

24 May 2023

Land and Environment Consultants Pty Ltd
Suite 5, 66 Bay Terrace Wynnum QLD 4178
P: 07 2112 5692
E: info@landiconsultants.com.au
ABN: 16 629 295 361

Russell Dunster
Senior Development Manager
AV Jennings Properties Limited
rdunster@avjennings.com.au

Subject: Bushfire attack level assessment for Cadence Estate, stages 4a and 4b – 145 Binnies Road and 143-163 Daleys Road, Ripley, Queensland

1 Introduction

Land and Environment Consultants Pty Ltd (**LEC**) was engaged to undertake a bushfire attack level (**BAL**) assessment for the residential lots at Cadence Estate, stages 4a and 4b (**stages 4a and 4b**) at 145 Binnies Road and 143-163 Daleys Road, Ripley (**the site**), properly described as lots 349 and 366/S3173.

The approved subdivision plan for Cadence Estate which shows stages 4b and 4c is provided in Appendix 1.

The site is identified as a bushfire prone area by the Queensland State Planning Policy *Bushfire prone area map* and is a 'designated bushfire prone area' under Section 7 of the Queensland *Building Regulation 2021*. As a result, provisions of the *Building Code of Australia* (ABCB 2019) (**BCA**) and the *Queensland Development Code* (QG 2021) (**QDC**) that apply to a designated bushfire prone area apply to any building assessment work for the site.

Residential dwellings will be constructed in stages 4a and 4b. A residential dwelling is a BCA class 1a building. Compliance with the BCA and QDC requires BCA class 1a buildings, which are located in a designated bushfire prone area, to be designed and constructed in accordance with the BAL construction standards in the *Australian Standard (AS 3959-2018) Construction of buildings in bushfire prone areas* to reduce the risk of ignition from bushfire.

This report provides a BAL assessment for residential lots in stages 4a and 4b and identifies sections of AS 3959-2018 which are relevant to the construction of residential dwellings within these lots.

2 Classified vegetation and radiant heat exposure modelling

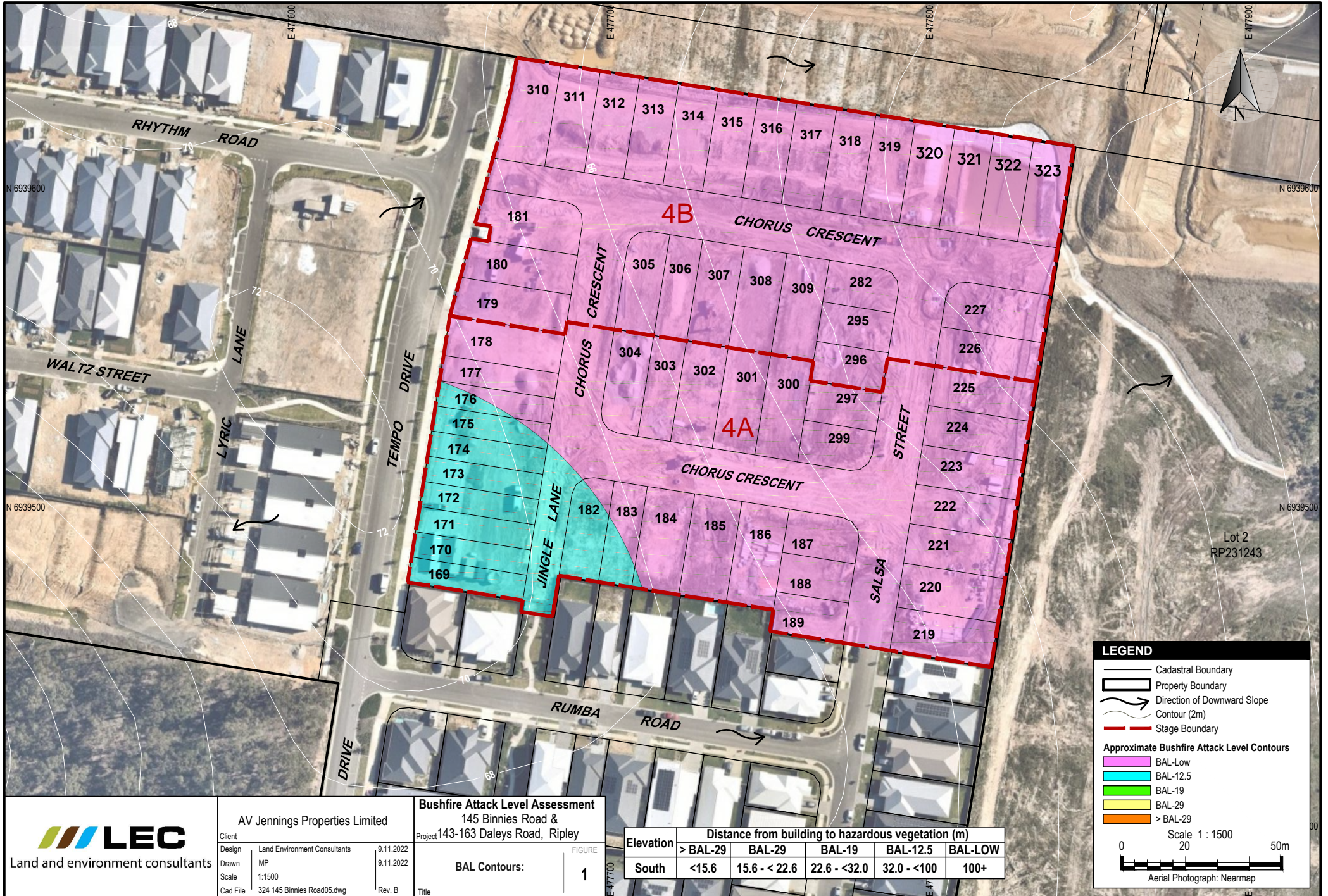
LEC prepared the bushfire management plan (LEC 2019) (**BMP**) for the site which includes stages 4a and 4b – Ipswich City Council application number 2834/2019/MAPDA/D.

The BMP provides an assessment of vegetation adjoining the site. It assessed land adjoining the northern and eastern boundaries of stages 4a and 4b as a non-bushfire hazard class.

Land adjoining the southern and western boundaries of stages 4a and 4b consists of other stages of Cadence Estate as shown in the approved subdivision plan in Appendix 1 and are a non-bushfire hazard class for the purpose of land use planning and development assessment.

The BMP assessed vegetation within 100 metres (**m**) of the north-western and south-western corners of stages 4a and 4b as classified vegetation. The classified vegetation adjacent to the north-west has since been cleared and is now a non-bushfire hazard class. However, the classified vegetation adjacent to the south-western corner is not cleared and remains a possible source of bushfire attack to stages 4a and 4b.

A radiant heat exposure model of bushfire attack from the classified vegetation adjacent to the south-western corner of stages 4a and 4b was prepared for the BMP and is provided in Appendix 2. It has been used in this report to assign BAL ratings to the residential lots within stages 4a and 4b.



Bushfire Attack Level Assessment
 145 Binnies Road &
 143-163 Daleys Road, Ripley

Client AV Jennings Properties Limited
 Design Land Environment Consultants 9.11.2022
 Drawn MP 9.11.2022
 Scale 1:1500
 Cad File 324 145 Binnies Road05.dwg Rev. B

BAL Contours: 1

Elevation	Distance from building to hazardous vegetation (m)				
	> BAL-29	BAL-29	BAL-19	BAL-12.5	BAL-LOW
South	<15.6	15.6 - < 22.6	22.6 - <32.0	32.0 - <100	100+

LEGEND

- Cadastral Boundary
- Property Boundary
- Direction of Downward Slope
- Contour (2m)
- Stage Boundary

Approximate Bushfire Attack Level Contours

- BAL-Low
- BAL-12.5
- BAL-19
- BAL-29
- > BAL-29

Scale 1 : 1500
 0 20 50m
 Aerial Photograph: Nearmap

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3 Bushfire attack level assessment

AS 3959-2018 sets out the requirements for the construction of buildings in bushfire prone areas to improve their safety when they are subjected to burning debris, radiant heat or flame contact generated from a bushfire.

BALs are a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts/square metre, and are the basis for establishing requirements for construction to improve the protection of building elements to attack by bushfire.

The radiant heat exposure model in Appendix 2 identifies the separation distances required from the classified vegetation adjacent to the south-western corner of stages 4a and 4b to achieve different BAL ratings. The separation distances are summarised in Table 1.

Table 1 BAL separation distances

Bushfire attack	Separation distances to achieve BAL ratings (metres)				
	>BAL-29	BAL-29	BAL-19	BAL-12.5	BAL-LOW
South-western corner	< 15.6	15.6 - < 22.6	22.6 - < 32	32 - < 100	100+

The BAL contours over the residential lots within stages 4a and 4b are shown in Figure 1. The BAL rating of the residential lots are identified in Table 2.

Table 2 BAL ratings of lots

Lot number	BAL LOW	BAL-12.5	BAL-19	BAL-29
	177, 178, 179, 180, 181, 185, 186, 187, 188, 189, 219, 220, 221, 222, 223, 224, 225, 226, 227, 282, 295, 296, 297, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322 and 323	169, 170, 171, 172, 173, 174, 175, 176, 182, 183 and 184 ¹		

Note 1 Micro-siting of a residential dwelling within lot 184 may reduce the BAL rating to the next lowest BAL rating, ie BAL-LOW.

4 BAL construction requirements

A residential dwelling must be constructed in accordance with the relevant BAL requirements of AS 3959-2018 based on the BAL rating of the lot which is identified in Table 2.

Please note, Table 2 identifies that the BAL rating of lot 184 could be reduced to the next lowest level with micro-siting of the residential dwelling within the lot.

Building design and construction specifications for BAL-LOW and BAL-12.5 are provided in the following sections of AS 3959-2018:

- BAL-LOW – section 4; and
- BAL-12.5 – sections 3 and 5.

5 Closing

This report provides a BAL assessment for the residential lots within stages 4a and 4b shown in the approved subdivision plan in Appendix 1 and identifies sections of AS 3959-2018 which are relevant to the construction of residential dwellings within stages 4a and 4b.

Please contact the undersigned if you have any questions about this report.

Yours sincerely,



Robert Janssen
Managing principal
Land and Environment Consultants
07 2112 5692
rjanssen@landeconsultants.com.au

Disclaimer

Notwithstanding the precautions adopted in this report, it should always be remembered that bushfires burn under a range of conditions. An element of risk, no matter how small always remains, and although AS 3959-2018 is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any building will withstand bushfire attack on every occasion.

It should be noted that upon lodgement of a development proposal, State Government, council and/or the fire service may recommend additional construction requirements.

Although every care has been taken in the preparation of this report, Land and Environment Consultants Pty Ltd accept no responsibility resulting from the use of the information in this report.

References

Australian Building Codes Board (ABCB) 2019, *National Construction Code Series, Building Code of Australia Class 1 and Class 10 Buildings, Volume 2*, Australian Government and States and Territories of Australia, Version 2.1 July 2020

Land and Environment Consultants (LEC) 2019, *Bushfire management plan – proposed development at 145 Binnies Road and 143-163 Daleys Road, Ripley, Queensland*, Report 19006, Final, 23 May 2019

Queensland Government (QG) 2021, *Queensland Development Code*, accessed online at <https://www.business.qld.gov.au/industries/building-property-development/building-construction/laws-codes-standards/queensland-development-code>, last updated March 2021

Standards Australia Limited (Standards Australia) 2018, *Australian Standard 3959-2018 Construction of buildings in bushfire prone areas*, Fourth edition, November 2018

Appendix 1 Approved subdivision plan

LEGEND:
 Stage Boundary
 Stage Number

DEVELOPMENT SUMMARY

- Terrace (41)
- Premium Terrace (7)
- Cottage (43)
- Villa (27)
- Premium Villa (130)
- Courtyard (66)
- Duplex Housing (D) (1) (2 Dwellings)
- Townhouse Site (1) (20 Dwellings)
- Park (1)
- Drainage Reserve (2)
- Temporary Drainage Reserve (5)

Total Site Area - 19,809 ha
 Park Detention Area - 6353 m²
 Park - 4652 m²
 Total Lots - 324
 Total Dwellings - 336
 Overall Density - 17.0 dwellings/hectare

NOTES:

1. Drawn to scale on an A1 sheet.
2. All dimensions and areas are subject to ICC approval and confirmation by survey.

Code	Description	Date		
AD	Lot 157 added, Lots 325-331 & Stages 3E & 4C deleted	TJJ 12/09/2022		
AC	Role 31 replaced with pathway	23/06/2022		
	A.C. Lots 8, 9 & 21-227 amended & Lot 324 added			
AB	Lot 157 removed & LOTS 325-331 (Stage 3E) added	TJJ 16/06/2022		
AA	Development Summary Table Added	TJJ 18/03/2022		
Z	Stage boundary amended	BRD 11/01/2022		
Y	FIM / RMU Added to Stages 2A, 3A & 3C	BRD 15/09/2021		
X	Stage boundary amended	BRD 24/07/2021		
W	Stage boundary amended	BRD 24/05/2021		
V	Stage boundary amended	BRJ 27/01/2021		
U	Lots 39-54 Boundaries amended	BRJ 24/09/2020		
T	Lots 280 & 281 amended, Emt C in Lot 280 added, Stage boundaries amended	BRJ 15/09/2020		
S	Lots 266-271 & Gravel Access Hatching Removed	JEW 4/03/2020		
R	Staging & Lots Update	JEW 12/12/2019		
Q	Minor Update	SDS 27/08/2019		
P	Lot Layout and Stage Boundaries Amended	SDS 31/07/2019		
O	Road Names & Lot 254 Updated	JEW 24/06/2019		
N	Stage 1A/1C Minor Amendment	JEW 13/03/2019		
M	Stage 1A/1B Minor Amendment	JEW 5/11/2018		
L	Road 1 Intersection	JEW 18/10/2018		
K	Updated Layout	JEW 16/10/2018		
J	Detection modified and Park Added	JEW 4/05/2018		
I	Updated layout	JKC 15/03/2018		
H	Updated Layout	JKC 06/03/2018		
	Issue	Revision	Int	Date

Title:
**Plan of Proposed
 Subdivision of Lots 1-324
 Staging Plan**
 (Cancelling Lots
 336 & 349 on S3173)

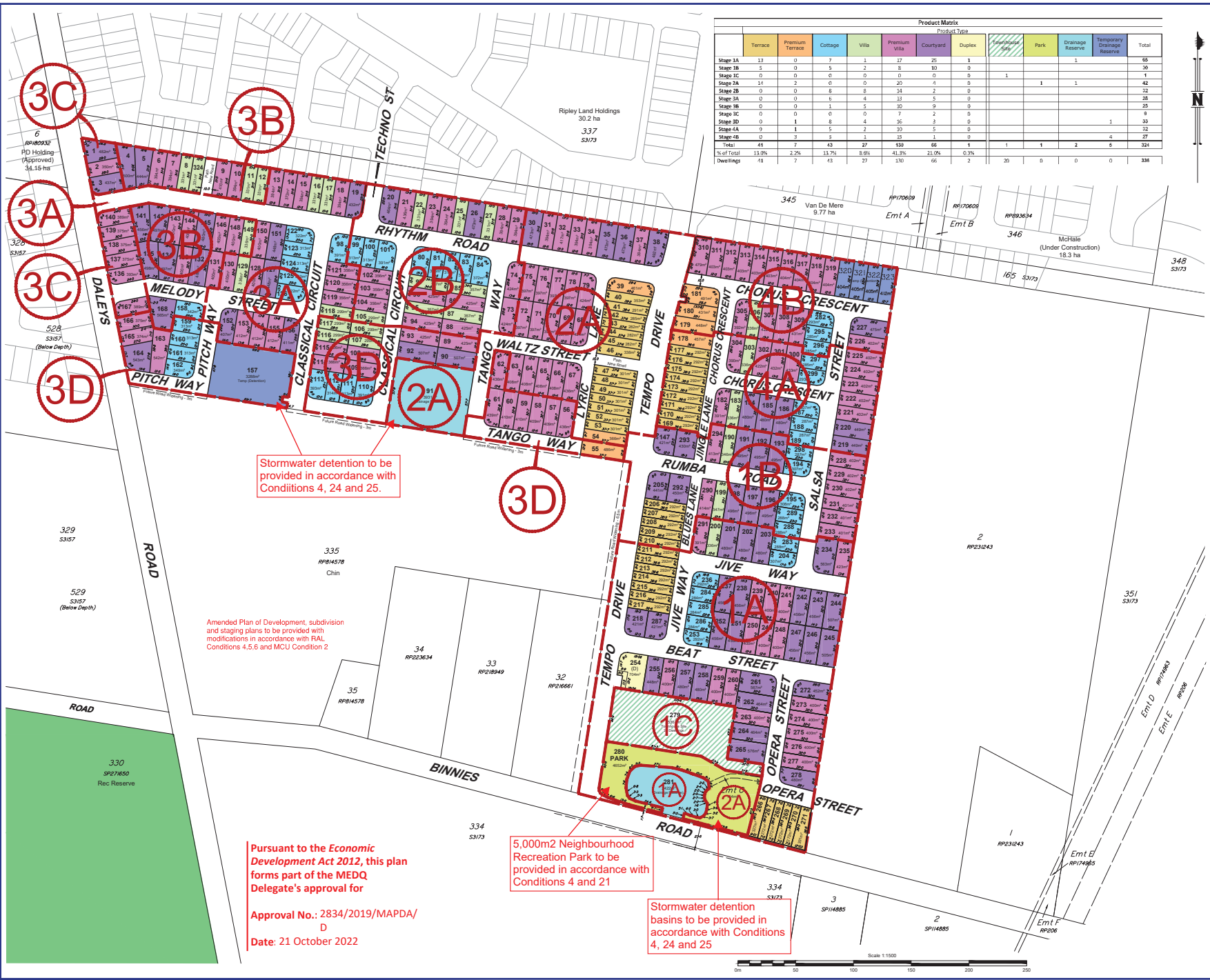
Client: AV JENNINGS

Locality: RIPLEY
 Local Gov: ICC Prepared By: JKC
 Surveyed By: Approved: SWM
 Date Created: 27/11/2017 Scale: 1:1500
 Comp File:

Plan No: 08070_002_PRO

Product Matrix

	Product Type										Total	
	Terrace	Premium Terrace	Cottage	Villa	Premium Villa	Courtyard	Duplex	Townhouse Site	Park	Drainage Reserve		Temporary Drainage Reserve
Stage 1A	13	0	7	1	27	25	1					66
Stage 1B	5	0	5	1	8	10	0					30
Stage 1C	0	0	0	0	0	0	0	1	1			2
Stage 2A	14	2	0	0	20	7	0					42
Stage 2B	0	0	0	0	0	0	0					0
Stage 3A	0	0	0	0	4	13	5					22
Stage 3B	0	0	1	5	30	9	0					45
Stage 3C	0	0	0	0	0	0	0					0
Stage 3D	0	1	8	4	36	3	0				1	47
Stage 4A	9	1	5	2	30	5	0					52
Stage 4B	0	7	2	3	35	1	0					58
Totals	44	7	43	27	130	68	1	1	1	2	5	324
% of Total	13.9%	2.2%	13.7%	8.6%	41.3%	21.0%	0.3%	2.0%	0.0%	0.0%	0.0%	100%
Dwellings	44	7	43	27	130	66	2	20	0	0	0	336



Stormwater detention to be provided in accordance with Conditions 4, 24 and 25.

Amended Plan of Development, subdivision and staging plans to be provided with modifications in accordance with RAL Conditions 4.5, 6 and MCU Condition 2

Pursuant to the Economic Development Act 2012, this plan forms part of the MEDQ Delegate's approval for

Approval No.: 2834/2019/MAPDA/D
 Date: 21 October 2022

5,000m² Neighbourhood Recreation Park to be provided in accordance with Conditions 4 and 21

Stormwater detention basins to be provided in accordance with Conditions 4, 24 and 25



Appendix 2 Radiant heat exposure model

Bushfire attack from the south-west

- Forest fire danger index - 58
- Vegetation – VHC 10.1 *Spotted gum dominated open forest*
- Understorey fuel load – 20.8 t/ha
- Total fuel load – 20.8 t/ha¹
- Effective slope – 3° down slope
- Site slope – 0° slope
- Flame width – 100 m

Note 1 Total fuel load taken from *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire'* (QFES 2019) (**Bushfire resilient communities**).



Calculated February 11, 2019, 3:22 pm (MDC v.4.8)

J19006 (N, S1)

Minimum Distance Calculator - AS3959-2009 (Method 2)			
Inputs		Outputs	
Fire Danger Index	58	Rate of spread	1.78 km/h
Vegetation classification	Forest	Flame length	14.07 m
Surface fuel load	20.8 t/ha	Flame angle	50 °, 60 °, 69 °, 75 °, 76 ° & 82 °
Overall fuel load	20.8 t/ha	Elevation of receiver	4.8 m (user defined value)
Vegetation height	n/a	Fire intensity	19,135 kW/m
Effective slope	3 °	Transmissivity	0.874, 0.856, 0.83, 0.804, 0.791 & 0.728
Site slope	0 °	Viewfactor	0.597, 0.4425, 0.3005, 0.204, 0.1658 & 0.045
Flame width	100 m	Minimum distance to < 40 kW/m ²	11.699999999999997 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	15.599999999999996 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	22.600000000000005 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	32.000000000000018 m
		Minimum distance to < 10 kW/m ²	38.000000000000027 m