BUSHFIRE & EVACUATION SOLUTIONS
SYDNEY - ILLAWARRA - SHOALHAVEN

Bush Fire Strategic Study

PLANNING PROPOSAL – ELAMBRA WEST URA

Lot 2 DP 1168922

Campbell Street

GERRINGONG NSW

17 November 2023

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DOCUMENT CERTIFICATION

This report has been developed based on agreed requirements as understood by Bushfire and Evacuation Solutions at the time of investigation. It applies only to a specific task on the nominated lands.

Any recommendations or findings of this report are based on an honest appraisal of the constraints that existed at the site at the time of investigation, subject to the scope, resources and information available and provided at the time. Within the confines of the above statements and to the best of my knowledge, this report does not contain any incomplete or misleading information.

Principal Consultant

BUSHFIRE & EVACUATION SOLUTIONS

Version Control

Version:	Date/ amendments	Reviewed by
1	17 November 2023	**KT**

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Disclaimer: Any recommendation or advice expressed in this document is made in good faith and in accordance with the relevant legislation for bushfire prone development in NSW. It should be borne in mind that the measures recommended in this report cannot guarantee that a building will survive a bushfire event on every occasion. This is due to the degree of vegetation management, the unpredictable behaviour of bushfires and extreme weather conditions. The author of this report accepts no responsibility for any loss or damage, whether direct or consequential, suffered by any person as the result of or arising from the reliance on the statements, information or recommendations of this document.

SECTION 1 EXECUTIVE SUMMARY

Bushfire and Evacuation Solutions have been engaged by Allen Price & Scarratts Pty Ltd on behalf of SMG Holdings Pty Ltd to complete a bushfire strategic study for a Planning Proposal (PP) that seeks to rezone part of the subject land (legally known as Lot 2 DP 1168922) from RU2 (Rural Landscape) to R2 (Low Density Residential) and C2 (Environmental Conservation). Rezoning of the subject land (herewith referred to as Elambra West URA) would permit low density residential development as a natural expansion of the Gerringong urban area.

The Elambra West URA site is located at the end of Campbell Street and to the west of the existing residential estate known as Elambra Estate. The subject site is currently occupied as a rural-residential property and operated commercially for grazing livestock. Existing development on the site comprises two (2) detached dwellings and several outbuildings and infrastructure utilised for farming purposes.

The subject land is mapped as bushfire prone land on Kiama Council (KC) mapping. The site is constrained by 'Vegetation Category 3' (i.e., medium risk hazard) associated with grassland (pasture) and riparian vegetation located along the eastern property boundary.

The primary purpose of this report is to assess the Planning Proposal with due regard to the NSW Rural Fire Service guideline *Planning for Bush Fire Protection* 2019 (PBP) as required under the Local Planning Directions– Direction 4.3. Accordingly, this report provides detail on the sites ability to comply with the provisions of PBP and makes recommendations to ensure future compliance. The following Bush Fire Strategic Study is made with reference to:

- Environmental Planning and Assessment Act 1979 (EP & A Act – s9.1(2));
- NSW Rural Fires Act 1997 (RF Act);
- Kiama Local Environmental Plan 2011 (KLEP);
- NSW Rural Fire Service planning guideline *Planning for Bush Fire Protection* (PBP);
- Illawarra Bush Fire Risk Management Plan (IBFRMP);
- Preliminary Structure Plan prepared by Allen Price & Scarratts (Ref: K128069-07; Rev: P2; dated 17/03/2022

This report recommends that future planning for the site is undertaken with due consideration of the Acceptable Solutions of PBP. More specifically, Section 10 of this report makes the following recommendations:

- That Asset Protection Zones (APZ's) commensurate with the bushfire risk are incorporated separating future development within the proposed R2 zone from the adjacent hazard areas. The required APZ distances (as specified in Section 5) are those based on 29kW/m² for residential development and 10kW/m² for SFPP development;

- That any future Special Fire Protection Purpose SFPP) development are sited appropriately and with due consideration of the APZs provisioned under PBP for SFPP development;
- That public road access and design is in accordance with the Acceptable Solutions of PBP 2019 as detailed in Section 6 of this report. That due consideration is also given to the Acceptable Solutions of PBP regarding property access for any future/ proposed battle-axe lots;
- That perimeter roads are incorporated separating future residential development from the adjacent hazard areas;
- That future utility installations are designed in accordance with the relevant provisions of PBP as detailed in Section 7.

Where these measures are incorporated, it is determined that the Planning Proposal is suitable in terms of the sites ability to comply with the aim and objectives (specifications and requirements) of PBP for a future residential subdivision development.

1.1 AIM AND OBJECTIVES

This primary aim of this assessment is to address the matters required under EP & A Act s9.1(2) Planning Directions – Direction 4.3 (21 September 2023). In doing so, this report seeks to provide advice on the required bushfire protection measures relevant to any future/ proposed residential subdivision within the Elambra West URA site. More specifically, this report seeks to:

- Provide a bushfire assessment relevant to the Elambra West URA in accordance with the site assessment methodology detailed in Appendix 1 of PBP 2019;
- Determine the bushfire parameters relevant to future/ proposed residential and SFPP development on the subject land;
- Determine the minimum Asset Protection Zones required for a residential subdivision and any future proposed SFPP development on the site;
- Provide detail of other bushfire protection measures specified under Direction 4.3 and PBP relevant to the Planning Proposal; and
- Assist in finalising the Conceptual Masterplan (forming the basis of the PP) and any future residential subdivision plan prepared for the subject land.

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GLOSSARY

Term/ Abbreviation	Meaning
APZ	*Asset Protection Zone*
AS 2419 - 2005	*Australian Standard – Fire hydrant installations*
AS 3959 - 2018	*Australian Standard – Construction of buildings in bushfire prone areas*
BAL	*Bushfire Attack Level*
BFRMP	*Bushfire Risk Management Plan*
BPL Map	*Bushfire prone land map*
BPMs	*Bushfire Protection Measures*
EP & A Act	*Environmental Planning & Assessment Act 1979*
FDI	*Fire Danger Index*
IPA	*Inner Protection Area*
LGA	*Local Government Area*
NCC	*National Construction Code*
NSW RFS	*New South Wales Rural Fire Service*
OPA	*Outer Protection Area*
PBP	*Planning for Bush Fire Protection*
RF Act	*Rural Fires Act 1997*
KC	*Kiama Council*

Asset Protection Zone:

An area surrounding a development managed to reduce the bushfire hazard to an acceptable level. The width of the required asset protection zone varies with slope, vegetation and Fire Danger Index (FDI). The asset protection zone ensures there is no fire path between the hazard and the building.

AS 3959-2009 Construction of buildings in bushfire-prone areas:

The relevant Australian Standard for bushfire prone construction detailing the deemed to satisfy construction provisions for building development in NSW assessed as BAL-12.5 to BAL-40.

Bushfire Attack:

Attack by burning embers, radiant heat or flame generated by a bushfire, which might result in ignition and subsequent damage to, or destruction of a building.

Bushfire Prone Land:

An area that is subject to, or likely to be subject to bushfire attack. In general, a bushfire prone area is an area mapped for a local government area that identifies the vegetation types and associated buffer zones. Bushfire prone land maps are prepared by local councils and certified by the Commissioner of the NSW RFS.

Bushfire Attack Level (BAL):

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 per metre squared (kW/m^2), and the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire.

Bush Fire Safety Authority

An approval of the Commissioner of the NSW RFS required for subdivision for residential or rural residential purpose or for a special fire protection purpose listed under section 100B (6) of the *Rural Fires Act*. This form of development is considered to be integrated development.

Fire Danger Index:

An index providing a determination of the chance of a fire starting, its rate of spread, its intensity and the difficulty of its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long and short-term drought effects.

Planning for Bush Fire Protection:

Legislative planning guideline produced by the NSW Rural Fire Service detailing the specifications and requirements for bushfire prone development in NSW.

Special Fire Protection Purpose Development (SFPP):

These developments are required to obtain a Bush Fire Safety Authority from the NSW RFS under section 100B of the Rural Fires Act 1979 and are considered as 'integrated development' under section 91 of the EP & A Act.

The nature of SFPPs means that occupants may be more vulnerable to bushfire attack due to their special needs. This may result in the need for assisted evacuation by emergency services personnel. APZ requirements are therefore maximised based on potential radiant heat exposure to emergency services.

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SECTION 2. COMPLIANCE WITH THE RELEVANT LEGISLATION & PLANNING POLICIES

The legislation and statutory planning documents relevant to the Planning Proposal include the following:

2.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT (EP & A ACT) 1979.

Section 9.1 (2): Direction 4.3 - Planning for Bushfire Protection

Section 9.1 (2) directions apply to planning proposals for the rezoning of bushfire prone land. Under direction 4.3 of section 9.1 (2), a council must consult with the Commissioner of the NSW RFS during the preparation of a draft LEP and take into account any comments made. The draft LEP shall have regard to PBP and should address the following objectives:

- To protect life, property and the environment from bush fire hazards by discouraging the establishment of incompatible land uses in bush fire prone areas, and
- To encourage sound management of bush fire prone areas.

As part of the consultation process with the NSW RFS, a bush fire assessment is required to be submitted to demonstrate compliance with section 9.1 Directions and PBP. The general requirements for rezoning for the purpose of residential subdivision development include:

- Demonstrate that the required asset protection zones (APZ's) prescribed in PBP can be met on the development site;
- Contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks;
- Contain provisions for adequate water supply for firefighting purposes;
- Minimise the perimeter of the area of land interfacing the hazard which may be developed;
- Introduce controls on the placement of combustible materials in the Inner protection Area.

A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that Council has obtained written advice from the Commissioner of the NSW Rural Fire Service to the effect that, notwithstanding the non-compliance, the NSW Rural Fire Service does not object to the progression of the planning proposal.

Section 9.1 (2) directions require due regard to PBP. Specific assessment of the sites ability to comply with PBP is included in Section 4.0 and Section 5.0 of this report.

2.2 COMPLIANCE WITH PLANNING FOR BUSH FIRE PROTECTION (PBP) 2019

Planning for Bush Fire Protection (PBP) is the principal planning guideline relevant to the development of bush fire prone land in NSW. It is referenced in the *Environmental Planning and Assessment Act 1979,* the *Ministerial Direction No. 4.3* and the *Rural Fires Act 1997*.

The aim of PBP is *'to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.*

More specifically, the broad 'Objectives' of PBP are stated as follows:

- afford buildings and their occupants protection from exposure to a bush fire;
- provide for a defendable space to be located around buildings;
- provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;
- ensure that appropriate operational access and egress for emergency service personnel and occupants are available;
- provide for ongoing management and maintenance of BPMs; and
- ensure that utility services are adequate to meet the needs of firefighters.

An assessment to which a proposal conforms with or deviates from PBP will be required to accompany development applications which fall under section 100B of the RFA Act.

In accordance with PBP Section 4.4.1, where a proposal is of a strategic nature, a bushfire assessment should be prepared and take the form of a Strategic Bush Fire Study as outlined in PBP Section 4.2.

Specific assessment of the sites ability to comply with the provisions of PBP is included in this report.

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SECTION 3 DESCRIPTION OF THE PROPERTY

3.1 PROPERTY DETAILS

3.1.1 Lot and deposited plan (DP) number of the subject property

Lot 2 DP 1168922

3.1.2 Street address and locality map

Elambra West URA – Campbell Street Gerringong

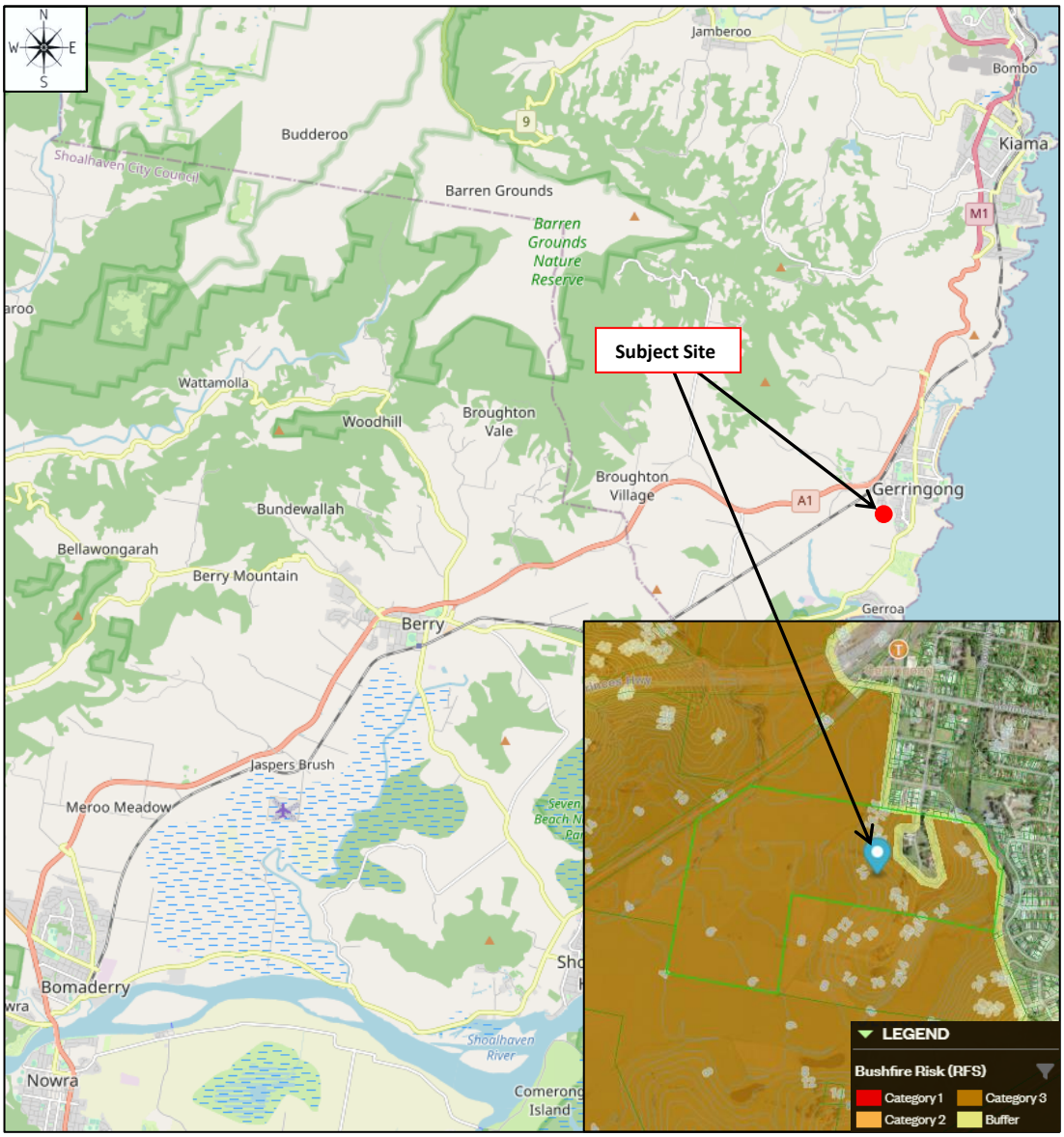

Figure 1: Locality Map (Insert: NSW RFS Bushfire Prone land Map)

3.1.3 Zoning of the subject land and any adjoining lands

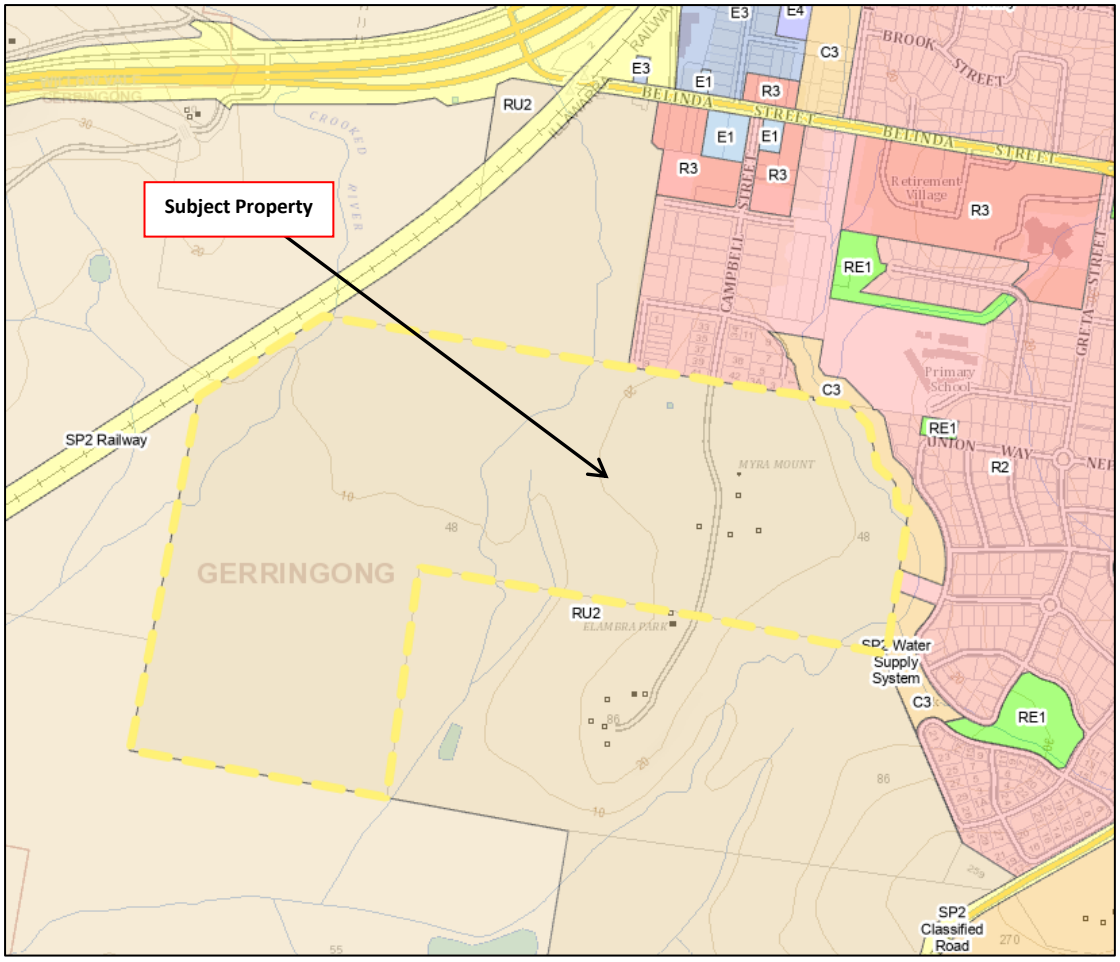

Figure 2: KLEP Zoning 2011 (Source: NSW Planning Portal mapping)

The subject property is zoned RU2 – Rural Landscape. Zoning of the adjoining land is as shown in Figure 2.

3.2 DESCRIPTION OF THE SUBJECT SITE & PLANNING PROPOSAL

The subject property (legally known as Lot 2 DP 1168922) is located at the southern end of Campbell Street approximately one (1) kilometre southwest of Gerringong town centre.

The Elambra West URA site is currently occupied as a rural-residential property and operated commercially for grazing livestock. Existing development on the site comprises two (2) detached dwellings and several outbuildings and infrastructure utilised for farming purposes. With the exception of a small number of individual trees and landscaping surrounding the dwelling sites, the property is otherwise predominantly cleared/ pastoral land.

The existing dwelling sites are located over high ground within the centre-eastern section of the property. From this location the topography grades down slope towards the west (at >0-5 degrees) to a watercourse (creek) where it levels out over the remaining western section of the property. The western topography drains gently towards the south/ southwest via two (2) creeks which eventually feed into Crooked River further to the south.

East of the dwelling sites the topography descends down slope towards the east at >5-10 degrees over pastoral land to a watercourse and vegetated riparian corridor which runs along the eastern property boundary between the subject property and residential development within Elambra Estate further to the east. This watercourse also drains towards the south eventually feeding into Crooked River.

The subject property is otherwise located at the urban-rural interface of Gerringong with pastoral land adjoining the site to the northwest, west and south. Adjacent land to the north/northeast and east is that associated with established residential/ urban development.

The Planning Proposal seeks to rezone part of the subject property from RU2 (Rural Landscape) to R2 (Low Density Residential) over higher ground within the eastern section of the site; and C2 (Environmental Conservation) through the eastern riparian corridor. Rezoning of the Elambra West URA would permit low density residential development as a natural expansion of the Gerringong urban area.

The proposed Structure Plan is included over page (Figure 3) and in Appendix 1 (broader scale plan).

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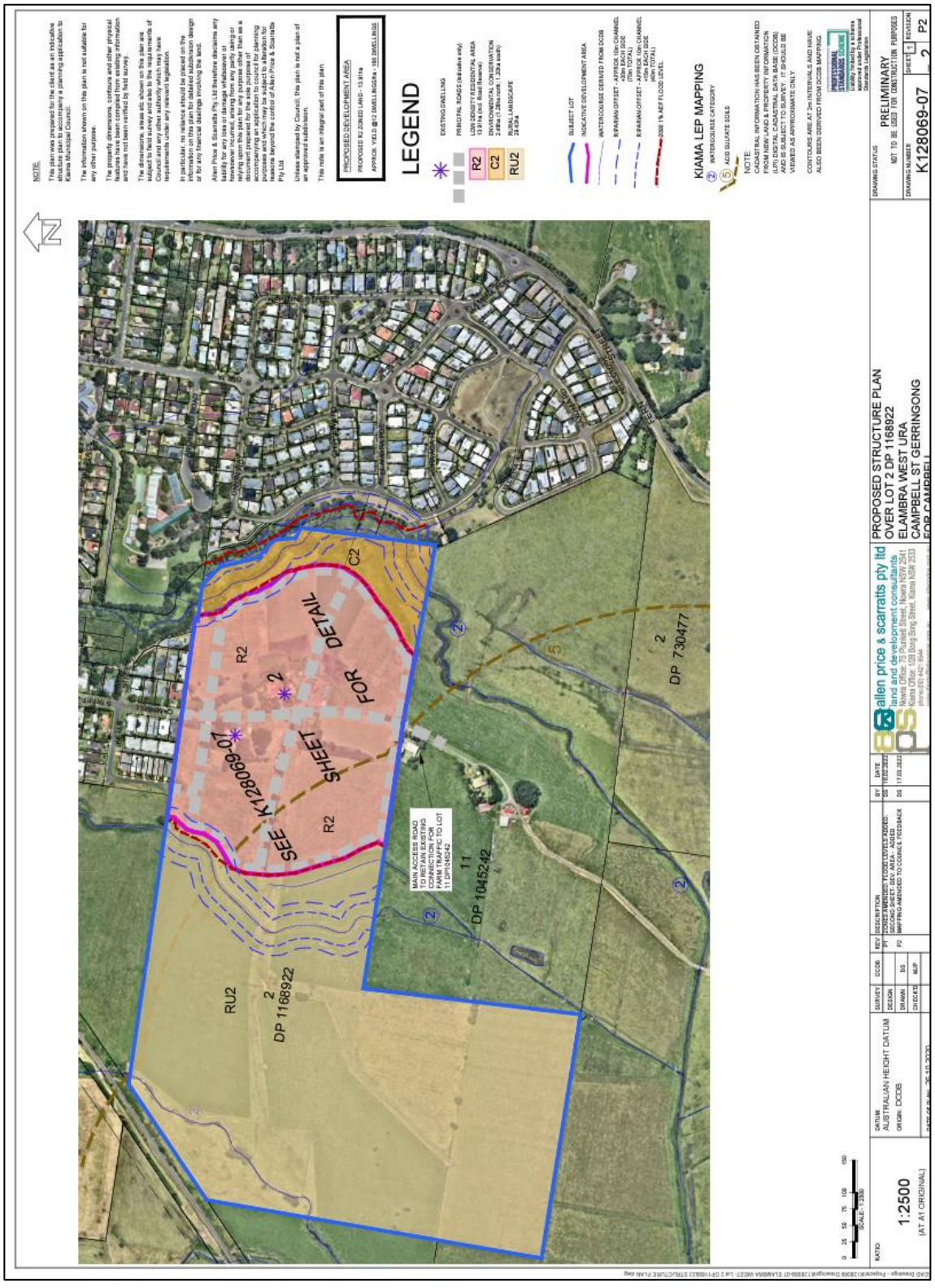

Figure 3: Proposed Structure Plan (Source: Allen Price & Scarratts Pty Ltd)

SECTION 4 BUSHFIRE LANDSCAPE ASSESSMENT

4.1 WEATHER

The subject site is located within the Illawarra Bush Fire Risk Management Plan (IBFRMP) area. The Illawarra is generally characterized by a humid temperate climate with an average annual rainfall of 1329mm.

The start of the normal fire season coincides with fresh to strong southwest to northwest winds which prevail during August and September. The majority of bush fires can occur from this period until the onset of summer rains or coastal showers. Longer fire seasons are experienced when rainfall is lower than average extending the bush fire season through summer to early autumn. Extreme fire danger days are usually experienced due to strong west to north westerly winds, particularly where the drought indices are low.

4.2 FIRE HISTORY

A review of the IBFRMP mapping (Bush Fire Frequency and Time Since Fire) indicates that (up to June 2015) there were no recorded bush or grass fire events occurring on the subject property or within the study area (out to 140 metres from the subject site).

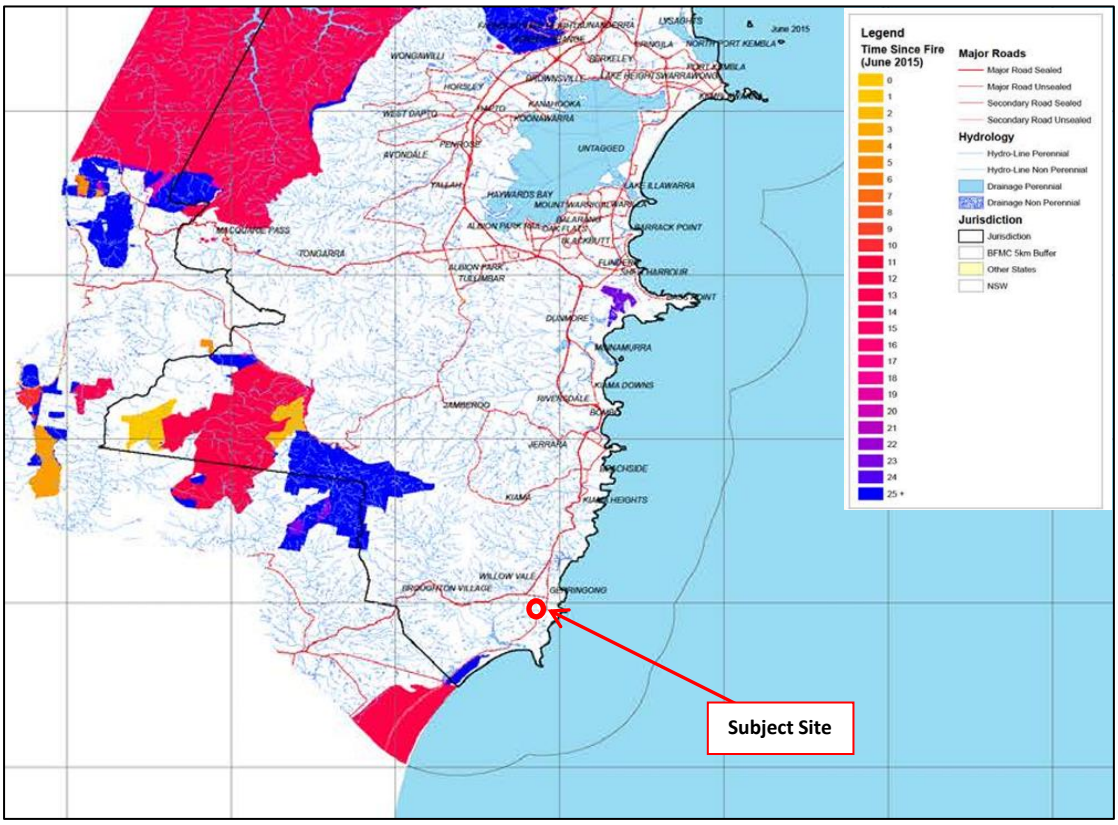

Figure 4: IBFRMP – Time Since Fire

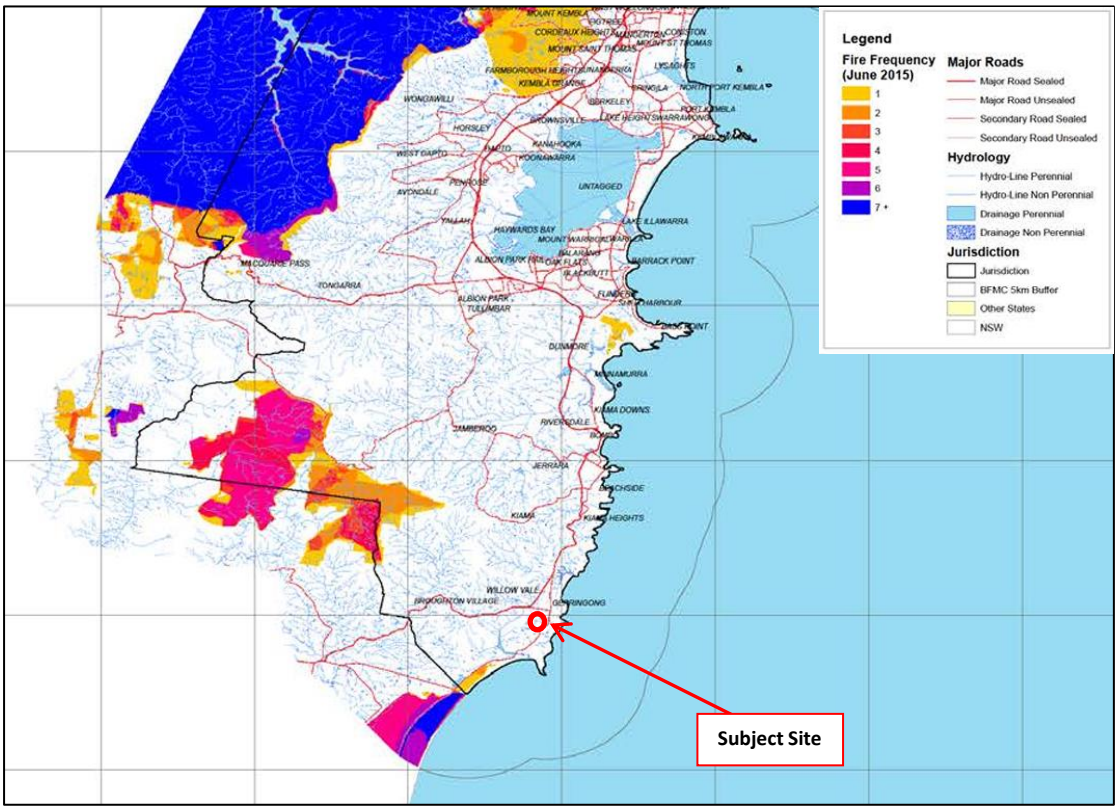

Figure 5: IBFRMP – Fire Frequency

4.3 BUSH FIRE HAZARD ASSESSMENT

4.3.1 Vegetation (hazard) Formations affecting the site:

Vegetation extent (bushfire hazard) within the study area is derived from aerial photo interpretation (API); a review of the SEED Portal mapping and an inspection of the subject property and surrounds.

Table 1.0: Vegetation (hazard) located within the study area (out to 140 metres)

Direction from proposed R2 Zone	Primary Vegetation (hazard) Formation (Keith 2004 Formations)	Comment
West, Northwest, East and South	***Grassland***	That associated with pastoral land located over the subject property and adjoining land. Areas of grassland (including pasture) potentially greater than 100mm in height are assessed as a grassfire threat under PBP.
East	***Remnant***	That associated with the narrow corridor of forested vegetation aligning the watercourse along the eastern boundary of the subject property. The relevant formation is mapped on SEED Portal (*NSW State Vegetation Type*

Direction from proposed R2 Zone	Primary Vegetation (hazard) Formation (Keith 2004 Formations)	Comment
		datasets) as ***Coastal Swamp Forests - PCT Name: Shoalhaven Lowland Flats Wet Swamp Forest - PCTID: 4009***. The forested section of the riparian corridor forms a narrow band of vegetation (generally <30 metres in width) before transitioning to reeds and grassland through the lower section of the riparian corridor. The existing remnant forested corridor satisfies the criteria of PBP Section A1.11.1 in terms of down grade to a remnant classification. Remnant hazards are assessed as a lower risk hazard with the relevant fuel load modelled as 'rainforest'.
Northeast	***Forest (Coastal Swamp Forest)***	Relevant to the more persistent hazard area within the riparian corridor to the northeast of the site. This hazard area supports a fire run through Coastal Swamp Forest exceeding 50 metres towards the proposed R2 zone.

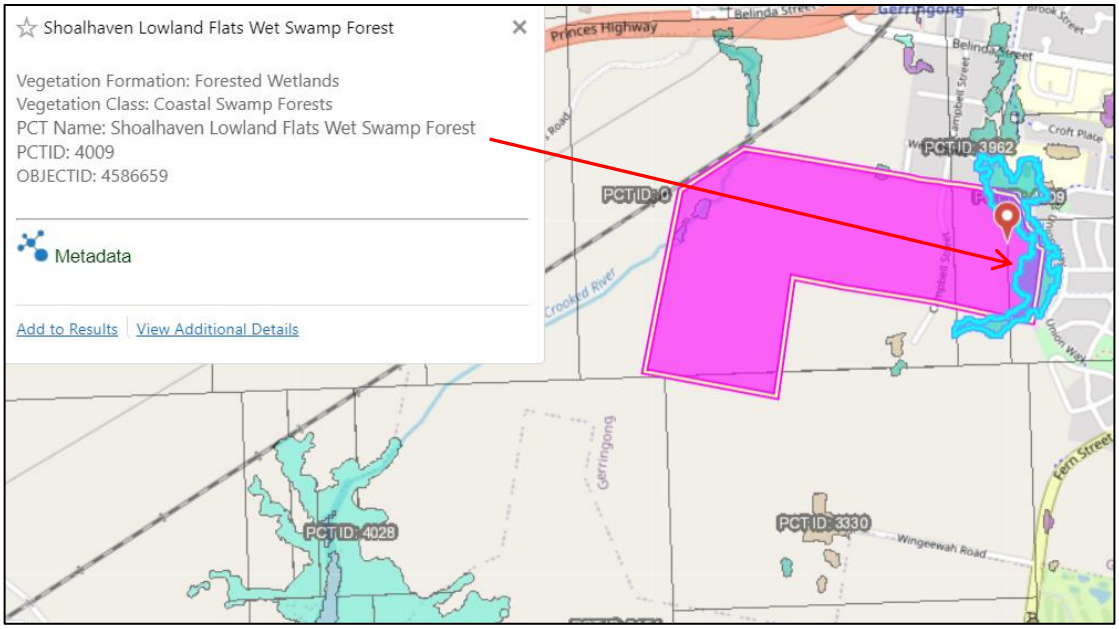

Figure 6: Extract – SEED Portal Mapping – NSW Vegetation Type Formation datasets

Note: Remnant classifications are applicable where the vegetation (hazard) has a size or shape that provides a potential fire run that could threaten buildings not exceeding 50 metres. In the event that the proposed C2 zone (riparian corridor) is re-vegetated to *coastal swamp forest* of a size or shape

supporting a fire run exceeding 50 metres, the relevant vegetation (hazard) classification within the riparian corridor to the east of the site will be assessed as a 'Forest' formation fuel load.

It is assumed (at the time of this assessment) that re-vegetation across the width of the riparian corridor within the proposed C2 zone is unlikely as this will place existing housing development located along Union Way in Elambra Estate (to the east) at a substantially higher risk (i.e., BAL rating) than is afforded by their current level of bushfire construction.

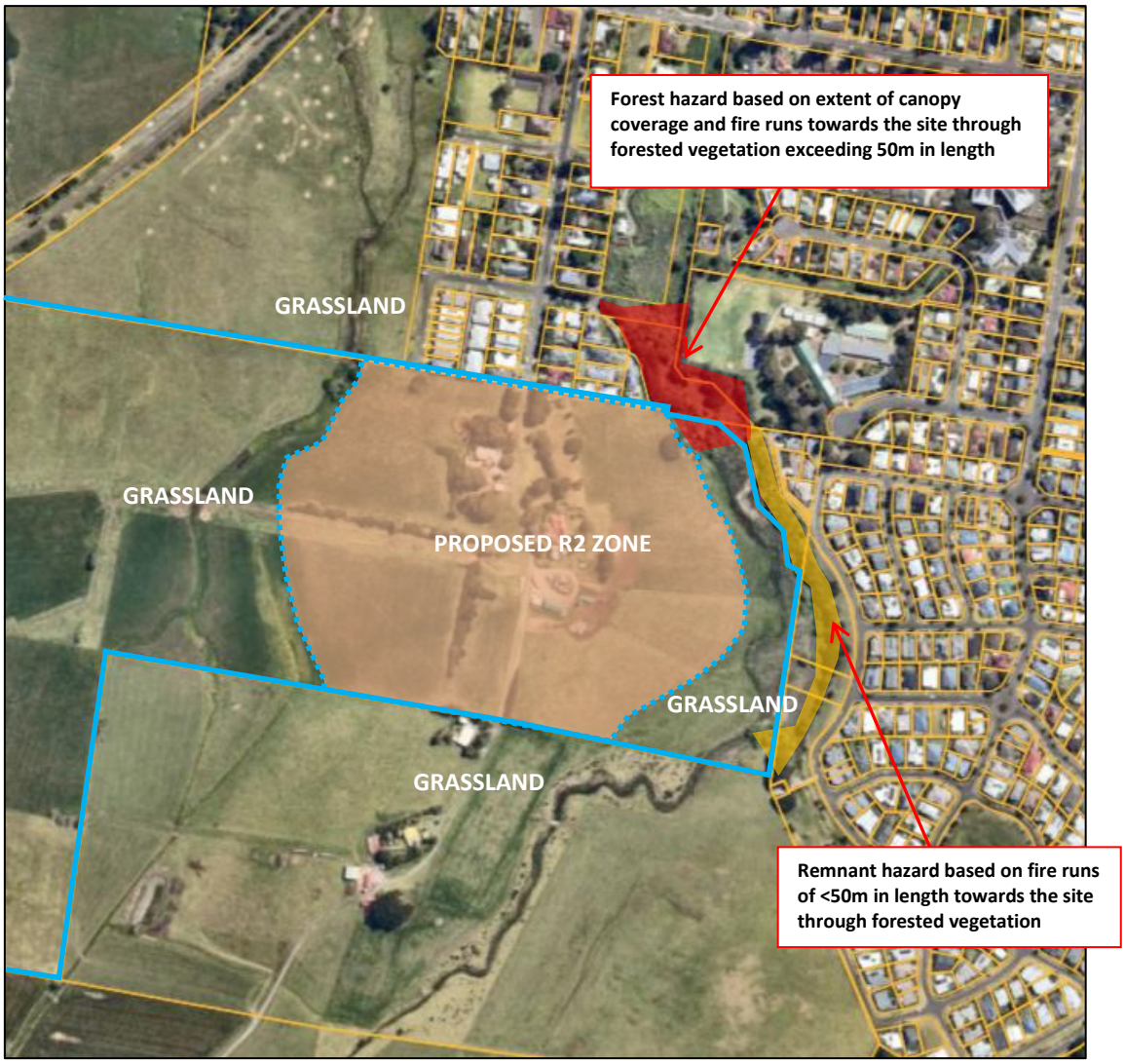

Figure 7: Site Context – Bushfire hazard surrounding proposed R2

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Plate 1: Access to subject site via Campbell Street

Plate 2: View west across subject property over pastoral land

Plate 3: View southeast over subject property showing Elambra Estate in background

Plate 4: View east over subject property showing remnant/ riparian hazard

Plate 5: View towards northeast corner of subject property showing more persistent hazard profile

Plate 6: Riparian hazard profile to the east taken from Union Way – Elambra Estate

4.3.2 Topography/ Effective Slopes affecting Bush Fire Behaviour:

The topography within the study area is characterised by relatively gentle slopes with land descending from the elevated section of the subject property (i.e., at the existing dwelling sites) to the west and east towards watercourses (creeks) on either side of the proposed R2 zone.

The effective slope is the slope of the land underlying the hazard having the greatest affect on bushfire behaviour. In this instance the relevant gradients have been determined using LIDAR digital elevation modelling (DEM – 2 metre contours) overlayed on Nearmap aerial imagery.

The effective slope analysis is depicted as follows:

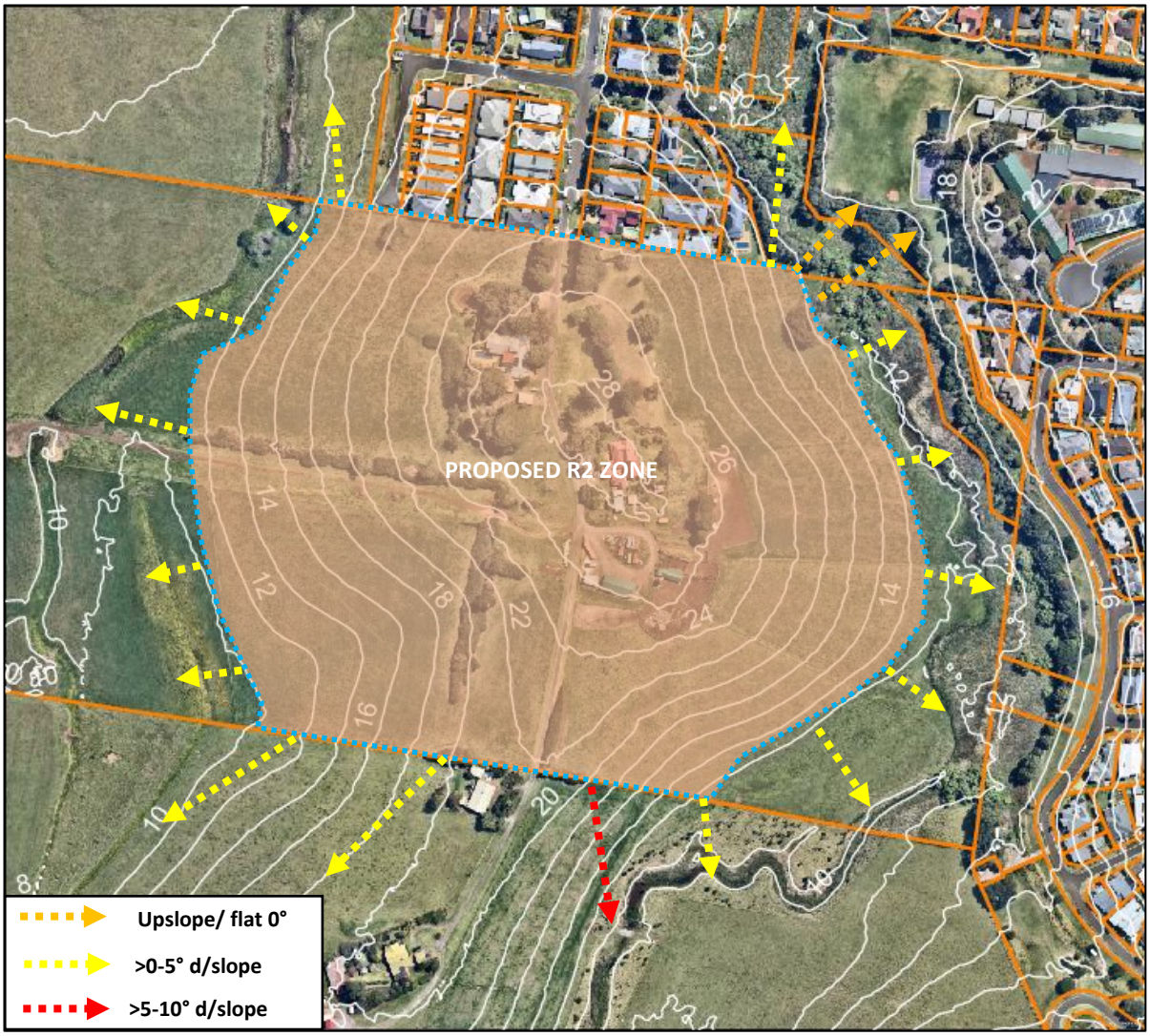

Figure 8: Effective Slope Analysis (2m LIDAR DEM over Nearmap Imagery)

4.3.3 Forest Fire Danger Index (FFDI) for Local Government Area (LGA):

Kiama LGA is assigned a fire danger rating of 100 representing the potential for extreme fire weather.

4.4 POTENTIAL FIRE RUNS INTO THE SITE AND THE INTENSITY OF SUCH FIRE RUNS

The potential fire intensity is determined based on the calculated bushfire attack level (BAL) and corresponding setbacks from the hazard for each BAL rating. Under PBP, residential subdivision development is designed to ensure that new dwellings are not exposed to radiant heat thresholds exceeding 29kW/m² (i.e., >BAL-29). The BAL is determined based on the relevant bushfire parameters inclusive of:

- Vegetation formation and corresponding fuel load;
- Effective slope underlying the hazard;
- Separation distance (between the building and hazard);
- Relevant FFDI (i.e., FFDI of 100 for the Kiama LGA).

The potential fire runs towards the site are depicted as follows:

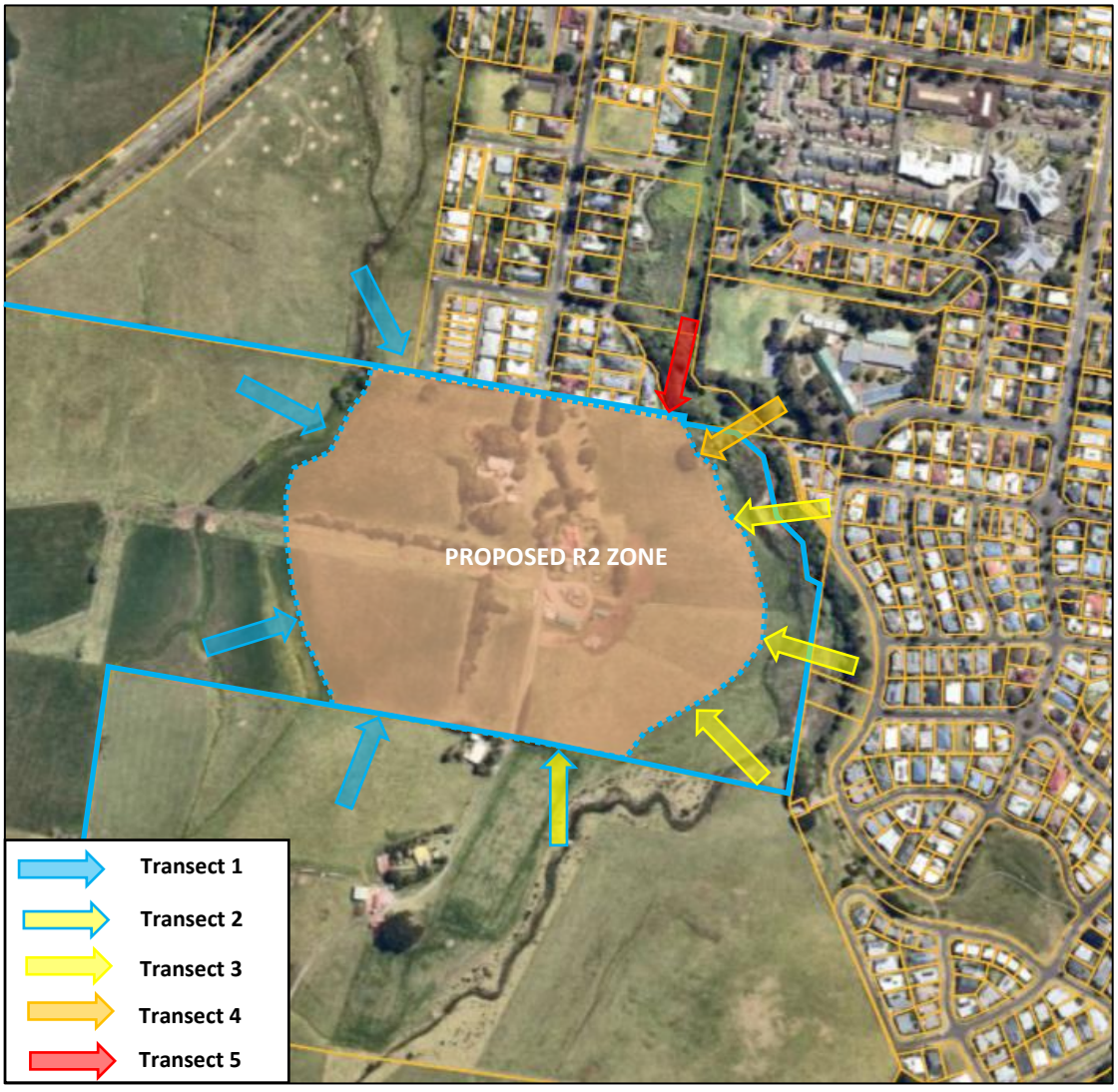

Figure 9: Fire Runs (Transects 1 – 5) towards the subject site

- **TRANSECT 1 (NORTHWEST; WEST; AND SOUTHWEST FIRE RUNS):**

  - Vegetation formation = grassland;
  - Effective slope = >0-5 degrees down slope

Potential fire intensity based on building setbacks from the hazard (Note: PBP Table A1.12.5 is referenced to determine the BAL and relevant APZ setbacks).

KEITH VEGETATION FORMATION		BUSH FIRE ATTACK LEVEL (BAL)				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) asset to predominant vegetation class				
> 0 > 5 DEGREES – DOWNSLOPE	Rainforest	< 11	11 -< 14	14 -< 21	21 -< 29	29 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 22	22 -< 29	29 -< 40	40 -< 54	54 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 12	12 -< 16	16 -< 23	23 -< 32	32 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 9	9 -< 12	12 -< 18	18 -< 26	26 -< 100
	Tall Heath	< 13	13 -< 18	18 -< 26	26 -< 36	36 -< 100
	Short Heath	< 8	8 -< 10	10 -< 15	15 -< 22	22 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 7	7 -< 11	11 -< 16	16 -< 100
	Freshwater Wetlands	< 4	4 -< 6	6 -< 8	8 -< 12	12 -< 100
	Grassland	< 9	9 -< 12	12 -< 17	17 -< 25	25 -< 50

Comment/ Analysis:

Grassland is considered as a medium risk hazard. The APZ/ building setbacks required to achieve a maximum radiant heat threshold of ≤29kW/m² can easily be provided on the site (i.e., within the perimeter road reserve).

- **TRANSECT 2 (SOUTH/ SOUTHEAST FIRE RUN):**

  - Vegetation formation = grassland;
  - Effective slope = >5-10 degrees down slope

KEITH VEGETATION FORMATION		BUSH FIRE ATTACK LEVEL (BAL)				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) asset to predominant vegetation class				
> 5 > 10 DEGREES – DOWNSLOPE	Rainforest	< 14	14 -< 18	18 -< 26	26 -< 37	37 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 28	28 -< 36	36 -< 49	49 -< 65	65 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 15	15 -< 20	20 -< 28	28 -< 39	39 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 12	12 -< 16	16 -< 23	23 -< 33	33 -< 100
	Tall Heath	< 15	15 -< 20	20 -< 29	29 -< 40	40 -< 100
	Short Heath	< 9	9 -< 12	12 -< 18	18 -< 25	25 -< 100
	Arid-Shrublands (acacia and chenopod)	< 6	6 -< 8	8 -< 12	12 -< 18	18 -< 100
	Freshwater Wetlands	<5	5 -< 6	6 -< 10	10 -< 14	14 -< 100
	Grassland	< 10	10 -< 13	13 -< 20	20 -< 28	28 -< 50

Comment/ Analysis:

Grassland is considered as a medium risk hazard. The APZ/ building setbacks required to achieve a maximum radiant heat threshold of ≤29kW/m² can easily be provided on the site (i.e., within the

perimeter road reserve).

- **TRANSECT 3 (EAST FIRE RUNS):**
  - Vegetation formation = Remnant (modelled as 'rainforest');
  - Effective slope = >0-5 degrees down slope

	KEITH VEGETATION FORMATION	BUSH FIRE ATTACK LEVEL (BAL)				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) asset to predominant vegetation class				
>0>5 DEGREES – DOWNSLOPE	Rainforest	< 11	11 -< 14	14 -< 21	21 -< 29	29 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 22	22 -< 29	29 -< 40	40 -< 54	54 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 12	12 -< 16	16 -< 23	23 -< 32	32 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 9	9 -< 12	12 -< 18	18 -< 26	26 -< 100
	Tall Heath	< 13	13 -< 18	18 -< 26	26 -< 36	36 -< 100
	Short Heath	< 8	8 -< 10	10 -< 15	15 -< 22	22 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 7	7 -< 11	11 -< 16	16 -< 100
	Freshwater Wetlands	< 4	4 -< 6	6 -< 8	8 -< 12	12 -< 100
	Grassland	< 9	9 -< 12	12 -< 17	17 -< 25	25 -< 50

Comment/ Analysis:

Remnant vegetation (i.e., total area of <1Ha or a shape that supports a fire run towards dwellings not exceeding 50 metres in length) is considered as a low-risk hazard. The APZ/ building setbacks required to achieve a maximum radiant heat threshold of ≤29kW/m² can easily be provided on the site (i.e., within the perimeter road reserve).

Note: where the C2 zone is revegetated (i.e., to a fuel load consistent with ***Shoalhaven Lowland Flats Wet Swamp Forest,*** thereby creating a shape that supports a fire run exceeding 50 metres towards dwellings) the relevant fuel load and corresponding setbacks for a '**forest**' formation will be applied. The minimum APZ would be incorporated within the perimeter road reserve and adjoining residential lots.

- **TRANSECT 4 (NORTHEAST FIRE RUN):**
  - Vegetation formation = Forest;
  - Effective slope = 0 degrees - flat

	KEITH VEGETATION FORMATION	BUSH FIRE ATTACK LEVEL (BAL)				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) asset to predominant vegetation class				
ALL UPSLOPE AND FLAT LAND	Rainforest	< 8	8 -< 11	11 -< 16	16 -< 23	23 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 18	18 -< 24	24 -< 33	33 -< 45	45 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 9	9 -< 12	12 -< 18	18 -< 26	26 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 7	7 -< 10	10 -< 14	14 -< 21	21 -< 100
	Tall Heath	< 12	12 -< 16	16 -< 23	23 -< 32	32 -< 100
	Short Heath	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 6	6 -< 9	9 -< 14	14 -< 100
	Freshwater Wetlands	< 4	4 -< 5	5 -< 7	7 -< 11	11 -< 100
	Grassland	< 8	8 -< 10	10 -< 15	15 -< 22	22 -< 50

Comment/ Analysis:

Forested vegetation is considered as a high-risk hazard. Notwithstanding, Transect 4 supports a short fire run of <80 metres in length which significantly reduces the overall risk of intense fire behaviour. The APZ/ building setbacks required to achieve a maximum radiant heat threshold of ≤29kW/m² can be provided on the site (i.e., within the perimeter road reserve and adjacent residential lots).

- **TRANSECT 5 (NORTH FIRE RUNS):**
  - Vegetation formation = Forest;
  - Effective slope = >0-5 degrees down slope

KEITH VEGETATION FORMATION		BUSH FIRE ATTACK LEVEL (BAL)				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) asset to predominant vegetation class				
> 0 > 5 DEGREES – DOWNSLOPE	Rainforest	< 11	11 -< 14	14 -< 21	21 -< 29	29 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 22	22 -< 29	29 -< 40	40 -< 54	54 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 12	12 -< 16	16 -< 23	23 -< 32	32 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 9	9 -< 12	12 -< 18	18 -< 26	26 -< 100
	Tall Heath	< 13	13 -< 18	18 -< 26	26 -< 36	36 -< 100
	Short Heath	< 8	8 -< 10	10 -< 15	15 -< 22	22 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 7	7 -< 11	11 -< 16	16 -< 100
	Freshwater Wetlands	< 4	4 -< 6	6 -< 8	8 -< 12	12 -< 100
	Grassland	< 9	9 -< 12	12 -< 17	17 -< 25	25 -< 50

Comment/ Analysis:

Forested vegetation is considered as a high-risk hazard. Notwithstanding, Transect 5 supports a short fire run of <80 metres in length (through forested vegetation) which significantly reduces the overall risk of intense fire behaviour. The APZ/ building setbacks required to achieve a maximum radiant heat threshold of ≤29kW/m² can be provided on the site.

It is recommended that future planning ensures that 29 metre APZ/building setbacks can be achieved within the northeast section of the site. Furthermore, unobstructed access to the hazard in this area should be provided for fire and emergency services via the public (perimeter) road network.

4.5 DIFFICULTY IN ACCESSING AND SUPPRESSING A FIRE – STRATEGIC HAZARD TERRAIN ANALYSIS

The Structure Plan includes provision for perimeter road access to the eastern, southern and western interface of the proposed R2 zone. In this regard, direct firefighter access is provided from the proposed R2 zone to all transect (hazard) areas.

Furthermore, the following (existing) public road network is available (if required) to access the surrounding hazard areas:

- Access to Transect 4 and Transect 5 hazard areas via Wells Street and access to the riparian corridor further to the north via Parkes Street and Belinda Street;
- Access to Transect 3 Hazard area from Union Way along the western interface of the existing Elambra Estate;
- Access to the northwest grassland interface hazard area (Transect 1) via Wells Street and Short Street.

From a strategic standpoint, the proposed perimeter road network significantly improves firefighter/emergency access to the southwest urban-rural interface of Gerringong by providing perimeter roads along the hazard interface that are designed and constructed in accordance with the specifications of PBP. Suitable emergency access is also provided from the north and east via the existing public road network.

The proposed re-zoning and the associated future perimeter road network will significantly improve firefighter access to the hazard within the riparian corridor along the eastern boundary of the subject property. Access to this hazard area via the existing Elambra Estate is also provided along Union Way.

Section 6 and Figure 11 of this report provide further detail of the existing public road network surrounding Elambra West URA and specify the relevant provisions of PBP for public road access as required for new development within the R2 zone.

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SECTION 5 LANDUSE ASSESSMENT

5.1 PROPOSED LAND USE ZONES AND PERMITTED USES

Kiama LEP 2011 specifies the following objectives for the proposed land use zones:

C2 – Environmental Conservation:

Objectives of zone – C2 - zone:

- To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.
- To prevent development that could destroy, damage or otherwise have an adverse effect on those values.
- To ensure adequate environmental buffers are provided, maintained or rehabilitated in the vicinity of high ecological value areas and waterways.

Development permitted with consent – C2 - zone:

- Environmental facilities; Oyster aquaculture Recreation areas; Roads.

Recreation areas and road reserves may be included as part of an Asset Protection Zone (APZ) where there is surety the relevant land will be landscaped and managed (in-perpetuity) in accordance with APZ standards.

At a strategic level (and in order to emphasize the appropriateness of the proposed re-zoning) the APZs determined in this report are incorporated entirely within the proposed R2 zone. Notwithstanding, where managed recreational areas and road reserves are incorporated within the C2 zone they may be included as part of the APZ separating the hazard from future dwellings.

R2 – Low Density Residential:

Objectives of zone – R2 zone:

- To provide for the housing needs of the community within a low-density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- To increase the supply of secondary dwellings for affordable rental housing stock.
- To provide economic and employment opportunities for people who conduct business activities from their homes where these will not adversely affect the amenity of neighbours or the neighbourhood.

Development permitted with consent – R2 zone:

- Bed and breakfast accommodation; Boat sheds; Business identification signs; Centre-based child care facilities; Community facilities; Dual occupancies; Dwelling houses; Environmental protection works; Exhibition homes; Exhibition villages; Group homes; Health consulting rooms; Home-based child care; Home businesses; Home industries; Hospitals; Multi dwelling housing; Oyster aquaculture; Places of public worship; Pond-based aquaculture; Recreation areas; Respite day care centres; Roads; Secondary dwellings; Semi-detached dwellings; Tank-based aquaculture.

Under PBP, new residential subdivisions for the purpose of single dwellings, semi-detached dwellings, dual occupancies, multi-dwelling housing, exhibition homes and villages, bed and breakfast accommodation, home-based child-care and Class 5-8 development require provision for an APZ based on 29kW/m² (i.e., BAL-29).

Special Fire Protection Purpose (SFPP) development and Class 9 development permitted within the R2 zone as detailed above may include: centre-based child care; community facilities; health consulting rooms, hospitals, places of public worship and respite day care centres.

These types of development may be occupied by at-risk members of the community who are more susceptible to the impacts of bush fire. Evacuating at-risk occupants is typically more challenging as they may be physically or psychologically less able to relocate themselves or are unfamiliar with their surroundings. Under PBP these types of development typically require a larger APZ based on 10kW/m².

Section 5.2 details the Asset Protection Zones (APZs) relevant to the site for future residential and SFPP use.

5.2 APPROPRIATE SITING OF DIFFERENT LAND USES BASED ON RISK PROFILES WITHIN THE SITE

An asset protection zone (APZ) is a buffer zone located between a bushfire hazard and buildings that is designed to mitigate the risk to life and property. This area is managed to minimise fuel loads and reduce potential radiant heat levels, flame, ember and smoke attack at the building elevation. The relevant standards for fuel management within the APZ are detailed in PBP Appendix 4 (refer Appendix 2 of this report).

PBP (Appendix 1) specifies the following procedure for determining the Asset Protection Zone (APZ) setback distances required for residential subdivision and SFPP development:

Step 1. Determine the vegetation formation in all directions around the building to a distance of 140 metres (refer PBP Section A1.2);

Step 2. Determine the effective slope of the land (under the predominant vegetation class) from the building for a distance of 100 metres (refer to PBP Sections A1.4 and A1.5);

Step 3. Determine the relevant FFDI for the Council area in which the development is to be undertaken (refer PBP Section A1.6); and

Step 4. Match the relevant FFDI, vegetation formation and effective slope to determine the APZ required from the appropriate table of PBP Appendix 1 (refer PBP Section A1.7).

5.2.1 APZ/ building setbacks based on 29kW/m² required for residential development (and other non-SFPP development) within the R2 zone.

Table A1.12.2 of PBP specifies the following (minimum) APZ's for a residential subdivision (FFDI 100) based on the bushfire parameters relevant to the subject site.

Table 2.0: *Minimum Required APZ - 29kW/m²*

Vegetation Formation	Slope (under hazard)	Radiant heat exposure	Minimum/ Required APZ (PBP Table A1.12.2)
Transect 1 - Grassland	>0 - 5º d/slope	≤29kW/m	**12 metres**
Transect 2 - Grassland	>5 - 10º d/slope	≤29kW/m	**13 metres**
Transect 3 - Remnant	>0 - 5º d/slope	≤29kW/m	**14 metres**
Transect 4 - Forest	0º flat	≤29kW/m	**24 metres**
Transect 5 - Forest	>0 - 5º d/slope	≤29kW/m	**29 metres**

5.2.2 APZ/ building setbacks based on 10kW/m² required for SFPP development

Table A1.12.1 of PBP specifies the following (minimum) APZ's for SFPP development based on the bushfire parameters relevant to the subject site.

Table 3.0: *Minimum Required APZ – SFPP - 10kW/m²*

Vegetation Formation	Slope (under hazard)	Radiant heat exposure	Minimum/ Required APZ (PBP Table A1.12.2)
Transect 1 - Grassland	>0 - 5º d/slope	≤10kW/m	**40 metres**

Vegetation Formation	Slope (under hazard)	Radiant heat exposure	Minimum/ Required APZ (PBP Table A1.12.2)
Transect 2 - Grassland	>5 - 10º d/slope	≤10kW/m	**45 metres**
Transect 3 - Remnant	>0 - 5º d/slope	≤10kW/m	**47 metres**
Transect 4 - Forest	0º flat	≤10kW/m	**67 metres**
Transect 5 - Forest	>0 - 5º d/slope	≤10kW/m	**79 metres**

The relevant APZ/ building setback for future residential and SFPP development are illustrated as follows:

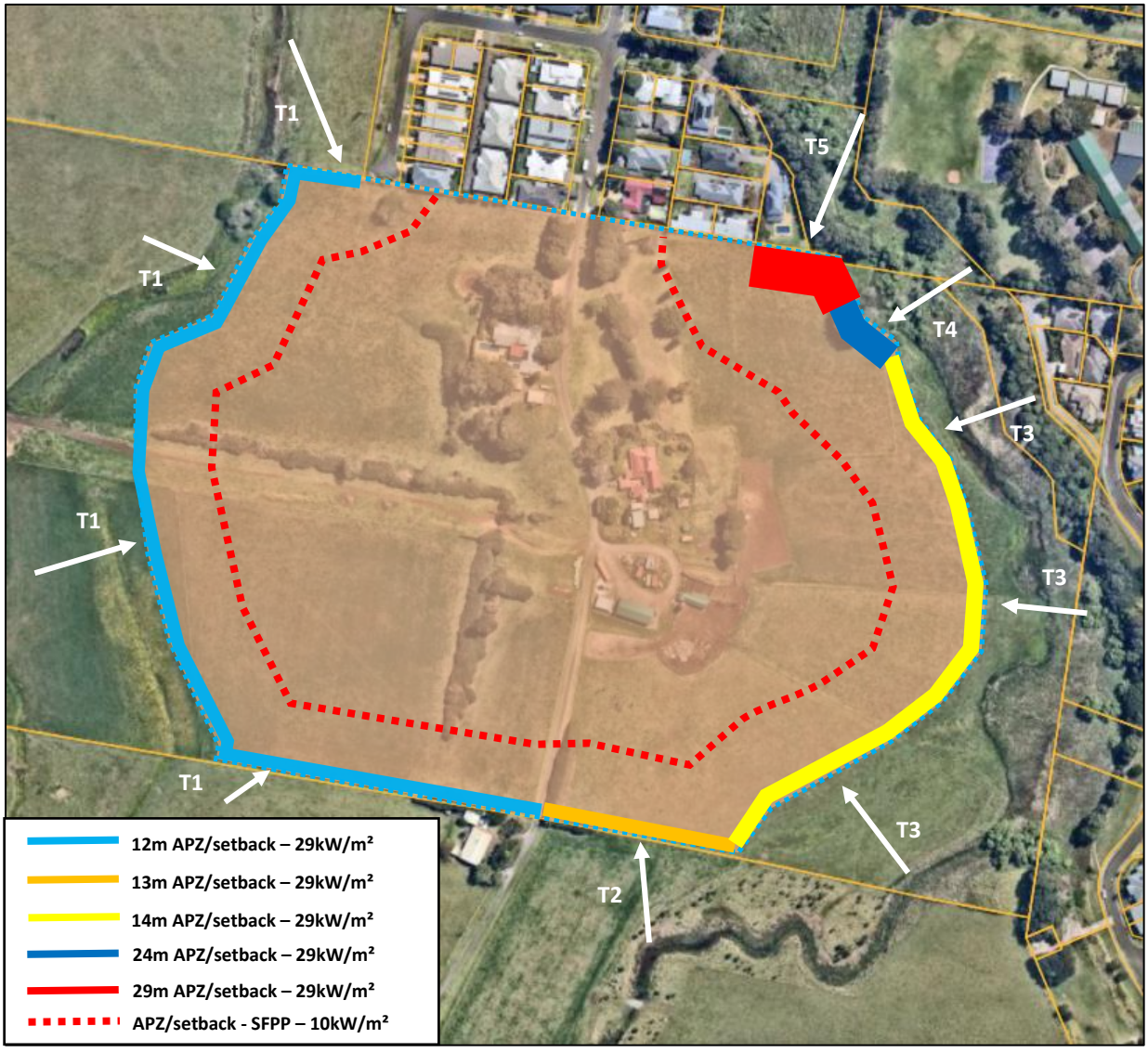

Figure 10: Minimum/ Required APZ/ building setbacks – residential and SFPP Development

Note: distances depicted in Figure 10 are indicative only and are not to scale.

Comment/ Analysis:

APZs as required for residential subdivision and SFPP development can reasonably be accommodated on the subject site.

The APZs required for residential dwellings will likely be incorporated within the perimeter road network along the eastern, southern and western interface. Future planning should ensure that the APZ from the more persistent northeast hazard (Transects 4 and 5) is provided so that firefighting vehicles can directly access the hazard interface.

Furthermore, future planning should ensure that SFPP development is limited to those areas of the site where the APZ/ setbacks detailed in Table 3.0 are provided.

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SECTION 6 ACCESS AND EGRESS:

6.1 Location of Key Access Routes and Direction of Travel

Elambra West URA is accessed from the north via Campbell Street (i.e., 8-metre-wide sealed carriageway set within a 20-metre-wide road reserve). Secondary access to/from the R2 zone is proposed via Short Street and Wells Street (i.e., currently a 6-metre-wide sealed carriageway and 8-metre-wide sealed carriageway respectively set within 20-metre-wide road reserves).

Travel to and from the site via this route towards Gerringong town centre is through established residential land and in a direction away from the primary bushfire risk to the west, south and east of the subject property.

The existing public road dimensions are consistent with other local arterial roads through the urban section of Gerringong. It is therefore reasonably assumed that the existing arrangement has sufficient capacity to deal with increased traffic volumes associated with a bushfire emergency event.

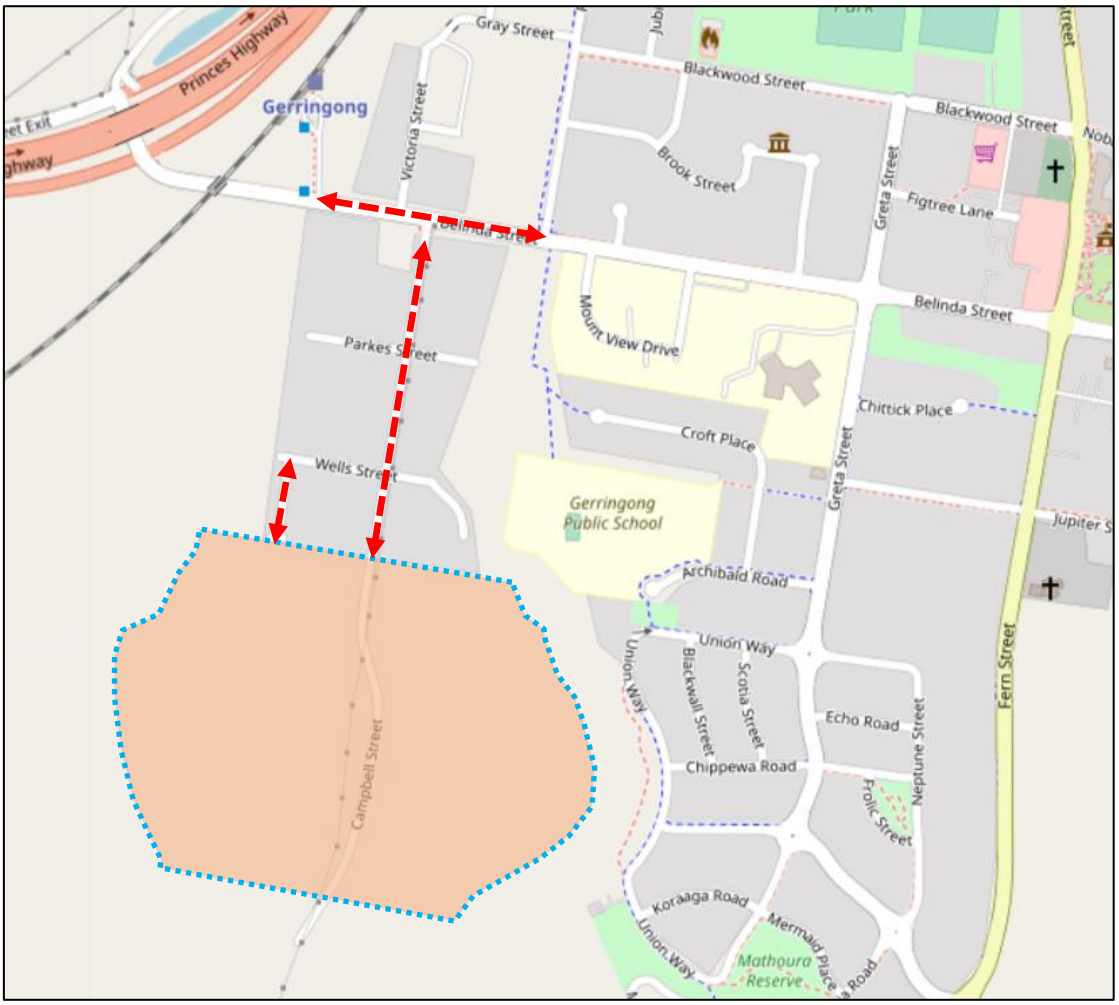

Figure 11: Access/Egress to/from the site via the existing public road network

6.2 *The capacity of the proposed road network to deal with evacuating residents and responding emergency services.*

The proposed Structure Plan includes provision for perimeter roads along interface areas with internal through roads linking with the perimeter roads at regular intervals.

The Acceptable Solutions of PBP for residential subdivision development include provision for safe emergency access to/ from a site during a bushfire event. The intent of measures of PBP 2019 include:

'*To provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area*'

The recommendations of this report (Section 10) include provision for public road access and design in accordance with the Acceptable Solutions of PBP 2019 (Table 5.3B) detailed as follows:

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
ACCESS (GENERAL REQUIREMENTS)	› firefighting vehicles are provided with safe, all-weather access to structures.	› property access roads are two-wheel drive, all-weather roads; › perimeter roads are provided for residential subdivisions of three or more allotments; › subdivisions of three or more allotments have more than one access in and out of the development; › traffic management devices are constructed to not prohibit access by emergency services vehicles; › maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient; › all roads are through roads; › dead end roads are not recommended, but if unavoidable, are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end; › where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road; › where access/egress can only be achieved through forest, woodland and heath vegetation, secondary access shall be provided to an alternate point on the existing public road system; and › one way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.
	› the capacity of access roads is adequate for firefighting vehicles.	› the capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/ causeways are to clearly indicate load rating.
	› there is appropriate access to water supply.	› hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression; › hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005 - *Fire hydrant installations System design, installation and commissioning*; and › there is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.

PERIMETER ROADS	access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	are two-way sealed roads; minimum 8m carriageway width kerb to kerb; parking is provided outside of the carriageway width; hydrants are located clear of parking areas; are through roads, and these are linked to the internal road system at an interval of no greater than 500m; curves of roads have a minimum inner radius of 6m; the maximum grade road is 15 degrees and average grade of not more than 10 degrees; the road crossfall does not exceed 3 degrees; and a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
NON-PERIMETER ROADS	access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	minimum 5.5m carriageway width kerb to kerb; parking is provided outside of the carriageway width; hydrants are located clear of parking areas; roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m; curves of roads have a minimum inner radius of 6m; the road crossfall does not exceed 3 degrees; and a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

Note: where battle-axe lots are proposed, the following property access provisions (PBP 2019) are applicable.

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
PROPERTY ACCESS	firefighting vehicles can access the dwelling and exit the property safely.	There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. In circumstances where this cannot occur, the following requirements apply: minimum 4m carriageway width; in forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay; a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; provide a suitable turning area in accordance with Appendix 3; curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; the minimum distance between inner and outer curves is 6m; the crossfall is not more than 10 degrees; maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and a development comprising more than three dwellings has access by dedication of a road and not by right of way. Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.

It is recommended that future planning for the Elambra West URA is undertaken with due consideration of the Acceptable Solutions of PBP (Table 5.3B) detailed above.

The incorporation of these standards will enable safe emergency access to the interface under threat while residents evacuate the affected area to a safe location within the Elambra west URA site, or to a safe location within Gerringong further to the north via the existing public road network.

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SECTION 7 INFRASTRUCTURE:

7.1 Reticulated Water Supplies and Safe Installation of Electricity and Gas

The subject site is serviced by the local reticulated water supply network with regularly spaced hydrants (100mm water main) located along the existing public road network to the north of subject site.

Figure 12: Extract - Prime Maps showing existing 100mm mains hydrants to the north of subject site

Given the proximity of the existing reticulated water supply and utility infrastructure it is reasonably assumed that future development within the proposed R2 zone will be serviced via water and utility installations installed in accordance with the relevant provisions of PBP Table 5.3C detailed as follows

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
WATER SUPPLIES	adequate water supplies is provided for firefighting purposes.	reticulated water is to be provided to the development where available; a static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed; and static water supplies shall comply with Table 5.3d.
WATER SUPPLIES	water supplies are located at regular intervals; and the water supply is accessible and reliable for firefighting operations.	fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2005; hydrants are not located within any road carriageway; and reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.
WATER SUPPLIES	flows and pressure are appropriate.	fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
WATER SUPPLIES	the integrity of the water supply is maintained.	all above-ground water service pipes are metal, including and up to any taps; and above-ground water storage tanks shall be of concrete or metal.
ELECTRICITY SERVICES	location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	where practicable, electrical transmission lines are underground; where overhead, electrical transmission lines are proposed 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*.
GAS SERVICES	location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	reticulated or bottled gas is 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.

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SECTION 8 EMERGENCY RESPONSE AND MANAGEMENT:

8.1 Landscaping/ Vegetation Management

Section 5 of this report specifies the APZ's prescribed under PBP that are relevant for any future residential and SFPP development within the proposed R2 zone. Development within the R2 zone will be separated from the hazard along its eastern, western and southern boundaries by the proposed perimeter road network and associated APZs.

In perpetuity management of the R2 zone and associated asset protection zones (in accordance with the relevant APZ standards) will be subject to the conditions of consent and relevant planning instruments applied to any future residential subdivision development.

8.2 Illawarra Bushfire Risk Management Plan (SBFRMP)

Gerringong is located within a NSW Rural Fire Service brigade area with the local fire station located in close proximity to the site (i.e., within 700 metres) at 46 Blackwood Street Gerringong.

Bushfire risk within the Kiama LGA is managed under the Illawarra Bush Fire Risk Management Plan. The IBFRMP (2015) was prepared by the Illawarra Bushfire Management Committee in accordance with the legislative requirements of Part 3 Division 4 of the RF Act. It is a strategic document that identifies community assets at risk and sets out a five-year program of coordinated multi-agency treatments designed to reduce the risk of bushfire to these assets.

The subject property is not currently identified under the IBFRMP as requiring specific treatments.

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SECTION 9 COMPLIANCE WITH DIRECTION 4.3 – PLANNING FOR BUSHFIRE PROTECTION.

Table 4.0: *Compliance – Direction 4.3*

Direction 4.3 Requirement	Comment
1. In the preparation of a planning proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 3.34 of the Act, and prior to undertaking community consultation in satisfaction of clause 4, Schedule 1 to the EP&A Act, and take into account any comments so made.	*This study has been undertaken in accordance with PBP Section 4.2 (Strategic planning in bush fire prone areas); Section 4.4 (Local Environmental Plans); Section 4.4.1 (Consideration of bush fire issues); and Table 4.2.1 (Bush Fire Strategic Study requirements) to assist the relevant planning authority in undertaking the required consultation process.*
(2) A planning proposal must: (a) have regard to Planning for Bushfire Protection 2019, (b) introduce controls that avoid placing inappropriate developments in hazardous areas, and (c) ensure that bushfire hazard reduction is not prohibited within the Asset Protection Zone (APZ).	***Complies:*** *This study has been undertaken in accordance with the information requirements and assessment methodology prescribed under PBP. Accordingly, this report provides an assessment of the bushfire risk to the Elambra West URA site and recommends APZs appropriate to future residential and SFPP development. The recommended APZs can be provided over managed land (i.e., road reserves and residential lots) within the proposed R2 zone, and/ or over managed recreational areas and road reserves within the proposed C2 zone. APZ compliance (as recommended in this report) does not require clearing of any areas of native vegetation.*
(3) A planning proposal must, where development is proposed, comply with the following provisions, as appropriate: (a) provide an Asset Protection Zone (APZ) incorporating at a minimum: i. an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and ii. an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road, (b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as	***Complies:*** *Section 5 and 10 of this report recommend APZs (managed in accordance with Inner protection Area standards) commensurate with the bushfire risk and associated development type and in accordance with the acceptable solutions of PBP.* *N/A*

Direction 4.3 Requirement	Comment
defined under section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with, (c) contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks, (d) contain provisions for adequate water supply for firefighting purposes, (e) minimise the perimeter of the area of land interfacing the hazard which may be developed, (f) introduce controls on the placement of combustible materials in the Inner Protection Area.	*The recommendations contained herein are made with reference to the Acceptable Solutions of PBP and are relevant for future planning for the Elambra West URA in relation to provision for public access roads, reticulated water supplies for firefighting and utility installations.* *The hazard areas affecting the site are assessed as a low to medium risk. The primary access to the site via the existing public access roads is to the north through the existing urban landscape and away from the primary bushfire threat to the south, west and east.* *The recommended APZ (IPA) is over cleared land within the Elambra URA site. APZ compliance in accordance with the relevant standards (refer Appendix 2 of this report) will be subject to the provisions of future development consent and planning instruments.*

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SECTION 10 CONCLUSION

The bushfire assessment and recommendations contained herein have been made in accordance with the specifications of PBP relevant to the proposed re-zoning of the Elambra West URA.

Rezoning of the subject property would permit low density residential development as a natural expansion of the Gerringong urban area. The subject site is located within a semi-rural context and is constrained by low to moderate risk vegetation hazard areas associated with adjoining pastoral land, remnant vegetation and a remnant forested area over a short fire run distance.

The recommendations of this report include provision for the implementation of bushfire protection measures prescribed under PBP relevant to the proposed rezoning of land.

Where the following measures are incorporated into future planning it is considered that the Planning Proposal can suitably comply with the relevant provisions of PBP as required under Local Planning Directions - Direction 4.3 – Planning for Bush Fire Protection.

10.1 RECOMMENDATIONS

I. That APZ's for residential and SFPP development commensurate with the bushfire risk as detailed in Section 5 of this report are incorporated within the Elambra West URA;

II. That planning for the Elambra West URA ensures that the entire R2 zone is landscaped and maintained in accordance with the relevant standards for an APZ (Inner protection Area);

III. That planning for the site includes provision for public road access and design in accordance with the Acceptable Solutions of PBP 2019 as detailed in Section 6 of this report.

IV. That due consideration is also given as part of the planning process to the Acceptable Solutions of PBP regarding property access for any proposed battle-axe lots;

V. That perimeter roads designed in accordance with the Acceptable solutions of PBP (detailed in Section 6.2 of this report) are incorporated separating future residential development from the hazard areas identified in Section 3.1 of this report. Where landscaped and managed in accordance with APZ standards, the perimeter roads may form part of the recommended APZs.

VI. That all other public roads planned as part of the Elambra West URA are designed in accordance with the Acceptable Solutions of PBP (refer Section 6.2).

VII. Where public recreational areas and/or perimeter roads are located within the C2 zone and these areas are required to be managed to a standard consistent with an APZ (IPA) they may be included as part of the APZ separating future building development within the R2 zone from the adjacent hazard.

VIII. That the Acceptable Solutions of PBP relevant to the provision of services (i.e., water supplies for firefighting and utilities) as detailed in Section 7 of this report are incorporated for any future planning for the site.

Should any of the above information require clarification or further discussion, please contact the undersigned.

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Bushfire Planning & Design Consultant

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REFERENCES

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- Section 4.14 Consultation and Development Consent Certain Bushfire Prone Land
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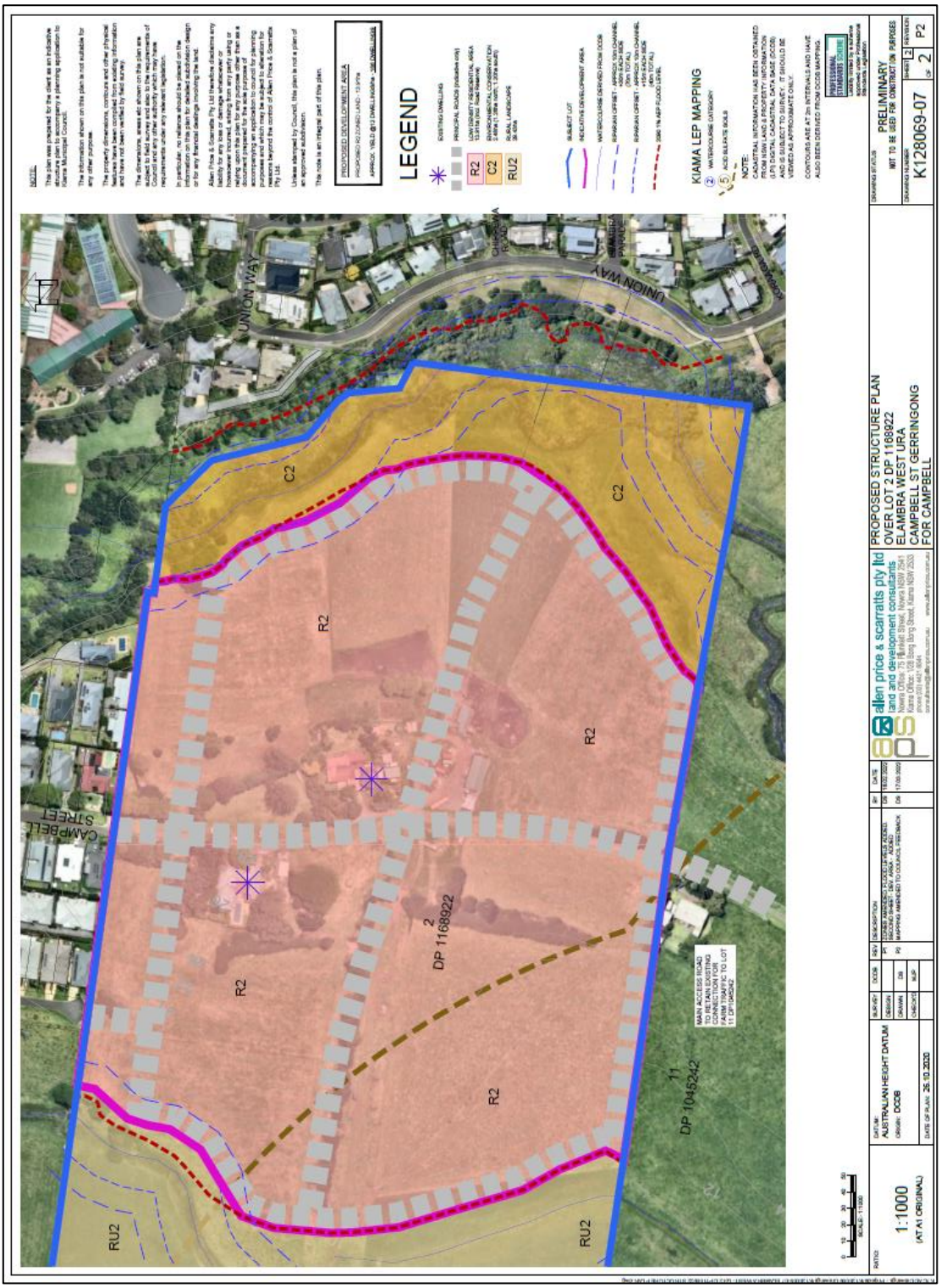
Addendum: Appendix 3 - Planning for Bushfire Protection. A guide for councils, planners, fire authorities and developers (2010) – NSW Rural Fire Service.

Standards for Asset Protection Zones – NSW Rural Fire Service

Appendix 1: *Broad Scale Structure Plan (Source: AP & S)*



Appendix 2: *Asset Protection Zone Description/ Profile (Source: PBP 2019)*

A4.1 Asset protection zones

An APZ is a fuel-reduced area surrounding a built asset or structure.

For a complete guide to APZs and landscaping, download the NSW RFS document *Standards for Asset Protection Zones* at: www.rfs.nsw.gov.au/resources/publications.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset
- an area of reduced bush fire fuel that allows suppression of fire
- an area from which backburning or hazard reduction can be conducted,
- an area which allows emergency services access and provides a relatively safe area for firefighters and home owners to defend their property.

Potential bush fire fuels should be minimised within an APZ. This is so that the vegetation within the planned zone does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy.

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

- direct flame contact on the asset
- damage to the built asset from intense radiant heat
- ember attack.

The APZ should be located between an asset and the bush fire hazard.

The methodology for calculating the required APZ distance is contained within Appendix 1. The width of the APZ required will depend upon the development type. APZs for new development are set out within Chapters 5, 6 and 7 of this document.

In forest vegetation, the APZ can be made up of an inner protection area (IPA) and an outer protection area (OPA).

Inner protection areas (IPAs)

The IPA is the area closest to the asset and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and be a defendable space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous.

In practical terms the IPA is typically the curtilage around the dwelling, consisting of a mown lawn and well maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

Trees:

- canopy cover should be less than 15% (at maturity)
- trees (at maturity) should not touch or overhang the building
- lower limbs should be removed up to a height of 2m above ground
- canopies should be separated by 2 to 5m
- preference should be given to smooth barked and evergreen trees.

Shrubs:

- create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings
- shrubs should not be located under trees
- shrubs should not form more than 10% ground cover
- clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

Grass:

- should be kept mown (as a guide grass should be kept to no more than 100mm in height)
- leaves and vegetation debris should be removed.

Outer protection areas (OPAs)

An OPA is located between the IPA and the unmanaged vegetation. Vegetation within the OPA can be managed to a more moderate level. The reduction of fuel in this area substantially decreases the intensity of an approaching fire and restricts the pathways to crown fuels; reducing the level of direct flame, radiant heat and ember attack on the IPA.

Because of the nature of an OPA, they are only applicable in forest vegetation.

In practical terms the OPA is an area where there is maintenance of the understorey and some separation in the canopy.

When establishing and maintaining an OPA the following requirements apply:

Trees:

- tree canopy cover should be less than 30%
- trees should have canopy separation
- canopies should be separated by 2 to 5m

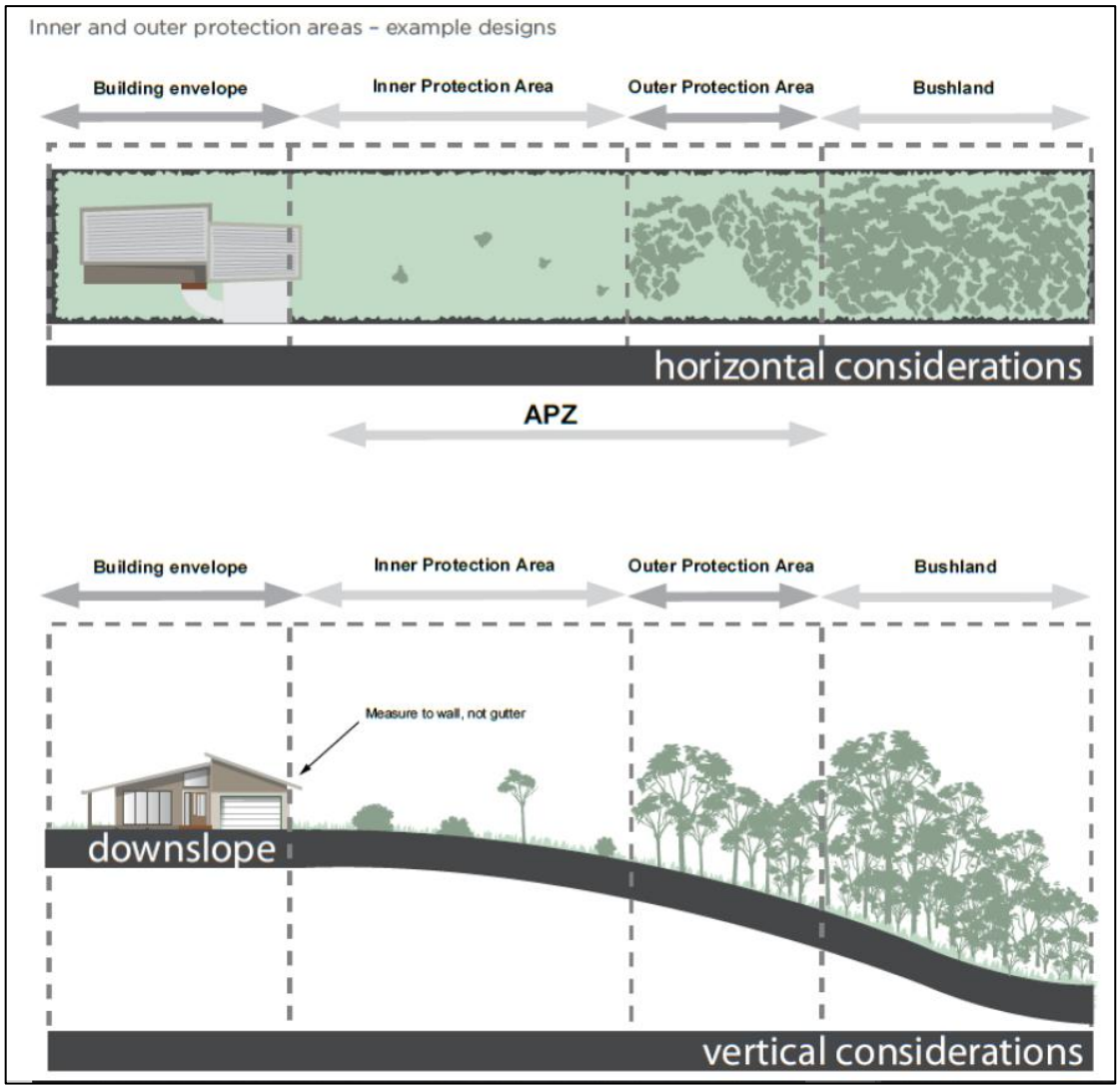
Shrubs:

- shrubs should not form a continuous canopy
- shrubs should form no more than 20% of ground cover

Grass:

- should be kept mown (as a guide grass should be kept to no more than 100mm in height)
- leaf and other debris should be mown, slashed or mulched.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA and OPA to the standards given above should be undertaken on an annual basis, in advance of the fire season, as a minimum.


Inner and outer protection areas – example designs
Building envelope
Inner Protection Area
Outer Protection Area
Bushland
horizontal considerations
APZ
Building envelope
Inner Protection Area
Outer Protection Area
Bushland
Measure to wall, not gutter
downslope
vertical considerations

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