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Bushfire Hazard Assessment

Stage 04 - Werrington Subdivision

741 - 755 Great Western Highway, Werrington

Prepared for

Statewide Planning Pty Ltd

25th February 2021 Version V1.0

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Fire Protection Association of Australia BPAD Level 3 – BPAD16373

Contents

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Glossary of Terms

APZ	Asset protection zone
AS2419	*Australian Standard – Fire hydrant installations*
AS3745	*Australian Standard – Planning for emergencies in facilities*
AS3959	*Australian Standard – Construction of buildings in bushfire-prone areas 2009*
BAL	*Bushfire Attack Level*
BCA	*Building Code of Australia*
BFSA	Bush Fire Safety Authority
EPA Act	*Environmental Planning & Assessment Act 1979*
FDI	Fire Danger Index
ha	Hectare
m	Metres
PBP	*Planning for Bush Fire Protection 2019*
RF Act	*Rural Fires Act 1997*

1. Introduction

Blackash Bushfire Consulting has been engaged by Statewide Planning for a proposed residential subdivision of 134 housing lot residential subdivision which sits on the corner of French Street and Great Western Highway at 741-755 Great Western Highway, Werrington (the site) which is legally known as Lot 125 & Lot 126 DP 1215199 (Figure 1). The site is zoned R3 Medium Density Residential.

This is the final stage of residential subdivision for the precinct with existing development to the north, west and an area within the Stage 4 scheduled for further development (Figure 2). The Great Western Highway is to the south of the site (Figure 1). The site has been used as a transport and/or works compound, and has been subject to significant filling, in recent years. The site plan is at Figure 2. The pre lodgment advice received from Penrith Council (Council) on 24 July flagged that the site was Bushfire Prone, and Bushfire Hazard Assessment Report would be required. No specific bushfire issues were raised by Council.

Residential subdivision triggers the integrated development referral requirements of Section 4.46 of the *Environmental Planning and Assessment Act, 1979* (EPA Act) and require assessment by the NSW Rural Fire Service (RFS) under Section 100B of the Rural Fires Act, 1997 (RF Act).

The site is identified as Vegetation Category 2 Bushfire Prone Land which will be cleared and developed with the approval of the subdivision. The site is accessed by a number of proposed roads within the existing approved road network. Land to the east of the site is owned and managed by Western Sydney University which is managed land. The site is regularly mown and is not identified as being bushfire prone. Bushfire risk to the site has been managed and bushfire will not be a risk for the development. The site and surrounding land are managed and cleared (Figure 3).

As a new residential subdivision, the application is able to meet Bushfire Attack Level (BAL) of a maximum of BAL-29. The proposal meets all the deemed to satisfy (DTS) provisions of the NSW RFS document *Planning for Bushfire Protection 2019* (PBP 2019) and as such, is afforded appropriate bushfire protection.

This assessment was completed by Lew Short who is a BPAD Level 3 certified practitioner (BPAD Level 3 BPAD16373).

2. Legislative Framework

Development on land that is identified as being bushfire prone must comply with the NSW RFS document *Planning for Bushfire Protection* (PBP 2019) under s.4.46 of the EPA Act.

A residential subdivision development is categorised as Integrated Development, under s.4.46 of the EPA Act and requires assessment by the RFS under Section 100B of the Rural Fires Act, 1997 (RF Act). lintegrated development requires development consent from Council and General Terms of Approval from the RFS. Any development applications for such a purpose must obtain a Bush Fire Safety Authority (**BFSA**) from the Commissioner of the RFS in accordance with Section 100B of the RF Act.

A BFSA authorises development to the extent that it complies with PBP 2019 including standards regarding setbacks, provision of water supply and other measures in combination considered by the Commissioner necessary to protect persons, property or the environment from danger that may arise from a bushfire.

Figure 1 Site Location

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Legend

Watercourse

Subject Land

N

DKGIS

Date: 26/10/2020

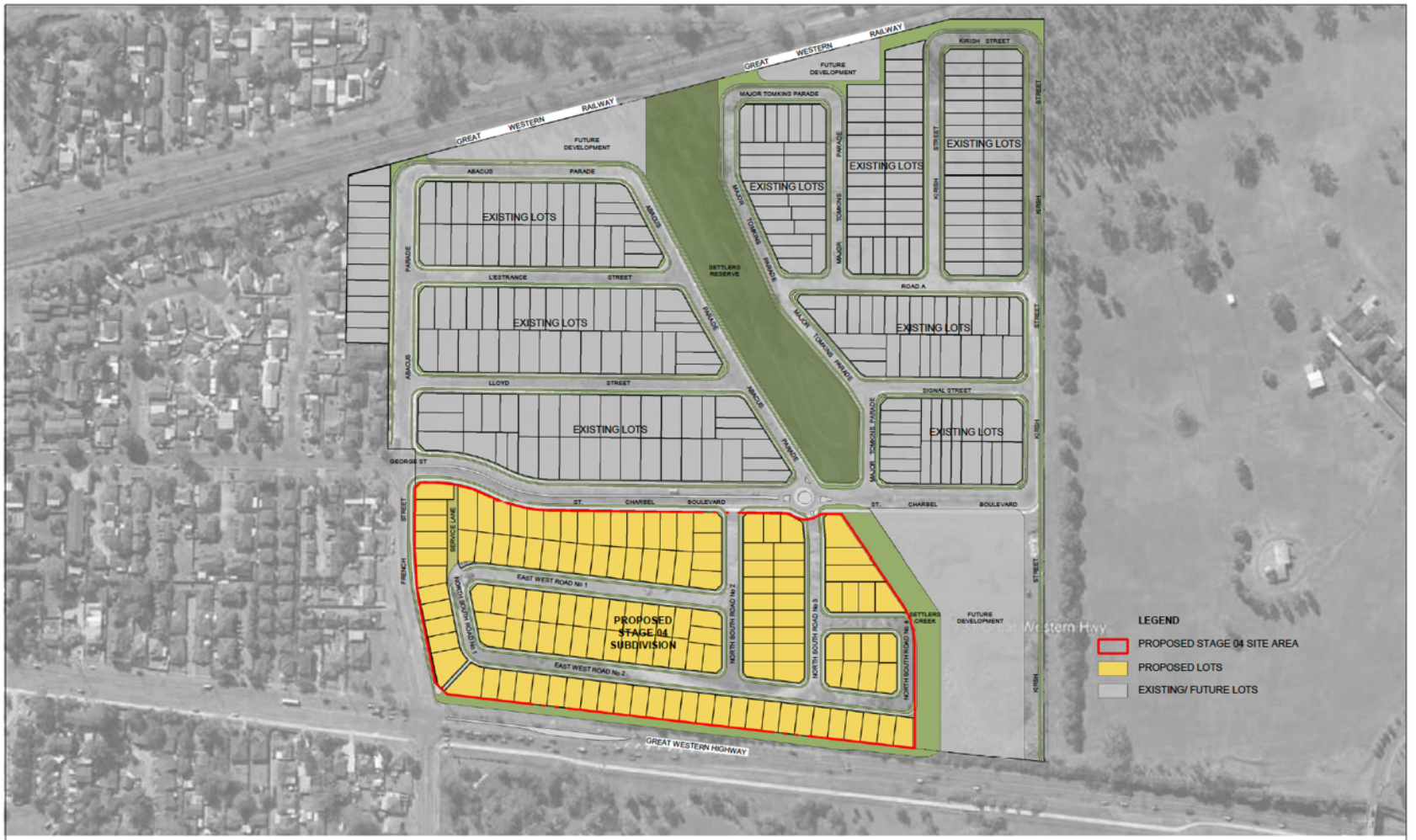
0 50 100 200 300

Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

Figure 2 Site Plan



ISSUE	DATE	REVISION	BY
B	15/09/2020	AMENDED AS PER PRE-DA ADVICE	CD
A	21/04/2020	ISSUED FOR REVIEW	CD

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PROJECT: STAGE 04
741 - 755 GREAT WESTERN HIGHWAY, WERRINGTON

DRAWING TITLE: SITE PLAN

NORTH:

PROJECT NO:	DATE:	DRAWING No:	REV:
--	15/09/2020	DA 102	B
DRAWN BY: CHD	SCALE: 1 : 2500		

Figure 3 Air Photo of the site showing cleared land and surrounding uses – source Google Maps

3. Bushfire Prone Land

Bushfire prone land (BFPL) is land that has been identified by council which can support a bushfire or is subject to bushfire attack. Bushfire prone land maps are prepared by local council and certified by the Commissioner of the NSW RFS.

The identification of Bushfire prone land in NSW is required under s.10.3 of the EPA Act. The maps provide a trigger for the various development assessment provisions.

The site has Category 2 vegetation designated within the western part of the site. This will be cleared and developed with approval of the site. The development of Stage 4 will remove the Bushfire Prone Vegetation. Sate 5 will be developed to the east of the drainage channel in the near future which will remove the grassland hazard. This area is currently not mapped as Bushfire Prone Land.

The site has Category 2 Bushfire Prone Land (Figure 4) identified within the site. Land to the north of the site has been developed with housing throughout the area. Figure 1 shows recent aerial photography for the site with housing removing the Category 2 land within the bounds of Abbacus Parade, Lloyd Street, L'Estrange Street, Major Tomkins Parade, St Charbel Boulevard and Signal Street. As such, the Bushfire Prone Map is out of date and does not reflect the development of adjoining sites.

The Great Western Highway is to the south of the site. The road reserve is 40m which is cleared and managed. At the western part of the site, the Great Western Highway is 6 lanes wide (3 lanes each way) which narrows to 4 lanes wide adjacent to the east of the site. French Street to the west of the site is two lanes each way. Both these roads provide perimeter access around the site.

Land to the east of the site is owned and managed by Western Sydney University which is managed land. The site is regularly mown and is not identified as being bushfire prone. Bushfire risk to the site has been managed and bushfire will not be a risk for the development. The site and surrounding land is managed and cleared (Figure 3).

Figure 4 Bushfire Prone Land

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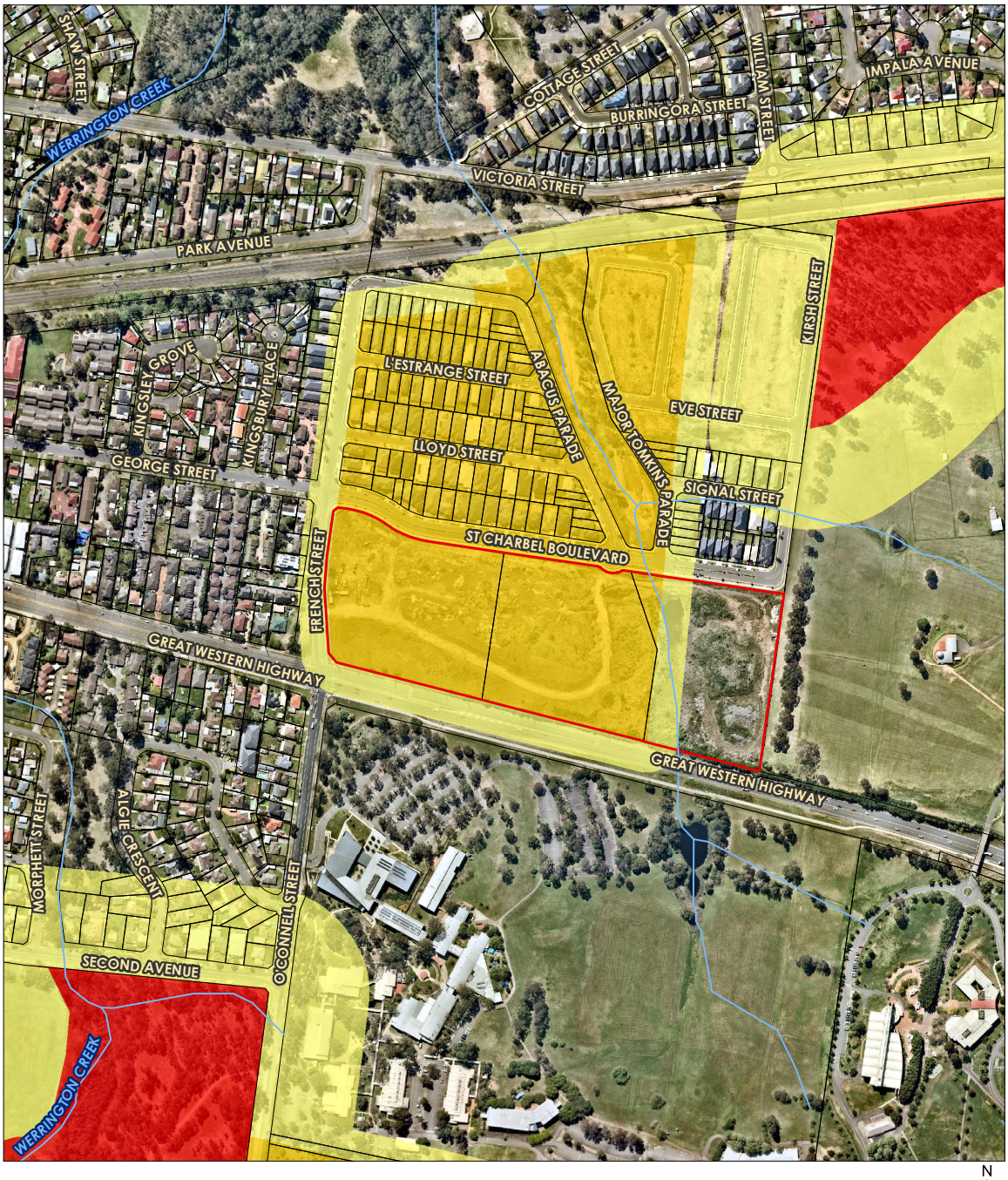


Legend

- Watercourse
- Subject Land
- Cadastre

Bushfire Prone Land

- Vegetation Buffer
- Vegetation Category 1
- Vegetation Category 2
- Vegetation Category 3

N

DKGIS
Date: 26/10/2020

0 25 50 100 150
Metres

Coordinate System: GDA 1994 MGA Zone 56
Imagery: © Nearmap

4. Bushfire Threat Assessment

4.1.Methodology

PBP 2019 provides a methodology to determine the bushfire threat and commensurate size of any asset protection zone (**APZ**) that may be required to offset possible bushfire attack. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation. For new residential subdivision, APZ requirements are based on keeping radiant heat levels at new buildings below 29kW/m^2.

The following assessment is prepared in accordance with Section 100B of the RF Act, Clause 44 of the RF Reg and PBP 2019. This assessment is based on the following resources:

- Planning for Bush Fire Protection (NSW RFS, 2019);
- Cowra Council Bushfire Prone Land Map;
- Aerial mapping;
- Detailed GIS analysis;
- Site inspection and analysis.

The methodology used in this assessment is in accordance with PBP 2019 Appendix 1 Site Assessment Methodology and is outlined in the following sections.

- Step 1: Determine vegetation formation in all directions around the building to a distance of 140 metres
- Step 2: Determine the effective slope of the land from the building for a distance of 100 metres
- Step 3: Determine the relevant FFDI for the council area in which the development is to be undertaken and
- Step 4: Match the relevant FFDI, vegetation formation and effective slope to determine the APZ required from the appropriate table of PBP 2019.

4.2.Forest Fire Danger Index

The Forest Fire Danger Index (FFDI) measures the degree of danger of fire in Australian vegetation. For the purposes of PBP 2019, the FFDI required to be used for development assessment purposes is based on local government boundaries.

The FFDI for Penrith Council is FFDI 100 and Table A1.12.2 of PBP 2019.

4.3.Bushfire Hazard

An assessment of the site and surrounding areas is necessary to determine the application of bushfire protection measures such as APZ locations and future building construction levels.

The vegetation formations (bushfire fuels) and the topography (effective slope) combine to create the bushfire threat that may affect bushfire behavior at the site, and which determine the planning and building response of PBP 2019.

The site is cleared and will be developed, removing potential bushfire threat.

4.4.Vegetation Assessment

The RF Regulation requires a classification of the vegetation on and surrounding the property (out to a distance of 140 metres from the boundaries of the property) in accordance with the system for classification of vegetation contained in PBP 2019.

Vegetation types give rise to radiant heat and fire behaviour characteristics. The predominant vegetation is determined over a distance of at least 140 metres in all directions from the proposed site boundary or building footprint on the development site. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate.

Predominant Vegetation is classified by structure or formation using the system adopted by Keith (2004) and by the general description using PBP 2019 and is shown in Figure 7. Vegetation within the site will be cleared as part of the development. A narrow band of vegetation will be provided within Settlers Reserve as a drainage reserve.

The drainage reserve will be revegetated but has been designed to minimise fuel load and bushfire risk to the development (both to the east and west). The Streetscape Masterplan is at Figure 5 and the detailed Landscape Plan for the drainage channel is at Figure 6. The drainage channel is approximately 15m wide and does not constitute a significant risk to the development.

As a redundancy, the development has been designed to provide a perimeter road to part of the drainage channel with access to the northern part of the channel by the existing St. Charbel Road.

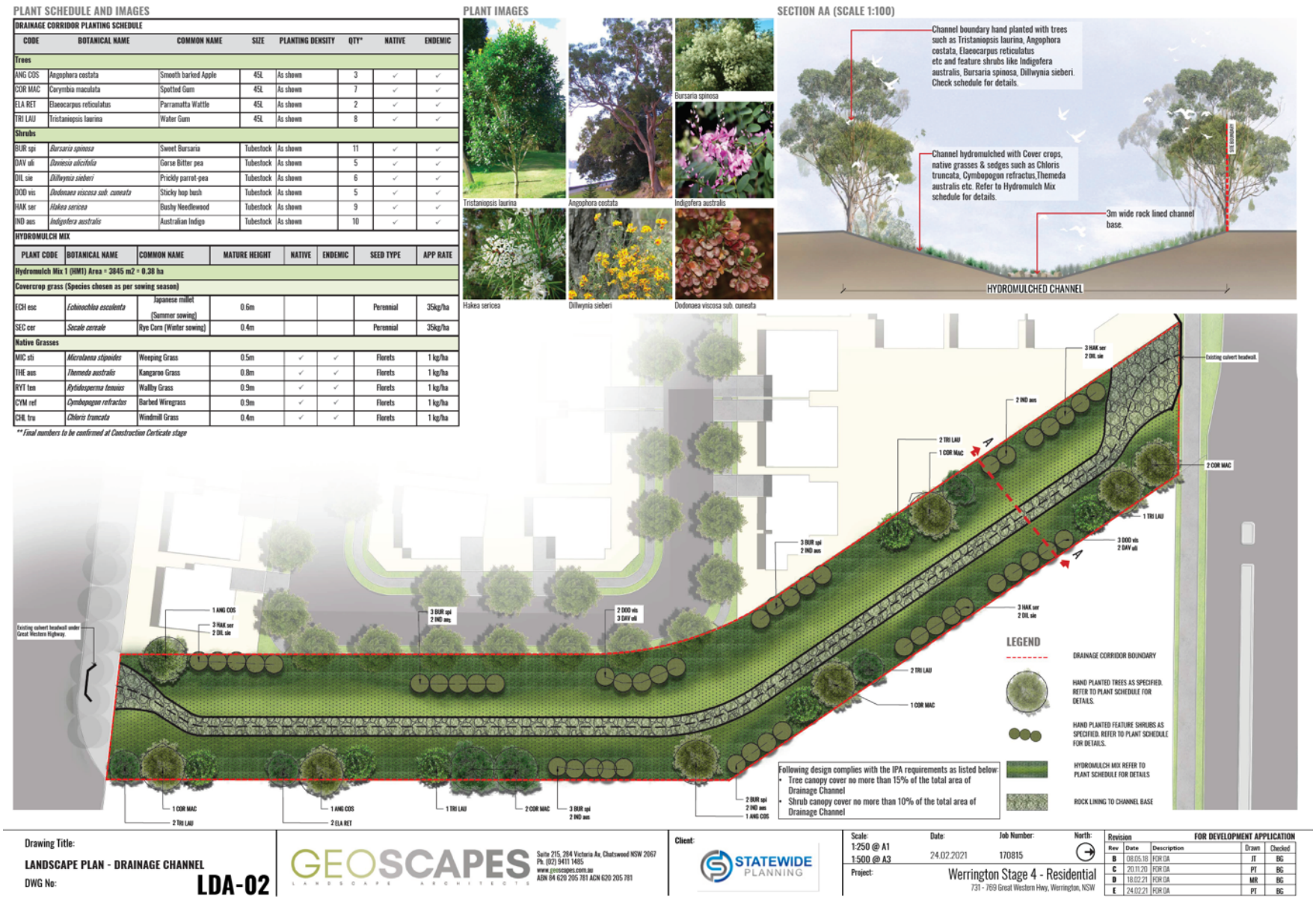
The species list (see Figure 6) has been carefully chosen by the bushfire expert and landscape architect to provide species that are fire resistant in the drainage channel.

Vegetation to the east of the channel will be cleared as part of a future Stage 5 development. It is currently grassland.

Importantly, the planting has been scheduled (see Figure 6 and inset cross section) to separate the few trees that will be planted within the drainage channel. The channel will not revegetate to a woodland or forest state and is at best considered a riparian/ drainage corridor with minimal current and future risk.

Figure 5 Streetscape Masterplan

Figure 6 Landscape Plan - Drainage Chanel



4.5.Slopes Influencing Bushfire Behavior

The RF Reg requires an assessment of the slope of the land on and surrounding the property (out to a distance of 100 metres from the boundaries of the property or from the proposed development footprint).

The effective slope' influencing fire behaviour approaching the sites has been assessed in accordance with the methodology specified within PBP 2019. The effective slope is the slope of the ground under the hazard (vegetation). It is not the slope between the vegetation and the building (slope located between the asset and vegetation is the site slope).

Figure 7 shows the effective slopes affecting the site. The slope to the east of the drainage channel is upslope grassland.

Figure 7 Vegetation and Slope Assessment

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Legend

- Contour - 2m
- Watercourse
- Stage 1
- Subject Land
- Cadastre

Vegetation Formation

- Grassland
- Woodland

N

DKGIS
Date: 26/10/2020

0 25 50 100 150
Metres

Coordinate System: GDA 1994 MGA Zone 56
Imagery: © Nearmap

4.6.Asset Protection Zones

For proposed new residential subdivision, PBP 2019 requires that a minimum separation is provided in the form of Asset Protection Zones (**APZ**). The APZ is a fuel-reduced, physical separation between buildings and bushfire hazards. For residential developments, APZ requirements are based on keeping radiant heat levels at buildings below 29kW/m^2 as the maximum exposure on all sides of a building.

The conservative deemed to satisfy (DTS) APZ requirements are shown in Figure 8. This APZ is based on an assessment of upslope grassland to the east of the drainage channel and the drainage channel being assessed as a riparian area. However, given the narrow width (15m) of the drainage channel, we have completed calculations using the Short Fire Run Methodology (SFR Methodology) approved by the RFS.

Using the SFR Methodology, **a radiant heat load of 26.39kWm can be achieved at 8m separation from the drainage channel**. The Short Fire Run (SFR) inputs and calculations are shown in Table 1. The following SFR inputs were used:

Input	Comment
Vegetation	Riparian – based on the narrow width of the drainage channel at 15m and the modified planting schedule
Surface & Elevated Fuel Load	10t used as per NSW RFS Comprehensive Vegetation Fuel Loads. Note: this is considered to over represent the maximum fuel load for the climax community.
Overall Fuel Load	12t used as per NSW RFS Comprehensive Vegetation Fuel Loads. Note: this is considered to over represent the maximum fuel load for the climax community.
Average canopy height	Default for Rainforest
Average elevated fuel height	Default for Rainforest. This is considered overly conservative as the bulk of the area will be planted with grasses with a maximum height of .5 of a metre.
Distance to Vegetation	8m has been used as the minimum distance to achieve less than 29kW.
Effective Slope	5 degrees downslope which is overly conservative for the approximately 7m down to the drainage line centreline and then upslope away from the drainage line
Nominal Head Width	15m which is the width of the drainage reserve. A wider head cannot develop. A longer head could develop, however, this would have a lower radiant heat load as a flank fire which has not been used.
Fire Weather	FDI 100 as default
Flame Temperature	1090K as default
SFR Length	15m which is the width of the drainage reserve. A wider head cannot develop. A longer head could develop, however, this would have a lower radiant heat load as a flank fire which has not been used.

Figure 8 DTS APZ Requirements

Table 1 Short Fire Run calculations

Common and bushfire behaviour contributor inputs:

Predominant vegetation	Dry Rainforests - 10 & 13.2 - Medium - 0.9 m - 1.4m				
urface & Elevated Fuel Load	10	tph	Overall fuel load	13.2	tph
Average Canopy Height	20	Metres	Fire weather district	100	FDI
verage elevated fuel height	1.4	Metres	Flame temperature	1090	Kelvin
Distance to vegetation	8	Metres	Target elevation of receiver	2	Metres
ffective slope	5	Degrees	mbient temperature	308	Kelvin
Site slope	2	Degrees	SFR fire run length	15	Metres
nominal head width	15	Metres			

Outputs - Fully Developed Fire (FDF)			**Outputs - Developing Fire Run (DFR)**		
Wind Speed	45	kph	Wind speed	30	kph
Default elevation of receiver	6.299	Metres	Default elevation of receiver	5.108	Metres
FDF Flame Angle	28	Degrees	SFR Flame Angle	32	Degrees
FDF Flame Length	12.60	Metres	SFR Flame Height	10.216	Metres
FDF Intensity	11556	kW/m	SFR Intensity	8754	kW/m
FDF FROS	1.6944	kph	SFR FROS	1.6944	kph
FDF Flame transmissivity	0.8941	kW/m	SFR Flame transmissivity	0.8889	kW/m
FDF View Factor	0.7190		SFR View Factor	0.3904	
			Calculated SFR Head Width	5.491	Metres
			SFR fire run length	15	Metres
			Approx. SFR travel time	8:51	min/sec
FDF Radiant Heat	**48.88**	**kW/m²**	**SFR Radiant Heat**	**26.39**	**kW/m²**

5. Water Supplies

The area will be serviced by reticulated water. Water meets PBP 2019.

6. Gas and electrical supplies

Electricity supply for the new development should comply with PBP 2019. Where practicable, all electrical transmission lines should be underground. Where overhead, electrical transmission lines should be as follows:

- lines are installed with short pole spacing of 30m, unless crossing gullies, gorges or riparian areas; and
- no part of a tree is closer to a power line than the distance set out in ISSC3 *Guideline for Managing Vegetation Near Power Lines*.

Any gas services are to be installed and maintained in accordance with *Australian Standard AS/NZS 1596 'The storage and handling of LP Gas'* (Standards Australia 2008). This complies with PBP.

In relation to any gas services to the proposed development:

- Reticulated or bottled gas should be installed and maintained in accordance with AS/NZS 1596:2014 - *The storage and handling of LP Gas*, the requirements of relevant authorities, and metal piping is used;
- All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side;
- Connections to and from gas cylinders are metal;
- Polymer-sheathed flexible gas supply lines are not used; and
- Above-ground gas service pipes are metal, including and up to any outlets.

7. Access

The design and construction of the access for the development must ensure safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing the area.

Figure 1 shows recent aerial photography for the site with housing removing the Category 2 land within the bounds of Abbacus Parade, Lloyd Street, L'Estrange Street, Major Tomkins Parade, St Charbel Boulevard and Signal Street.

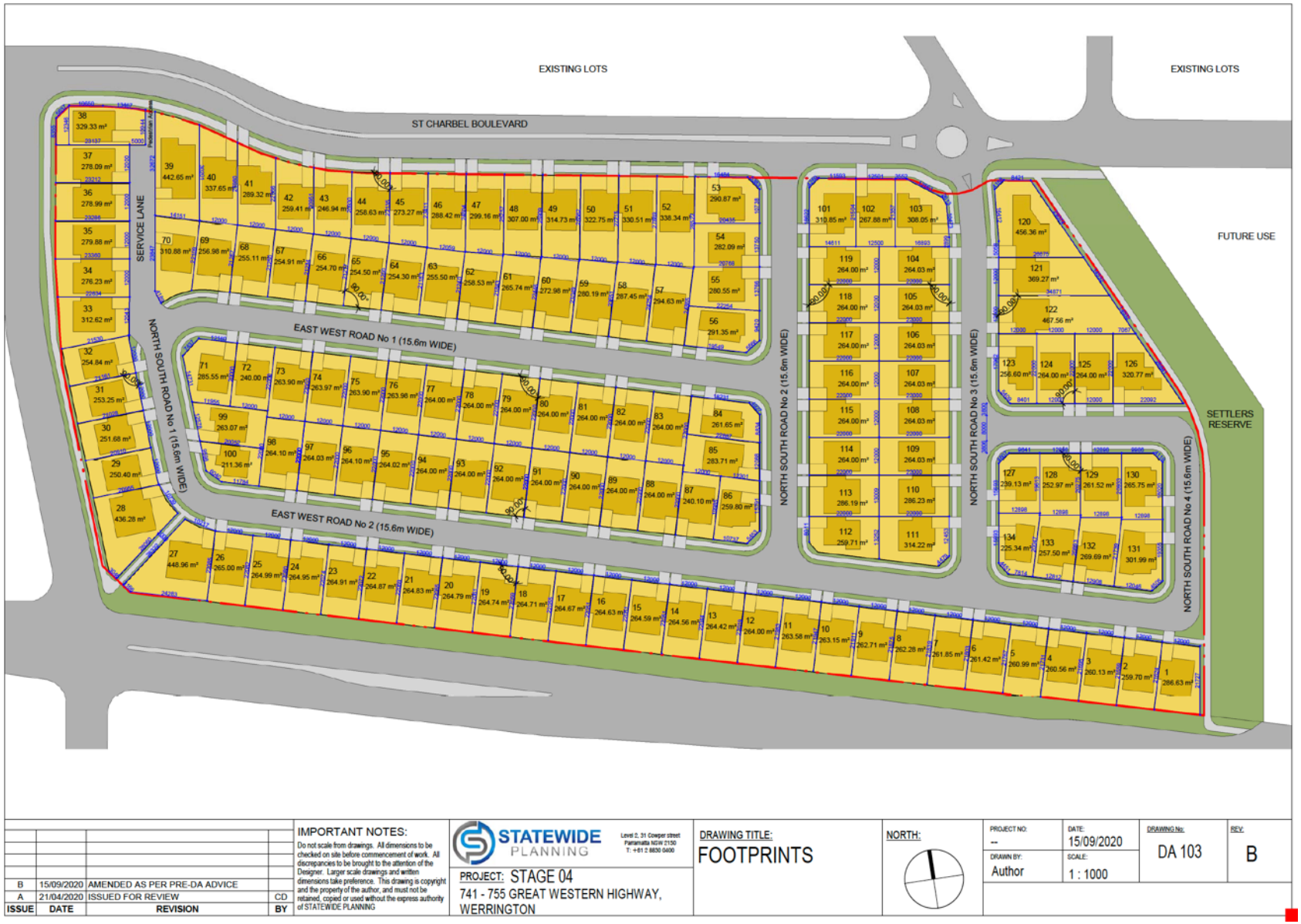
The Great Western Highway is to the south of the site. The road reserve is 40m which is cleared and managed. At the western part of the site, the Great Western Highway is 6 lanes wide (3 lanes each way) which narrows to 4 lanes wide adjacent to the east of the site. French Street to the west of the site is two lanes each way. Both these roads provide perimeter access around the site.

Roads within the site are 15.6m wide (Figure 7) with North Road No. 4 providing permitter access to Settlers Way.

The site is accessed by a number of proposed roads within the existing with access into the site being off St Charbel Road.

Road access complies with PBP 2019.

Figure 9 Proposed Road Network



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DRAWING TITLE: FOOTPRINTS

NORTH:

PROJECT NO:	DATE:	DRAWING No:	REV:
--	15/09/2020	DA 103	B
DRAWN BY: Author	SCALE: 1 : 1000		

8. Recommendations & Conclusion

The proposal Stage 4 residential subdivision can meet all the relevant requirements of *Planning for Bush Fire Protection 2019*.

The Bushfire Prone Land will be removed as part of the development and the drainage channel presents minimal bushfire risk. The layout has been designed to meet the requirements of PBP 2019.

The following recommendations are made for the bushfire protection of the proposed development:

Recommendation 1: Water, services and gas meet *Planning for Bush Fire Protection 2019*.

The development and sites are afforded adequate setbacks that can provide for compliance with *Planning for Bush Fire Protection 2019*.

In the authors professional opinion, the bushfire protection measures demonstrated in this report comply with the aim and objectives of *Planning for Bush Fire Protection 2019* and therefore the site and proposed development is considered suitable in the context of bushfire. The development conforms to the relevant specifications and requirements of *Planning for Bush Fire Protection 2019*.

Lew Short | Director

Blackash Bushfire Consulting

Appendix 1 References

Councils of Standards Australia AS3959 (2009) – *Australian Standard Construction of buildings in bushfire-prone areas.*

Councils of Standards Australia AS2419 (200) – *Fire Hydrant Installations.*

Keith, David (2004) – *Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT*. The Department of Environment and Climate Change.

NSW Rural Fire Service (2015) *Guide for Bushfire Prone Land Mapping.*

NSW Rural Fire Service (2006). *Planning for Bushfire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners.* Australian Government Publishing Service, Canberra.

NSW Rural Fire Service (2019). *Planning for Bushfire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners.* Draft for Public Exhibition.

NSW Government (1979) *Environmental Planning and Assessment Act 1979*. NSW Government Printer.