Bushfire Hazard Assessment Report & Management Plan

The Arbour – Lot 1004

Prepared for

Burleigh Heads Estate Pty Ltd

By

Rob Friend & Associates Pty Ltd

PLANS AND DOCUMENTS referred to in the DEVELOPMENT APPROVAL

Application No: COM/2021/330

Dated: 15 September 2022

Development shall comply with the conditions of approval as detailed in the Decision Notice and Council's Planning Scheme, Local Laws and Planning Policies

Document Control

Project Number RFA21-004

Quality Assurance Statement				
Revision No.	**Author**	**Status**	**Approved for Issue**	
			Name	**Date**
01	Rob Friend	Draft	Rob Friend, Director, Rob Friend & Associates Pty Ltd	2 August 2022

Cover Photography – view of master Lot 1004 from the east of the area.

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Introduction

This Bushfire Hazard Assessment Report has been prepared over Master Lot 1004.

The site was inspected in 2021 and a review of the latest aerial photography using near map aerial images indicates that the State Government has proceeded with significant upgrade works on the Pacific Motorway and that the plans will see this are managed for stormwater management into the future.

With regard to The Arbor, significant earth works have been undertaken over the main portion of the development footprint and the area within and around Master Lot 1004 has not changed in terms of vegetation type or its structure (see Figure 1).

Proposal

The development proposal is to develop Master Lot 1004 in the approved Reconfiguring a Lot Plan for residential allotments with 32 new residential lots and a residual lot for storm water management and an internal roadway (see Figure 2).

The development will have direct access into the constructed Cowell Drive along its southern boundary.

To the north and immediate east are approved drainage swales which were approved as part of the whole of site stormwater management.

Further to the east is an area of Open space, again approved as part of the Whole of site Reconfiguring a Lot approval.

Further to the north is the land which is currently within the Pacific Motorway and much of the area, which is not to form the new motorway widening, will be for stormwater management (see Figure 3).

Site Description

The Master Lot 1004 is located in the northern portion of The Arbour Development site and will be accessible from an extension of Cowell Drive.

Master Lot 1004 is located within Lot 600 on SP316141 which forms all of The Arbour development footprint.

The land has been total disturbed in the past and does not contain any "natural" vegetation or bushland.

The land form will be relatively flat with a slight slope from west to east to assist with drainage purposes.

It is noted a relatively narrow corridor of remnant vegetation exists to the south, separated from the site by Cowell Drive.

The Regulated Vegetation Management Area Mapping identifies this vegetation as Category B with the Regional Ecosystem 12.11.23 - *Eucalyptus pilularis* open forest. Other canopy species include *E. microcorys, Corymbia intermedia, Angophora woodsiana, E. tindaliae* and *E. carnea. E. racemosa* subsp. *racemosa* and *Corymbia trachyphloia* are prominent in the Venman area whilst *C. gummifera* and *E. resinifera* are prominent in the Nerang area. Occurs on low coastal Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics (Neranleigh-Fernvale beds). (BVG1M: 8b) (see Figure 4).

However, the area immediately to the south of Cowell Drive (when constructed, does not contain any Eucalyptus pilularis which is restricted to the upper portions of the gully to the south and on the neighbouring properties to the south of The Arbour.

The vegetation to the immediate south of Cowell Drive is better described as the Regional Ecosystem 12.11.25 - *Corymbia henryi* and/or *Eucalyptus fibrosa* subsp. *fibrosa* woodland. Other frequently occurring canopy species may include *Eucalyptus crebra, E. carnea, E. tindaliae, E. siderophloia, C. citriodora* subsp. *variegata, Angophora leiocarpa, E. acmenoides, E. helidonica, E. propinqua, C. intermedia* and *E. seeana*. Rarely includes patches of *E. dura*. Usually occurs on low hills, hills and footslopes of mountains in near coastal areas on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 10b).

It is noted this "tongue" of remnant and retained vegetation is approximately 36 metres wide

With regard to landform and topography in the area to the south of Cowell Drive, this land slope up to the east and west and south and as such master Lot 1004 is downslope of any area where vegetation will be retained as part of the Master Plan approval (see Figure 6).

Bushfire Hazard Mapping

The State Planning Policy Natural Hazards, Risk and Resilience Bushfire Hazard Mapping, maps Master Lot 1004 within a Potential Impact Buffer which is generated from an area of very high and High Potential Bushfire Intensity over vegetation to the South (see Figure 7).

It is noted that the bushfire hazard mapping has not kept up with the development and vegetation clearing within The Arbour Development footprint.

The Gold Coast City Plan Bushfire Hazard Overlay Map reflects the SPP bushfire hazard mapping exactly and also has not kept up with the approved vegetation removal within The Arbour development footprint.

The basis of the SPP and GCCC Bushfire Hazard overlay Mapping is the Vegetation, described as Vegetation Hazard Class (VHC), after *Leonard et al* (2014)[1]. The other values which are included in determining the potential bushfire intensity class is the Fire Weather Severity or the FFDI mapped over the local area and the slope under the area of VHC.

The Vegetation Hazard Class is based on the 1:1m scale Broad Vegetation Groups (BVG) mapping and as such there is the high potential when looking at a small area within the state that the 1:1m scale vegetation mapping may not be accurate.

We note that each Vegetation Hazard Class is also attributed with a series of fuels depending on the stratum and these include, surface fuel, near surface fuel elevated fuel, bark fuels which are added together to provide the total fuel load for a particular VHC.

The QFES Redi-Portal provides the mapped characteristics which are used to determine the Potential bushfire intensity over a particular location within the state.

- FFDI – 53
- VHC - 8.1 Wet eucalypt tall open forest (see Figure 5)
  - Surface Fuel Load – 31t/ha
  - Total Fuel Load – 35t/ha

However, as our site inspection indicates that the Regional ecosystem mapping is incorrect and as such the Broad Vegetation Group and based on the site inspection the vegetation within

[1] Leonard, J., Newnham, G., Opie, K., and Blanchi, R. (2014) *A new methodology for state-wide mapping of bushfire prone areas in Queensland*. CSIRO, Australia.

this local area outside of the upper portion gully is potentially more analogous with the Regional Ecosystem 12.11.25 which forms part of the Broad Vegetation Group 10b.

BVG 10b equates to the Vegetation Hazard Class 10.2 Spotted gum dominated woodlands which is attributed with the surface fuel load of 17t/ha and a total fuel load of 18t/ha.

Discussion

Based on the site-based assessment of the Vegetation Hazard Class is better described as VHC 10.2 and using the other site characteristics the FFDI and slope, Table 1 below is the Flamesol Method 2 (MDc v 4.9) determination of the Radiant Heat Flux exposure of a class 1 structure at the property boundary within master Lot 1004 directly opposite the tongue of hazardous vegetation.

Table 1 – Flamesol Minimum Distance Calculation

Master Lot 1004 - The Arbour - Minimum Distance Calculator - AS3959-2018 (Method 2) (Calculated August 2, 2022, 4:23 pm (MDc v.4.9))

Inputs		Outputs	
Fire Danger Index	53	Rate of spread	0.4 km/h
Vegetation classification	Woodland	Flame length	4.79 m
Understorey fuel load	17 t/ha	Flame angle	45 °, 53 °, 60 °, 64 °, 65 ° & 70 °
Total fuel load	18 t/ha	Elevation of receiver	2.86 m, 3.48 m, 4.35 m, 5.37 m, 5.99 m & 11.45 m
Vegetation height	n/a	Fire intensity	**3,769 kW/m**
Effective slope	-14.22 °	Transmissivity	0.892, 0.884, 0.872, 0.858, 0.849 & 0.792
Site slope	-14.22 °	Viewfactor	0.5894, 0.4296, 0.2853, 0.1912, 0.1543 & 0.0414
Flame width	40 m	Minimum distance to < 40 kW/m²	4.6 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	6.1 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	8.9 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	12.6 m
Relative humidity 25% Ambient Temp – 34.85^0		Minimum distance to < 10 kW/m²	15 m

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

Table 3 Potential Bushfire Intensity classes and corresponding Potential fire-line intensity rages in Leonard et al

(2014) indicates that a potential fire-line intensity of less than 4,000kW/m can effectively be described as a low potential fire-line intensity.

Table 1 above has determined that the Fire line Intensity is 3,769kW/m. therefore Table 3 in Leonard et al. (2014) indicates that the area can effectively be described as an area of low bushfire hazard, principally based on the local landscape in that it slopes up and away from the development site at 14.22 degrees, therefore any fire burning down slope will have a potential fire line intensity of 3,769kW/m and therefore be a low intensity fire within this VHC 10.2.

Conclusions

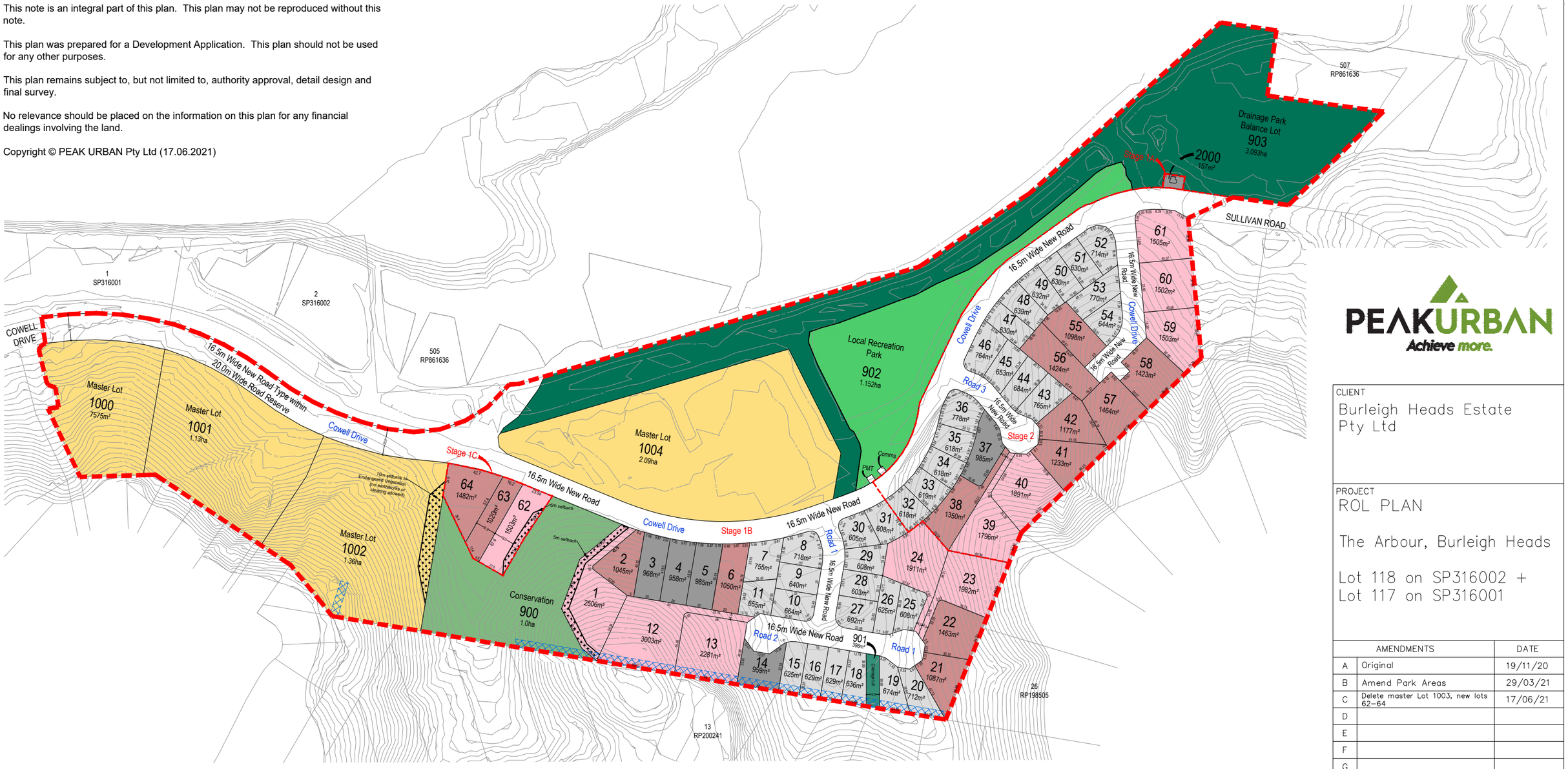
Based on the above discussion and calculations we have determined that based on the local slopes and directions of slopes within the mapped and determined Vegetation Hazard Class that the potential fire-line intensity that the development within Master Lot 1004 will be less than 4,000kW/m and therefore a low potential bushfire hazard.

As a consequence of this determination no specific bushfire mitigation measures are proposed.

Appendices

Appendix I – Figures

Figure 1 – Reconfiguring a Lot Plan (Masterplan)



LEGEND

Site Boundary	
Stage Boundary	
Existing EMT	
Vegetation Buffer	
Master Lot	
Pump Station Lot (lot 2000)	
Local Recreation Park Lot	
Drainage Park Balance Lot	
Conservation Lot	
Drainage Lot	

LOT SUMMARY

Conventional Lots	64
Master Lots	4
Pump Station Lot (lot 2000)	1
Local Recreation Park Lot	1
Drainage Park Balance Lot	1
Conservation Lot	1
Drainage Lot	1
Total Number of Lots	73

DEVELOPMENT SUMMARY

Approx. area of Conventional lots	6.57ha
Approx. area of Master Lots	5.35ha
Approx. area of Local Recreation Park Lot	1.152ha
Approx. area of Drainage Park Balance Lot	3.093ha
Approx. area of Conservation	1.0ha
Approx. area of Pump Station	0.015ha
Approx. area of Road	2.816ha
Approx. area of Drainage Lot	0.04ha
Approx. Total Area (subject to survey)	20.036ha
Approx. length of road	1529m

0 50 100 150

1:3,000@A3

NORTH

YIELD SUMMARY

Lot Area	No. of Lots	%
600m² - 799m²	35	54.69%
800m² - 999m²	5	7.81%
1000m² - 1499m²	13	20.31%
1500m² +	11	17.19%
Total No. of Lots	**64**	**100.0%**

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PROJECT
ROL PLAN

The Arbour, Burleigh Heads

Lot 118 on SP316002 + Lot 117 on SP316001

AMENDMENTS		DATE
A	Original	19/11/20
B	Amend Park Areas	29/03/21
C	Delete master Lot 1003, new lots 62–64	17/06/21
D		
E		
F		
G		

DESIGNED	KS	DATE 17/06/21
SURVEYED		DATE
DRAWN	KS	DATE 17/06/21

NOTES
CONTOUR INTERVAL = 1m
CADASTRAL BOUNDARIES = DCDB
REFERENCE TO JOB (ENGINEERING) = 20–0028

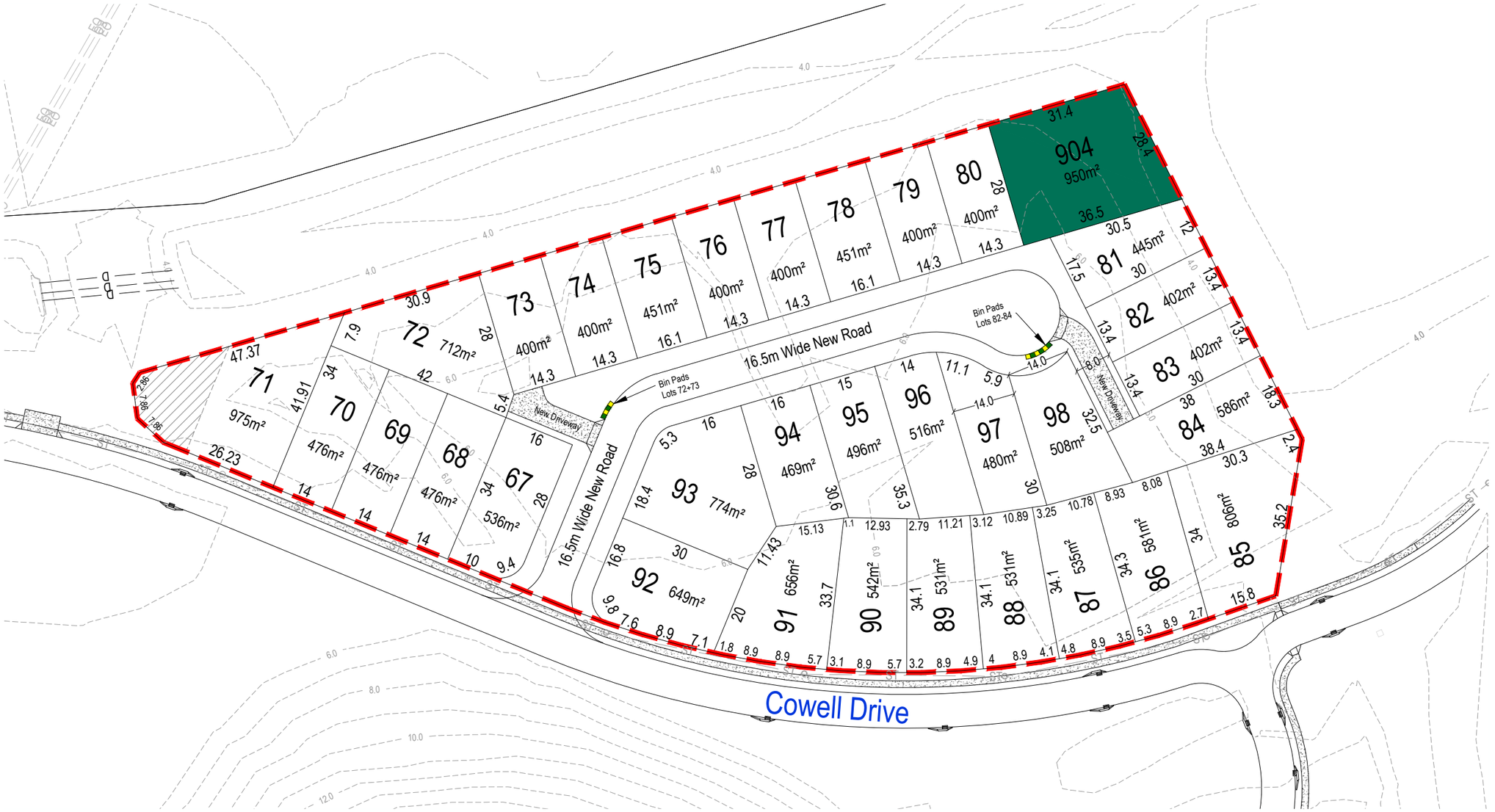
SHEET NO... 1 OF 1 ....SHEETS

COMPUTER FILE 20–0085–PS1–C

SCALE 1:3,000@A3

DRAWING No	AMEND
20–0085–PS1	C

Figure 2 – Proposed Layout Plan



LEGEND

Site boundary	
Existing Easement	
Drainage Lot	
Bin Pads	

LOT SUMMARY

Conventional Lots	32
Drainage Lot	1
Total Number of Lots	33

DEVELOPMENT SUMMARY

Approx. area of Conventional lots	1.685ha
Approx. area of Drainage Reserve Lot	0.095ha
Approx. area of road (including driveways)	0.31ha
Approx. Total Area (subject to survey)	2.09ha
Approx. length of road (excluding driveways)	145m

NORTH

0 50 100

1:1,000@A3

CLIENT
BURLEIGH HEADS ESTATE Pty Ltd

PROJECT
PLAN OF SUBDIVISION

The Arbour, Burleigh Heads

600 on SP316141

AMENDMENTS:		DATE:
A	Original	08.07.2022
B	Amend lots 85-91 + 71	27.07.2022
C		
D		
E		
F		
G		
H		

DESIGNED:	KS	DATE: 27.07.2022
DRAWN:	KS	DATE: 27.07.2022
SCALE:	1:1,000 @ A3	1 of 1

IMPORTANT NOTES:

This note is an integral part of this plan. This plan may not be reproduced without this note.

This plan was prepared for a Development Application. This plan should not be used for any other purposes.

This plan remains subject to, but not limited to, authority approval, detail design and final survey.

The total number of lots shown on this plan is approximate only.

No relevance should be placed on the information on this plan for any financial dealings involving the land.

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DRAWING NUMBER:	ISSUE:
20-0085-PS3	B

Figure 3 – Local Area Aerial Image (Nearmap 7 June 2022)


M1
89
Andrews Park
Pacific Mtwy
Sullivan Rd
Sullivan Rd
Sullivan Rd
Sky Royal Ter
Fenton Dr
Fenton Dr
Fenton Dr
Tue Jun 7 2022
Imagery © 2022 Nearmap, HERE
100 m
nearmap

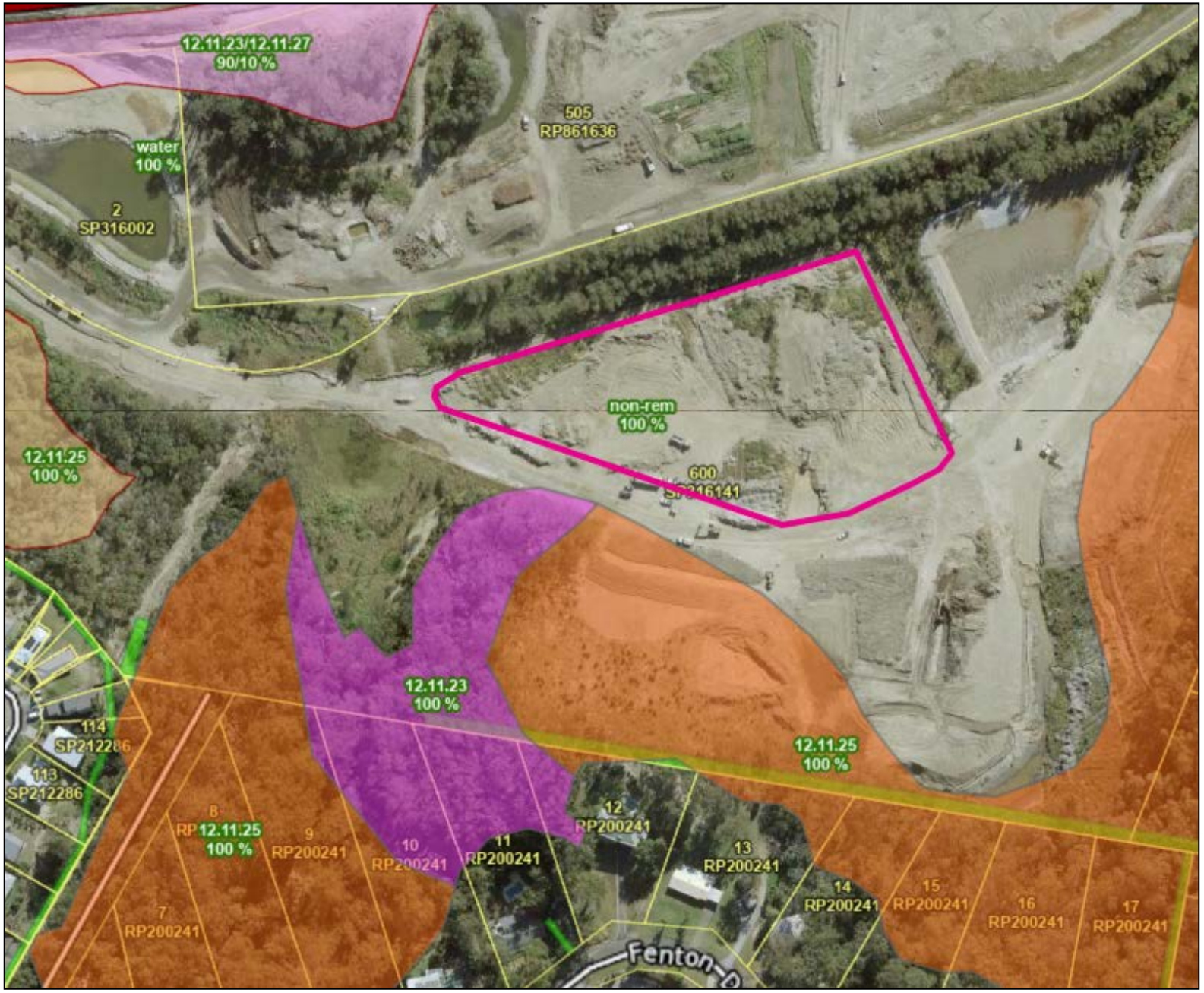
Figure 4 – QldGlobe Regulated Vegetation Management Area Map

Master Lot 1004

Regulated Vegetation Management Area

28°6'59"S 153°25'43"E

28°6'59"S 153°26'3"E



28°7'13"S 153°25'43"E

28°7'13"S 153°26'3"E

A product of Queensland Globe

Legend located on next page

N

0 50 metres

Scale: 1:3000

Printed at: A4

Print date: 2/8/2022

Projection: Web Mercator EPSG 102100 (3857)

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Resources

Master Lot 1004

Regulated Vegetation Management Area

Legend

Vegetation management regional ecosystem map labels

Category A or B area containing endangered

Category A or B area containing of concern

Category A or B area that is least concern

Category C or R area containing endangered

Category C or R area containing of concern

Category C or R area that is of least concern

Easement parcel

Strata parcel

Land parcel - gt 1000 ha

Parcel

Land parcel label

Land parcel label - gt 1 ha

Land parcel label - gt 10 ha

Land parcel label - gt 1000 ha

Places: My Places

Places: My Places

Railway

Road Crossing

Bridge

Tunnel

Road

Highway

Main

Local

Private

Attribution

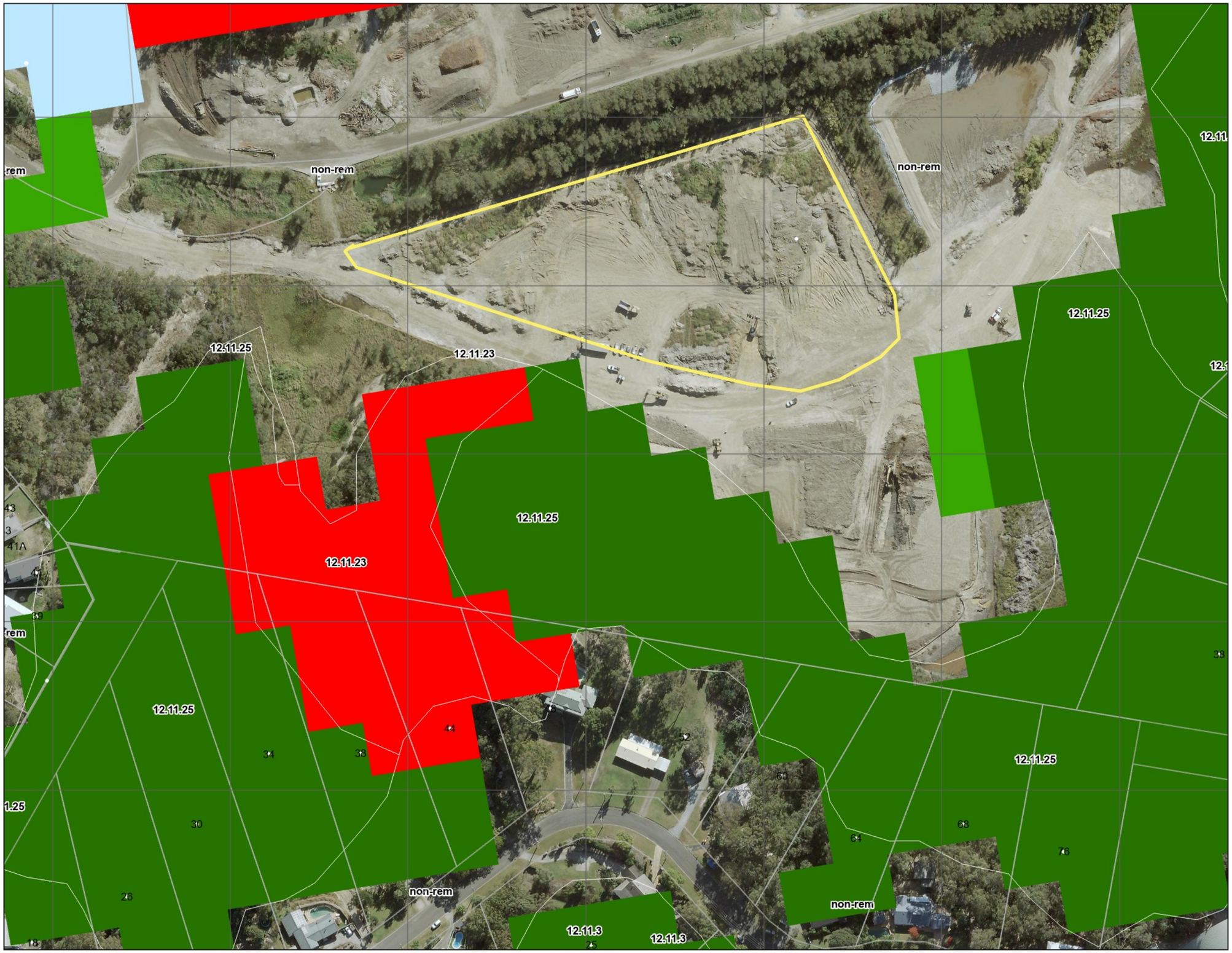
Figure 5 – Redi-Portal Vegetation Hazard Class

Redi Map

153°25'45" 153°25'48" 153°25'51" 153°25'54" 153°25'57" 153°26' 153°26'3"

-28°7'3" -28°7'5" -28°7'8" -28°7'10" -28°7'12"

-28°7'3" -28°7'5" -28°7'8" -28°7'10" -28°7'12"



Legend

- Addresses
- Base Parcels Only
- Forest Fire Danger Rating h20
- Remnant Vegetation V10 (Regional Ecosystems)
- Broad Vegetation Hazard Class
  - BVG 1-7 Rainforest and scrubs
  - BVG 8 Wet eucalypt open forest
  - BVG 9-15 Eastern eucalypt woodlands to open forests
  - BVG 16 Eucalypt open forests to woodlands on floodplains
  - BVG 17-19 Eucalypt dry woodlands on inland depositional plains
  - BVG 20 Callitris woodlands to open forests
  - BVG 21-22 Melaleuca open woodlands on depositional plains
  - BVG 23 Acacia aneura(mulga) dominated open forests, woodlands and shrublands
  - BVG 24-26 Other acacia dominated open forests, woodlands and shrublar
  - BVG 27 Mixed species woodlands - open woodlands (inland bioregions) ir wooded downs
  - BVG 28-29 Other coastal communities or heaths
  - BVG 30-32 Tussock grasslands, forblands
  - BVG 33 Hummock grasslands
  - BVG 34 Wetlands (swamps and lakes)
  - BVG 35 Mangroves and tidal saltmarshes
  - BVG 36 Exotic and hardwood plantation
  - BVG 37 Hoop plantations
  - BVG 38 Cropping and horticulture
  - BVG 39 Low to moderate tree cover in built-up areas
  - BVG 40 Low grass or tree cover in rural areas
  - BVG 41 Low grass or tree cover in built-up area
  - BVG 42 Nil to very low vegetation cover
  - BVG 43 Waterbodies
- World Imagery
- Low Resolution 15m Imagery
- High Resolution 60cm Imagery
- High Resolution 30cm Imagery
- Citations

Queensland Government

N

When printed at A3 - 1: 1,964

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Kilometres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map was automatically generated using Geocortex Essentials.

GDA

A3 map produced at:

August 2, 2022 3:41:31 PM

Figure 6 – GCCC Topographic Map

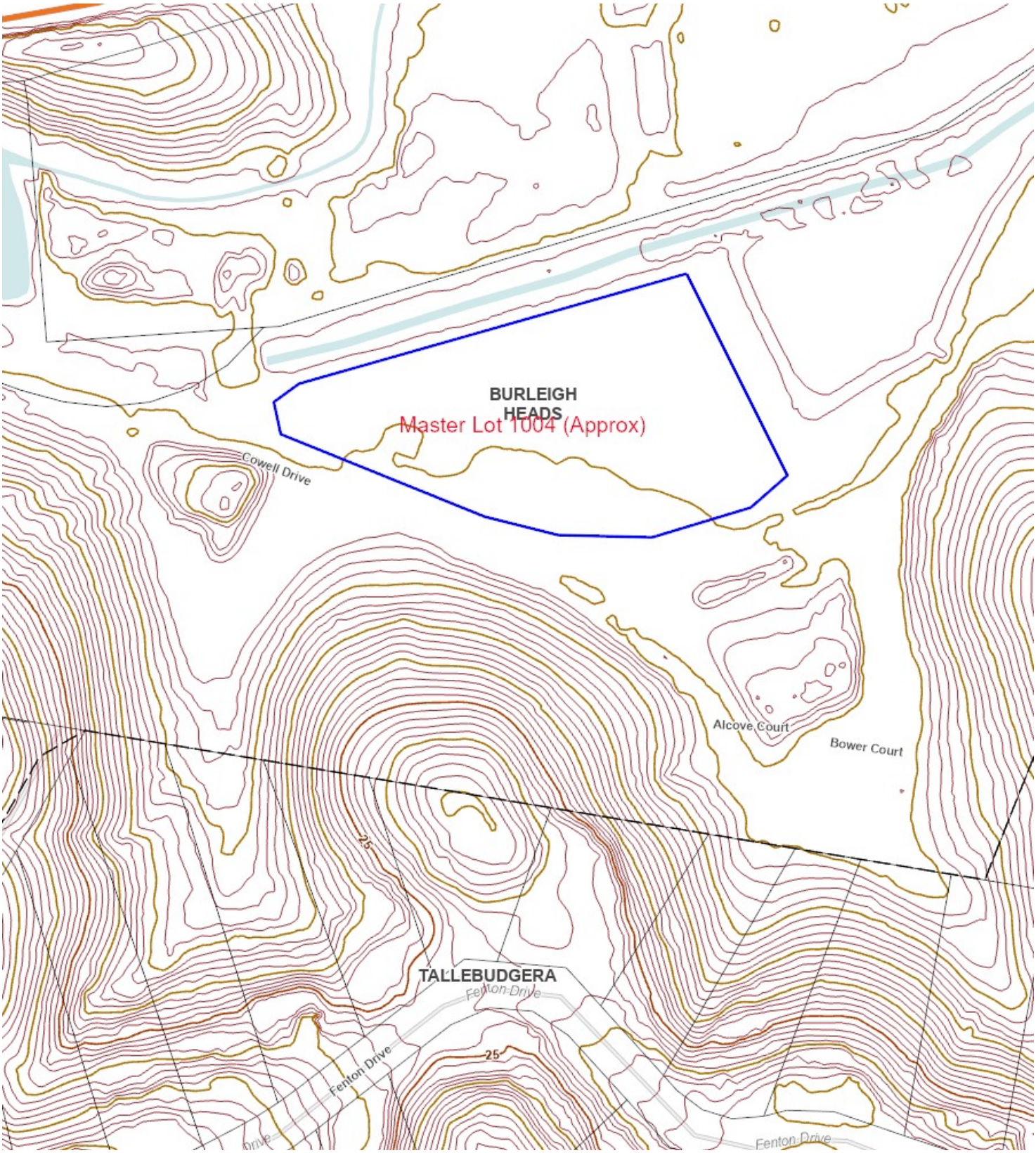

Figure 7 - SPP Bushfire Hazard Map

State Planning Policy

Making or amending a local planning instrument and designating land for community infrastructure

Date: 02/08/2022

Queensland Government

0 30 60 90 120

Metres

Disclaimer:
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Figure 8 – GCCC City Plan Bushfire Hazard Overlay Map