29 Construction to be adopted as per AS3959-2009 *Construction of Buildings in Bush Fire Prone Areas*. The relevant requirements of Sections 3 and 7 will need to be considered for design of the additions. Items to note: Section 3.6 deals with vents weepholes and gaps and this needs to be included into the door and window design. AS 1288 should be consulted for an explanation of the terminologies used to describe various types of glass in AS 3959-2009 Cladding requirements are discussed in Section 7.4, and timber paneling will need to comply with this section. All portions of openable windows shall be screened with mesh max. aperture 2mm that remains in place while the window is open made from corrosion resistance metal gauze screens. The openable portion of doors will need to be protected with corrosion resistant metal gauze screens with a maximum aperture of 2mm. Gaps should not exceed 3mm. Glazing shall be 5mm and 6mm toughened glass for windows and doors respectively. The roof is a suspended concrete slab.	Yes, if AS requirements incorporated
In relation to access requirements: • safe, operational access is provided (and maintained) for emergency services personnel in suppressing a bush fire while residents are seeking to relocate, in advance of a bush fire, (satisfying the intent and performance criteria for access roads in sections 4.1.3 and 4.2.7).	Vehicular access is not restricted from Allambie Road or the driveway into the AHV. The public road satisfies the acceptable solutions in Section 4.1.3 of PBP. With respect to the driveway, passing bays or similar should be provided at least every 200 metres that are 20 metres long, with a minimum width of 6 metres at these points. Any turning areas available within the site will have a minimum 12 metre outer radius. The design includes a loop road which caters for all emergency vehicles.	Yes
In relation to water and utility services: • adequate water and electricity services are provided for fire fighting operations • gas and electricity services are located so as not to contribute to the risk of fire to a building.	There is mains water supply available, and new hydrants and booster valves will be located within the road verge on the side of the road closest to the bushfire threat. The electrical service is delivered underground to the subject buildings. Gas supply lines will be buried and in all other ways compliant with PFBFP. The class 5-8 building will be fitted with a dedicated sprinkler system	Yes
In relation to landscaping: • it is designed and managed to minimise flame contact and	It is important that landscaping is not incorporated adjacent to the ancillary buildings. Preferably, a pathway or non-combustible ground finish is to adjoin buildings for a distance of at least 1 metre. Any landscaping works should be developed in accordance with the principles outlined in Appendix 5 of PBP	Yes

Performance Criteria	Proposal	Meets Performance Criteria?
radiant heat to buildings, and the potential for wind driven embers to cause ignitions.	2006, addressing landscape design, plant species selection and ongoing maintenance. The developed portion of the site should be maintained as an inner protection zone. This IPA in combination with the distance to the unmanaged vegetation will reduce the potential for fire to impact the structure. All native shrubs and weedy vegetation will be removed between the buildings and the man made drain.	

Table 2: *Compliance with requirements for Bush Fire Protection Measures for residential subdivision and SPFPP developments, as contained in Section 4.1.2, and 4.2.3*

Performance Criteria	Proposal	Meets Performance Criteria?
Minimise perimeters of the sub-division exposed to the bushfire hazard.	Hourglass shapes, which maximise perimeters and create bottlenecks, should be avoided.	**Achieved**
Minimise bushland corridors that permit the passage of bushfire.	The current design separates fire risks and proposed fire management plan will manipulate the structure of the fire risk to reduce fire risk/ fuel connectivity.	**Achieved**
Provide for the siting of future dwellings away from ridge-tops and steep slopes - particularly up-slopes, within saddles and narrow ridge crests.	The design and proposed management actions assist the adjacent ridgetop developments in achieving Bushfire safety standards.	**Achieved**
Ensure that separation distances (APZ) between a bushfire hazard and future dwellings enable conformity with the deemed-to-satisfy requirements of the BCA.	In a staged development, the APZ may be absorbed by future stages. The design and proposed management actions assist the adjacent ridgetop developments in achieving Bushfire safety standards.	**Achieved**
Provide and locate, where the scale of development permits, open space and public recreation areas as accessible public refuge areas or buffers (APZs).	The design facilitates the passage of the public through the property using existing fire trails and bushwalking paths and thereby improves the ability of the public to escape a fire within the adjacent reserve.	**Achieved**
Ensure the ongoing maintenance of asset protection zones Manage all gardens as an Inner	(Planning for Bushfire Protection 2006 Appendix 2 A2.2(vi) It is proposed that a Fire Management plan be included as a condition of consent and that the ecologists at Northern Beaches Council be included in its production to ensure that the population of Eastern Pygmy Possums be protected.	**Achieved**

Performance Criteria	Proposal	Meets Performance Criteria?
Protection Area (IPA).		
Provide clear and ready access from all properties to the public road system for residents and emergency services.	The design provided above achieves all of these parameters.	**Achieved**
Ensure the provision of and adequate supply of water and other services to facilitate effective firefighting.	A new water main with Hydrants on the road side between the fire risk and the bushfire hazard will be installed.	**Achieved**
Ensure that the bushfire risk to adjoining lands is not increased.	The development will substantially reduce the bushfire risk to adjoining lands by reducing the areas of bushland and increasing the defendable space on site.	**Achieved**
Provide a minimum defendable space.	The proposal creates Asset protection zones between 20 and 50 metres wide and compartmentalised bushland remnants which substantially improve the defendable space on site.	**Achieved**
Provide better bushfire protection, on a re-development site, than the existing situation.	This should not result in new works being exposed to greater risk than the existing buildings. The existing buildings will be better shielded from the fire threat than they currently are. *The available APZ or the ancillary building are not fully compliant with the acceptable solutions (Table A2.6) however, Method 2 of AS 3959-2009 was used to assess the APZ dimensions and identified those to the south south-east achieved the 10 kW/m2 SFPP threshold for radiant heat flux exposure.* A better outcome will be achieved by allowing this development to proceed.	**Achieved**
Ensure that the footprint of the proposed building does not extend towards the hazard beyond existing building lines on neighbouring land.	The proposed development does not extend closer to the bushfire hazard than the closest existing building footprints.	**Achieved**
Not result in an increased bushfire	The development only relies on existing bushfire management on neighbouring lands order to be compliant.	**Achieved**

Performance Criteria	Proposal	Meets Performance Criteria?
management and maintenance responsibility on adjoining land owners unless they have agreed to the development.	The development proposal includes an undertaking to write a and undertake emergency planning and property maintenance programs to facilitate the maintenance of asset protection zones, fire trails, access for firefighting and fire protections assets.	
Ensure building design and construction enhance the chances of occupant and building survival.	This bushfire assessment requires the proponent to upgrade the building construction standards to meet the standards for PFBFB. The proposed development of the ancillary building does not fully comply with the APZ deemed to satisfy threshold for new SFPP development. However the combination of upgraded construction design and materials as well as a design which facilitates safe access for emergency workers assisting in evacuation does meet the intent of PFBFP.	**Achieved**

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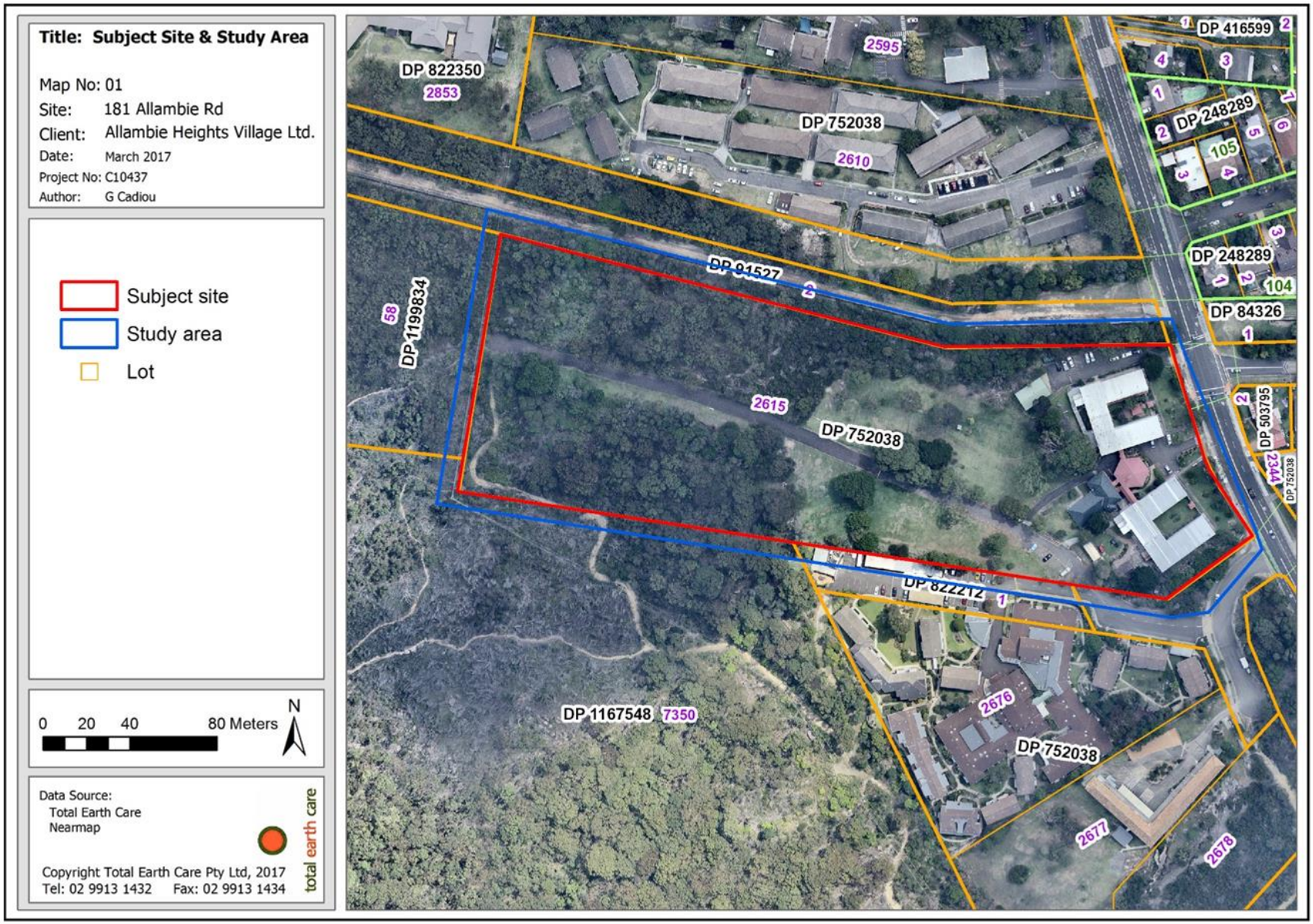
6 LIST OF ABBREVIATIONS

APZ	Asset Protection Zone
AS3959	Australian Standard 3959 – 2009 as amended.
BAL	Bushfire Attack Level
BCA	Building Code of Australia
BPMs	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Pittwater Council
DA	Development Application
EP&A Act	Environmental Planning and Assessment Act - 1979
ESD	Ecologically Sustainable Development
FRNSW	Fire & Rescue NSW
IPA	Inner Protection Area
NCC	National Construction Code
NP	National Park
NSP	Neighbourhood Safer Place
OPA	Outer Protection Area
PBP	Planning for Bush Fire Protection – 2006
ROW	Right of Way
RF Act	Rural Fires Act - 1997
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SWS	Static Water Supply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Map No: 01
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Client: Allambie Heights Village Ltd.
Date: March 2017
Project No: C10437
Author: G Cadiou
Subject site
Study area
Lot
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N
Data Source:
Total Earth Care
Nearmap
Copyright Total Earth Care Pty Ltd, 2017
Tel: 02 9913 1432 Fax: 02 9913 1434
total earth care
DP 822350
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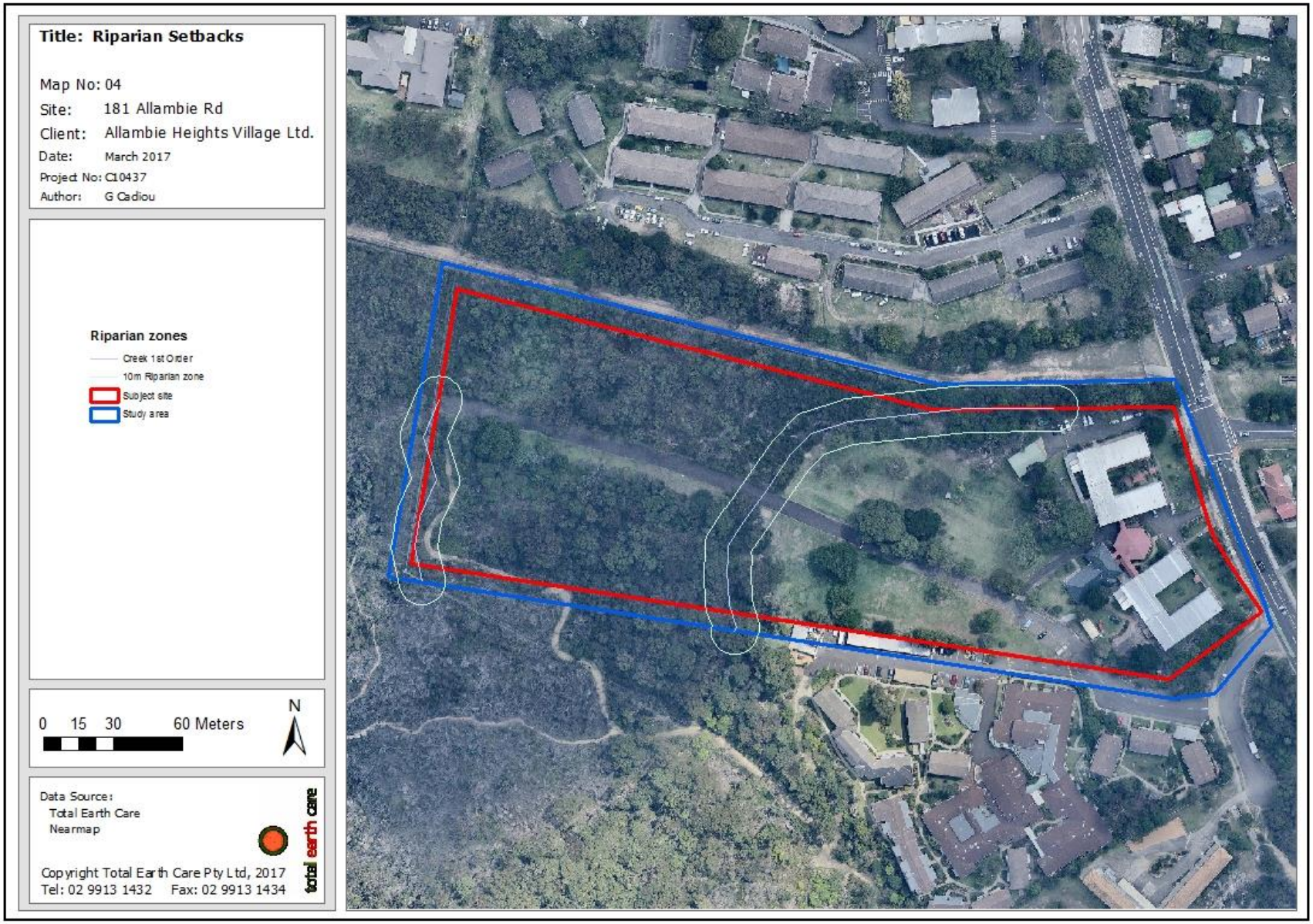
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Map No: 04
Site: 181 Allambie Rd
Client: Allambie Heights Village Ltd.
Date: March 2017
Project No: C10437
Author: G Cadiou
Riparian zones
Creek 1st Order
10m Riparian zone
Subject site
Study area
0 15 30 60 Meters
N
Data Source:
Total Earth Care
Nearmap
Copyright Total Earth Care Pty Ltd, 2017
Tel: 02 9913 1432 Fax: 02 9913 1434
total earth care

APPENDICES

Appendix A
Development Control Planning instruments relating to the property

Allambie Heights Village Project 2

181 Allambie Road, Allambie Heights, NSW 2100

E1 Preservation of Trees or Bushland Vegetation

Applies to Land

This control applies all land, waterways and Bushland covered by the Warringah LEP 2011.

Objectives

- To protect and enhance the urban forest of the Northern BeachesTo effectively manage the risks that come with an established urban forest through professional management of trees.
- To minimise soil erosion and to improve air quality, water quality, carbon sequestration, storm water retention, energy conservation and noise reduction..
- To protect, enhance bushland that provides habitat for locally native plant and animal species, threatened species populations and endangered ecological communities. To promote the retention and planting of trees which will help enable plant and animal communities to survive in the long-term.
- To protect and enhance the scenic value and character that trees and/or bushland vegetation provide.

Requirements for Tree Development Applications

1. All trees are prescribed for the purposes of clause 5.9 of the Warringah LEP 2011.
2. A person shall not ringbark, cut down, top, lop, remove, poison, injure, or wilfully destroy any prescribed tree or bushland vegetation unless authorised by a current Development Consent. This includes damage to a tree or bushland vegetation by:
    - Damaging or tearing live branches and roots;
    - Damaging the bark, including attachment of objects using invasive fastenings, the fastening of materials around the trunk of trees which may result in a detrimental impact on tree health;
    - Tree topping, where large branches and/or the trunk of the tree is removed from the top of the trees canopy;
    - Tree lopping, where branches are removed to reduce the height and spread of the tree.
    - Damaging the root zone of a tree by way of compaction, including storage and stockpiling materials;
    - Changing of ground levels within the root zone of a tree by way of excavation, trenching, filling or stockpiling;
    - Underscrubbing of bushland vegetation;
    - Burning of vegetation (not part of a Hazard Reduction Certificate); or

- Any other act or activity that causes the destruction of, the severing of trunks or stems of, or any other substantial damage to, some or all of the native vegetation in an area.

Where such activities are required as part of other works for which a Development Application (DA) is required, the works will be assessed as part of the DA.

This control does not apply to Council or its duly authorised servants or agents to carry out approved maintenance or works, including those covered under Part 5 of the Environmental Planning & Assessment Act. Works conducted in accordance with a Hazard Reduction Certificate issued under the Rural Fires Act 1997 for asset protection hazard reduction works do not require a permit.

3. Tree Development Applications (Tree DAs) are required for:
   a) Removal or cutting down of any tree over five (5) metres in height;
   b) Pruning of more than ten percent (10%) of a tree canopy.
   c) The removal of "Bushland".

   "Bushland" means land on which there is vegetation which is either a remainder of the natural vegetation of the land or, if altered, is still representative of the structure and floristics of the natural vegetation (as defined by the Local Government Act 1993).

4. The applicant must demonstrate that any tree to be removed as part of a Tree DA meets one or more of the criteria of the Removal of Tree Test in Appendix 8 (WDCP) and the Tree Retention Assessment in Appendix 9 (WDCP). An arborist report may be required to satisfy this requirement.

5. Applications for the removal of bushland on land under the Warringah LEP 2011 must address relevant objectives and requirements of Parts E2, E3, E4, E5, E6, E7 and E8 of the Warringah DCP 2011

Requirements for other Development Applications

6. Development is to be sited and designed to minimise the impact on remnant native vegetation, including canopy trees and understorey vegetation, and on remnant native ground cover species.

7. Where the applicant demonstrates that no reasonable alternative design exists and a tree must be removed, suitable compensatory tree planting is required. Details

including proposed species and the location of replacement planting are to be provided.

8. Development must also avoid any impact on trees on public land.

9. For development applications involving the construction of new buildings and works containing Classes 2-9 (BCA), the information contained in Appendix 11 is to be submitted.

10. Where trees proposed to be retained may be affected by the construction of new buildings and works of Classes 1 and 10, a Tree Protection Plan as per Appendix 12 is to be submitted.

11. Development applications which require the removal of bushland on land under the Warringah LEP 2011 must address relevant objectives and requirements of Parts E2, E3, E4, E5, E6, E7 and E8 of the Warringah DCP 2011.

Exceptions

Council may consider a variation to the requirements where:

- Council is satisfied a tree or other vegetation is dying or dead and is not required as habitat for native fauna.
- Council is satisfied a tree or other vegetation is a risk.

Trees can be removed or pruned without Council consent which are:

- In an area in which the Council has authorised their removal as part of a hazard reduction program, where that removal is necessary in order to manage risk
- Required to be removed under other legislation (including the NSW Rural Fires Act 1997 and the Environmental Planning and Assessment Act 1979).
- Removed by Rural Fire Services because they pose or will pose a significant threat to access along required fire trails or to human life, buildings or other property during a bushfire.
- In a National Park within the meaning of the National Parks and Wildlife Act 1974.
- A tree where the immediate removal is essential for emergency access or emergency works by the Council, the State Emergency Service or a public authority.
- A tree in a container, other than in a planter box that forms part of a building, or in a container that is permanently fixed to a structure.
- A field-grown tree propagated as part of a commercial horticultural or agricultural enterprise.

Council's consent is not required for:

- The removal of any tree on the Exempt Tree Species List (see Table 1).
- Reasonable maintenance involving trimming and pruning of up to ten percent (10%) of a tree's canopy within a 12 month period (all pruning works must be in accordance with Australian Standard AS 4373:2007 Pruning of amenity trees).
- The pruning or removal of hedges (unless required by conditions of a development consent).
  "Hedge" means groups of two (2) or more trees that:
  (a) are planted (whether in the ground or otherwise) so as to form a hedge, and
  (b) rise to a height of at least 2.5 metres (above existing ground level).
- The removal of a tree, where the base of the trunk of the tree at ground level, is located within two (2) metres of an existing approved building (not including decks, pergolas, sheds, patios or the like, even if they are attached to a building).
- The removal of deadwood from a tree.
- Removal of any species of parasite mistletoe or parasitic plant from any part of a tree to ameliorate the effects on the tree from such a parasite
- The removal of trees which are considered a high risk / imminent danger to life and property by a Level 5 qualified arborist. These trees can be removed without Council consent by the owner of the tree subject to the owner obtaining written confirmation from the arborist that clearly states the following:
  a) The arborists qualifications: AQF Level 5 Arborist or equivalent;
  b) That the tree(s) is declared a 'high risk' or is an imminent danger to life and property;
  c) That immediate removal of the tree(s) is recommended.
  d) A copy of the report must be sent to Council for record keeping purpose.

Note

A "significant tree" is a tree that is over 5.0m in height and, that impacts on the streetscape by virtue of its size, appearance, type, age, condition and heritage/cultural significance. It includes hollow-bearing trees and/or trees of conservation significance or habitat value.

The cutting down, pruning or removal by persons other than the owner must have written permission from the owner.

All work must be carried out in accordance with the Australian Standards 4373-2007 "Pruning of Amenity Trees" and in accordance with the current NSW Workcover Code of Practice - Amenity Tree Industry.

The submission of an arborist's report may be required to satisfy Council that a tree is dead or dying, or is a risk to human life or property.

The impact of development on native vegetation can be minimised by:

- *Locating buildings to minimise the amount of disturbance of vegetation and landforms;*
- *Providing adequate distance between the dripline of the tree and development. This avoids destabilising and deoxygenating the tree, altering the drainage and helps ensure its preservation;*
- *Avoiding strip footings and slab on ground construction due to the impact on trees in close proximity. Suitable footing alternatives are as follows;*
- *Stump footings usually associated with lightweight construction on sloping sites;*
- *Pier and beam footings as the beams are able to span the root systems and minimise tree root damage. Pier and beam footings also allow trees to be located closer to development where no other alternative exists;*
- *Locating paved areas outside the dripline of trees and minimise paved area impact on the native understorey vegetation or native groundcover species;*
- *Minimising hard surfaces to allow water infiltration to the root system;*
- *Locating trenches outside the dripline of a tree;*
- *Adequately protecting and managing trees and vegetation during construction;*
- *Protecting tree trunk bases with fencing or a tree barrier during construction*

For vegetation listed as threatened species, populations or ecological communities see the following for further information:

- *Commonwealth legislation: Environment Protection and Biodiversity Conservation Act (1999) State legislation: Threatened Species Conservation Act (1995)*

E2 Prescribed Vegetation

Applies to Land

This control applies to land to which Warringah Local Environmental Plan 2011 applies.

Objectives

• To preserve and enhance the area's amenity, whilst protecting human life and property.

• To improve air quality, prevent soil erosion, assist in improving water quality, carbon sequestration, storm water retention, energy conservation and noise reduction.

• To provide habitat for local wildlife, generate shade for residents and provide psychological & social benefits.

• To protect and promote the recovery of threatened species, populations and endangered ecological communities.

• To protect and enhance the habitat of plants, animals and vegetation communities with high conservation significance.

• To retain and enhance native vegetation communities and the ecological functions of wildlife corridors.

• To reconstruct habitat in non-vegetated areas of wildlife corridors that will sustain the ecological functions of a wildlife corridor and that, as far as possible, represents the combination of plant species and vegetation structure of the original 1750 community.

• Promote the retention of native vegetation in parcels of a size, condition and configuration which will as far as possible enable plant and animal communities to survive in the long-term.

Requirements

1. The following is prescribed for the purposes of clause 5.9(2) of the WLEP:
All native vegetation identified on:
a) DCP Map Threatened and High Conservation Habitat
b) DCP Map Wildlife Corridors
c) DCP Map Native Vegetation
d) known or potential habitat for threatened species, populations or ecological communities as listed under the NSW *Threatened Species Conservation Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

2. Development is to be situated and designed to minimise the impact on prescribed vegetation, including remnant canopy trees, understorey vegetation, and ground cover species.

Note

For vegetation listed as threatened species, populations or ecological communities see the following for further information:

Commonwealth legislation: Environment Protection and Biodiversity Conservation Act (1999), State legislation Threatened Species Conservation Act (1995),and www.warringah.nsw.gov.au/environment/threatened_species.aspx

E3 Threatened species, populations, ecological communities listed under State or Commonwealth legislation, or High Conservation Habitat

Applies to Land

This control applies to land identified on DCP Map Threatened and High Conservation Habitat and land identified as known or potential habitat for threatened species, as identified in the NSW Wildlife Atlas*.

Objectives

• To protect and promote the recovery of threatened species, populations and endangered ecological communities.
• To protect and enhance the habitat of plants, animals and vegetation communities with high conservation significance.
• To preserve and enhance the area's amenity, whilst protecting human life and property.
• To improve air quality, prevent soil erosion, assist in improving water quality, carbon sequestration, storm water retention, energy conservation and noise reduction.
• To provide natural habitat for local wildlife, maintain natural shade profiles and provide psychological & social benefits.

Requirements

1. The applicant must demonstrate that the objectives have been achieved through a Flora and Fauna Assessment prepared in accordance with Council guidelines

2. The applicant must demonstrate that the objectives have been achieved through a Biodiversity Management Plan prepared in accordance with Council guidelines that will protect, manage and where appropriate promote the recovery of threatened species, populations and ecological communities and areas of high conservation habitat on the subject property.

Note

*Records of threatened flora and fauna are available from the NSW Office of Environment and Heritage's Atlas of NSW Wildlife: http://www.bionet.nsw.gov.au. Council's Natural Environment section can be contacted to determine whether any site specific information is available for a particular property.

3 E4 Wildlife Corridors

4 *Applies to Land*

5 This control applies to land identified on DCP Map Wildlife Corridors.

6 *Objectives*

7 • To preserve and enhance the area's amenity, whilst protecting human life and property.
• To improve air quality, prevent soil erosion, assist in improving water quality, carbon sequestration, storm water retention, energy conservation and noise reduction.
• To provide natural habitat for local wildlife, maintain natural shade profiles and provide psychological & social benefits.
• To retain and enhance native vegetation and the ecological functions of wildlife corridors.
• To reconstruct habitat in non vegetated areas of wildlife corridors that will sustain the ecological function of a wildlife corridor and that, as far as possible, represents the combination of plant species and vegetation structure of the original 1750 community. See *Warringah Natural Area Survey, August 2005*.

8 *Requirements*

9 1. For modification of native vegetation where the area of land supporting the vegetation to be modified is greater than 50m2 or the land supporting the vegetation to be modified forms part of an allotment where vegetation has been modified in the last five years:
i. The applicant must demonstrate that the objectives have been achieved through a Flora and Fauna Assessment prepared in accordance with Council guidelines; and
ii. The applicant must demonstrate that the objectives have been achieved through a Biodiversity Management Plan prepared in accordance with Council guidelines that will protect, manage and enhance wildlife corridors, and where appropriate reconstruct wildlife corridor areas on the subject property.

2. For modification of native vegetation in all other cases, the applicant must demonstrate that the objectives have been achieved.

10 *Note*

11 *i. barriers and hazards that hinder fauna movement such as solid fences and roads are to be avoided in wildlife corridors.*
ii. management of exotic and native vegetation is to be carried out in a manner that does not result in significant short term or long term loss of habitat in wildlife corridors (see notes in Guideline for preparing a Biodiversity Management Plan).

E5 Native Vegetation

Applies to Land

This control applies to land identified on DCP Map Native Vegetation.

Objectives

- To preserve and enhance the area's amenity, whilst protecting human life and property.
- To improve air quality, prevent soil erosion, assist in improving water quality, carbon sequestration, storm water retention, energy conservation and noise reduction.
- To provide natural habitat for local wildlife, maintain natural shade profiles and provide psychological & social benefits. Promote the retention of native vegetation in parcels of a size, condition and configuration which will as far as possible enable local plant and animal communities to survive in the long term.
- To maintain the amount, local occurrence and diversity of native vegetation in the area

Requirements

1. For modification of native vegetation where the area of land supporting the vegetation to be modified is greater than 100m2 or the land supporting the vegetation to be modified forms part of an allotment where vegetation has been modified in the last five years:

i. The applicant must demonstrate that the objectives have been achieved through a Flora and Fauna Assessment prepared in accordance with Council guidelines; and
ii. The applicant must demonstrate that the objectives have been achieved through a Biodiversity Management Plan prepared in accordance with Council guidelines that will protect native vegetation on the subject property.

2. For modification of native vegetation in all other cases, the applicant must demonstrate that the objectives have been achieved.

E7 Development on land adjoining public open space

Applies to Land

This control applies to all land shown on DCP Map Land Adjoining Public Open Space.

Objectives

• To protect and preserve bushland adjoining parks, bushland reserves and other public open spaces.
• To ensure that development responds to its adjacent surroundings to preserve and enhance the natural qualities of the environment. • Development on land adjoining open space is to complement the landscape character and public use and enjoyment of the adjoining parks, bushland reserves and other public open spaces.

Requirements

1. Development on land adjoining public open space is to complement the landscape character and public use and enjoyment of the adjoining parks, bushland reserves and other public open spaces.

2. Public access to public open space is to be maximised. 3. Buildings are to be located to provide an outlook to public open space, without appearing to privatise that space

4. Development is to provide a visual transition between open space, bushland reserves or other public spaces and buildings, including avoiding abutting public open space with back fences.

5. Development is to protect views to and from public open space.
6. Development is to provide buffers for bushfire protection on private land, not on public land. 7. If the adjoining parks, bushland reserves or public open space contain bushland, development is not to threaten the protection or preservation of the bushland. 8. Development should be designed to maximise opportunities for casual surveillance of the public open space.

9. Development is to utilise landscaping or existing landscape elements to screen development.

Exceptions

Reference should be made to Part G for site specific requirements.

Note

Where suitable, development should ensure access to public open space is provided via roads or easements for access.

Development may retain outlook and views by:
• Choosing materials that minimise building mass

• Articulation of the building elevation, fence and wall materials, height, design and the selection of landscape
• Selection of suitable vegetation from Council's Tree Replacement Guide to form an attractive transition to the open space.
The transition between development and open space may be enhanced by:
• Incorporating a vegetation link to open space with the landscaping design

• Providing a similar landscaping design and plant species as the adjacent bushland;

• Selecting fence materials that integrate with the open space characteristics;
• Location of the building away from the open space areas

• Relate building heights to open space vegetation height
• Preserving significant fauna and flora habitats
• Providing a protective buffer between the development and bushland

• Avoiding introducing non-native flora and fauna
• Minimising clearing

• Providing on-site soil and water management that treats stormwater before it enters bushland. Views to and from open space may be protected by:
• Avoiding development that may interrupt the skyline

• Minimising clearings to avoid fragmentation of the landscaping especially adjacent to bushland reserves
• Limiting the height of development to below the tree canopy
• Setting development back from the open space area

E8 Waterways and Riparian Lands

Applies to Land

This control applies to land identified as waterway or riparian land as shown on DCP Map Waterways and Riparian Lands.

Objectives

• Protect, maintain and enhance the ecology and biodiversity of waterways and riparian land

• Encourage development to be located outside waterways and riparian land.

• Avoid impacts that will result in an adverse change in watercourse or riparian land condition.

controls and mitigation measures.

• Maintain and improve access, amenity and scenic quality of waterways and riparian lands.

• Development on waterways and riparian lands shall aim to return Group B and Group C creeks to a Group A standard (as described in Warringah Creek Management Study, 2004) through appropriate siting and development of development.

Requirements

1. The applicant shall submit a Waterway Impact Statement.
2. Developments shall comply with the requirements of Council's Protection of Waterway and Riparian Land Policy and Water Management Policy.
3. Infrastructure such as roads, drainage, stormwater structures, services, etc. should be located outside land identified as Waterways and Riparian Land.
4. The Asset Protection Zone must not extend into land identified as Waterways and Riparian Land. Refer to NSW Rural Fire Service for site assessment methodology.

Note

1. In its consideration of development applications under this Part Council will have regard to its Protection of Waterways and Riparian Land Policy.

2. Development within 40m of a waterway may require a "controlled activity approval" pursuant to the Water Management Act 2000 Development that requires a controlled activity approval under the Water Management Act 2000 constitutes "integrated development" pursuant to sections 91 and 91A of the Environmental Planning and Assessment Act 1979. Before granting development consent to an application for consent to carry out the development, the consent authority must obtain the general terms of any approval from the relevant approval body. Applicants need to refer to this legislation separately.

Exceptions

Brookvale Brickworks: 20metre setback top of the bank of Greendale Creek.

Non compliance

Protection of Waterway and Riparian Land Policy

3.1 Protection of Waterway and Riparian Land

a) Natural ecological processes of waterways and riparian land shall be maintained and enhanced to the greatest extent possible by:

- causing no net loss to biodiversity
- supporting natural flow regimes;
-
- minimising bank erosion and promoting naturalistic bank protection works when stabilisation is necessary (i.e. soft engineering outcomes); reshaping of the creek beneath the big coral trees will require designing by qualified experts (
- preventing alteration of watercourses (includes piping, channelling, relocation or removal);
- maintaining natural floodplains where appropriate.
-

b) Bushfire asset protection zones shall be maintained outside of riparian land.

c) Piped or channelised watercourses shall be reinstated to more natural forms where possible.

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d) Cultural heritage shall be preserved and opportunities created for appropriate public access and recreation in publicly owned land. Note: Public access should be located outside riparian zones where possible except for crossing points or other strategic locations.

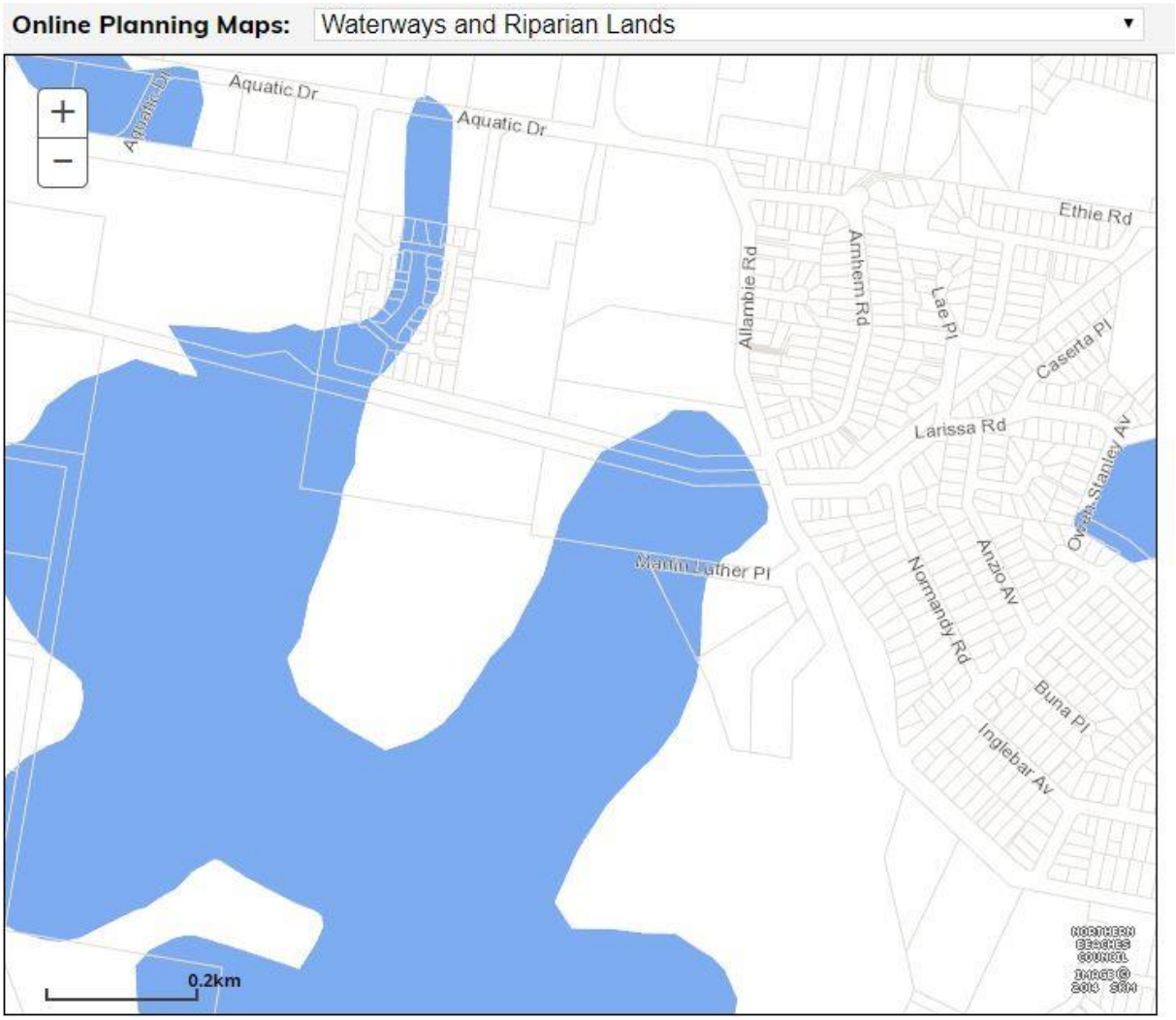

Figure 5: *DCP Map Waterways and Riparian Lands*