REF: 5231

June 15, 2022

Strategic Bushfire Assessment

Proposed Rezone

104 Fifteenth Avenue, West Hoxton

LGA: Liverpool

Applicant: DalCo NSW Pty Ltd

STRATEGIC BUSHFIRE HAZARD ASSESSMENT

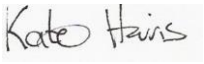
HARRIS ENVIRONMENTAL CONSULTING

ABN 541 287 40 549
Ph.: (02) 4236 0954 | (02) 4862 1168
Mob.: 04 0323 7072
Email: kate@hec.eco
Web: www.harrisenvironmental.com.au

ASSESSOR & QUALIFICATIONS

Letara Judd

BPAD-L2-46804
GRAD CERT BUSH FIRE PROTECTION, (UWS)
BACHELOR OF ENVSC (HONS) (UOW)



BPAD L3 26947
GRAD DIP BUSH FIRE PROTECTION, UWS
GRAD DIP ENVIRO MANG HERTS, UK,
GRAD DIP NAT RES UNE,
BSC APP SC, AGRICULTURE HAC

DISCLAIMER

The recommendations provided in this report's summary result from the proposal's analysis in relatioaboutrements of Planning for Bushfire Protection 2019. Utmost care has been taken in the preparation of preparingr there is no guarant;ee of h,uman error. The intention of this repo. This report intends requirements for Development Applications on bushfire prone land. There is no implbushfire-pron or guarantee the summary conditions will be accepted in the final consent and there is no wa,y Harris Environmental Consulting is liable for any financial losses incurred should the recommendations in this report not be accepted in the fitakenitions of consent. This bushfire assessment provides a risk assessment of the bushfire hazard as outlined in the PBP 2019 and AS3959 2018. It does not protect offer against any damages or losses.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDIX

EXECUTIVE SUMMARY

This strategic study has been undertaken to inform and support a Planning Proposal for 104 Fifteenth Avenue, West Hoxton and demonstrate how the proposal is appropriate in the bushfire hazard context. The proposed plan involves a service station, childcare centre, and McDonald's & food premises. Definitions are provided in Appendix I.

For a strategic landscape context, the subject site is approximately 1.82 hectares in size, triangular-shaped and adjacent to the following:

- existing urban area of West Hoxton on the northern and eastern elevations with access to the major road network.
- Western Sydney Parklands on the southwestern boundary.

The subject site consists of cleared land with Grassland. During the early stages of this proposal, the predominant vegetation within 140 of the subject site was considered Grassland for bushfire assessment purposes. However, the area has now become weedy. Furthermore, future revegetation of the Western Sydney Parklands may occur. Therefore, this bushfire assessment has identified the dominant vegetation to now be Upslope Woodland on the western elevation. The land to the east and north is managed suburban development with no bushfire-prone vegetation. The original 10 m APZ for Grassland using A1.12.45 and A1.12.1 PBP 2019 was incorporated into the plans. This assessment shows how the 10 m APZ can meet upslope woodland using Method 2 AS3959:2018 to calculate the radiant heat emission and flame length utilising the Bushfire Attack Assessor Program licensed by Newcastle Bushfire Consulting (NBC 2020). Full details of the assessment are in Appendix II. The 36 m APZ for the proposed SFPP Childcare also calculated using Method 2.

The proposed development includes development classified Hazard Industry, Commercial (Class 5-8) and Special Fire Protection Purpose.

The subject site is located on the existing public roads of Fifteenth Avenue and Second Avenue.

The Asset Protection Zone is provided over the entire subject lot as an Inner Protection Area (IPA) as well as the Formal Asset Protection Zone setback (<29kW/m^2) on the southwest boundary. An Outer Protection Area (OPA) is not proposed based on the woodland hazard.

Method 2 AS3959:2018 and Tables A1.12.5 and Table A1.12.1 *PBP 2019* have been used to assess the width of the required APZ.

The following controls in the form of a legal agreement should be placed on the lot:

- All land within the subject lot to be managed as an IPA for perpetuity or until development permanently removes the hazard.
- No buildings or combustible materials are to be located within the Formal Asset Protection Zone setback (<29kW/m^2).

1 INTRODUCTION

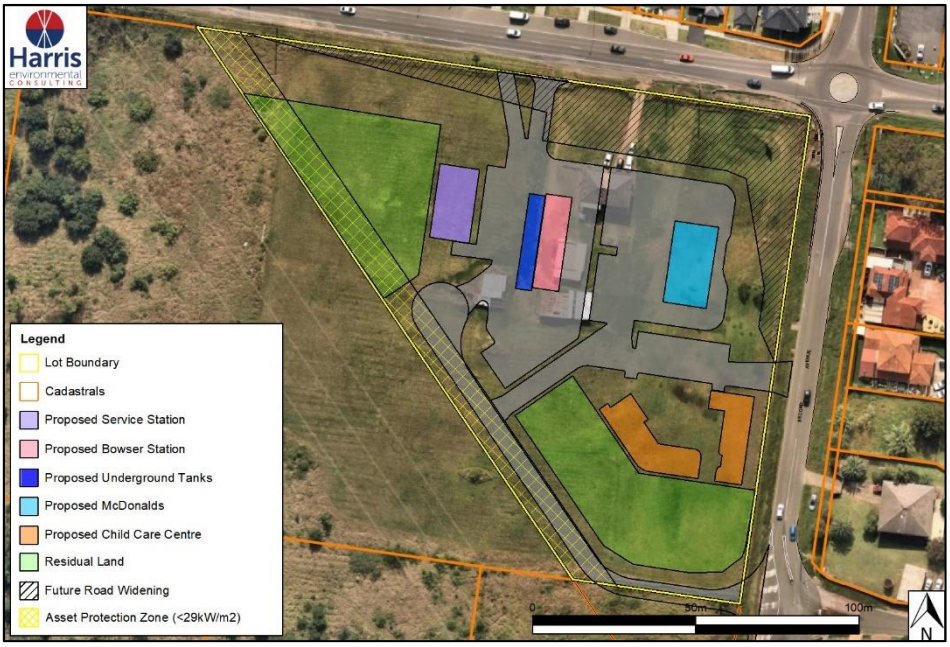
DalCo NSW Pty Ltd commissioned Harris Environmental Consulting to provide a strategic bushfire study. This Strategic Bushfire Hazard Assessment is for the proposed rezoning of Lot 2 DP 1074727 at 104 Fifteenth Avenue, West Hoxton, as part of the proposed commercial development of the land. The determination for the planning proposal requires consultation with the NSW RFS before the public exhibition.

This assessment is provided by Section 4 *Planning for Bushfire Protection 2019 and* addresses t. It addresses strategic bushfire protection requirements for proposed rezoning as required by the *Environmental Planning and Assessment Act 1979 s.9.1 (2).* Direction, 4.3 Direction in consideration of the bushfire risk, evacuation, and environmental constraints which may affect bushfire protection strategy are identified as critical issues in *Section 4.4.1 of 'Planning for Bush Fire Protection* (PBP) (RFS 2019). Table 4.2.1 (PBP 2019) provides the specific assessment considerations for a bush fire strategic study.

The proposed plan involves a proposed service station, childcare centre, and McDonald's & food premises. The land outside the proposed key sites is noted as residue land. Northeast of the site is also earmarked as Future Road Widening. Figure 1 shows the plan superimposed over an aerial.

Indicative plans are provided to demonstrate how the proposal location is suitable for development in the context of bushfire risk. The current land is cleared and zoned R2 Low Density Residential.

FIGURE 1 SUBJECT SITE



2 SITE ANALYSIS

2.1. Location

The subject land is in Liverpool (LGA); located in western Greater Sydney Region. The site is located in West Hoxton Township, with major roads including Cowpasture Road and the M7 located to the east as shown in Figure 2.

A broad-scale aerial view of the subject site, as shown in Figure 3, shows the site is west of the existing residential area of West Hoxton, with fragmented vegetation of the Sydney Parklands to the west.

Figure 4 provides a view of the subject site to 700 m; and shows how the site is located on the urban interface of Hoxton Park and the woodland remnants of the Sydney Parklands. Bushfire could potentially directly approach the subject site from the west, and this assessment provides a APZ buffer to provide a slower pathway for the bushfire attack.

FIGURE 2 SITE LOCATION

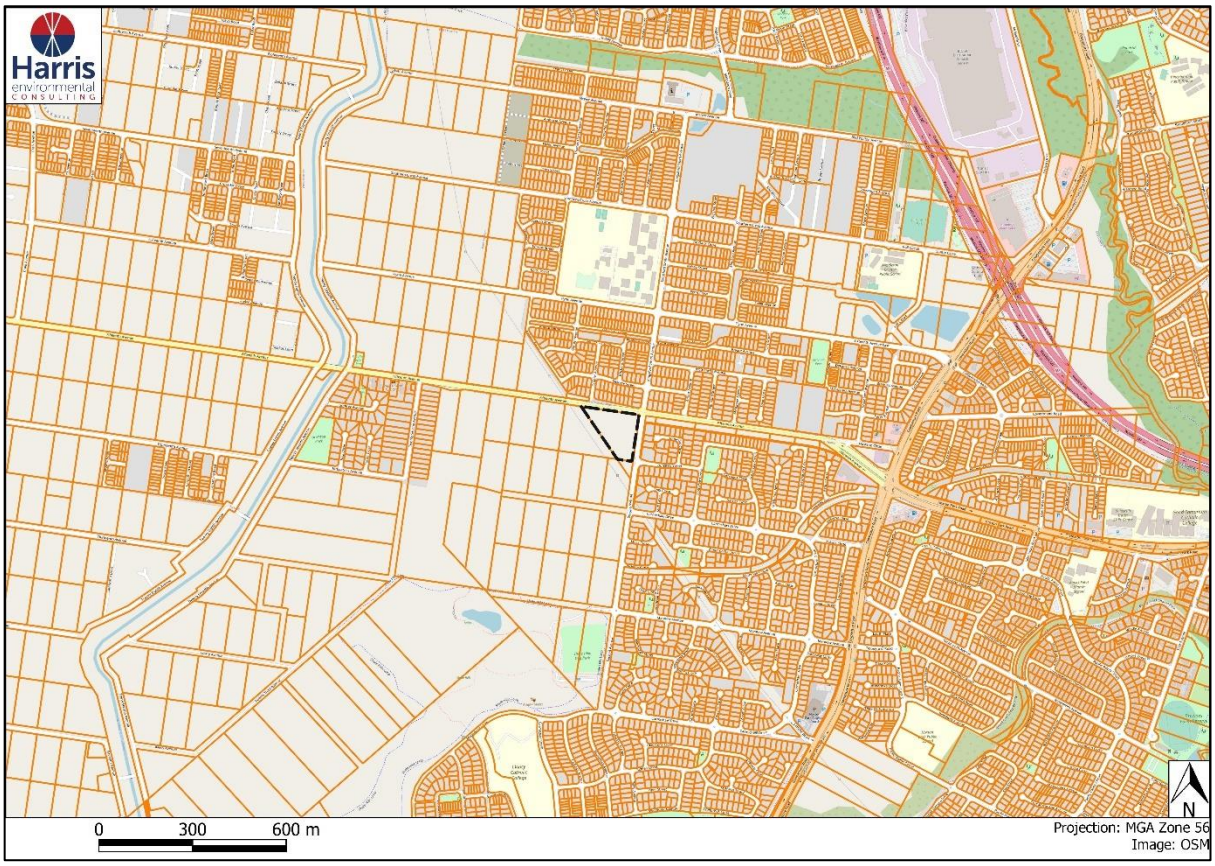


FIGURE 3 BROAD-SCALE AERIAL VIEW OF THE SUBJECT SITE

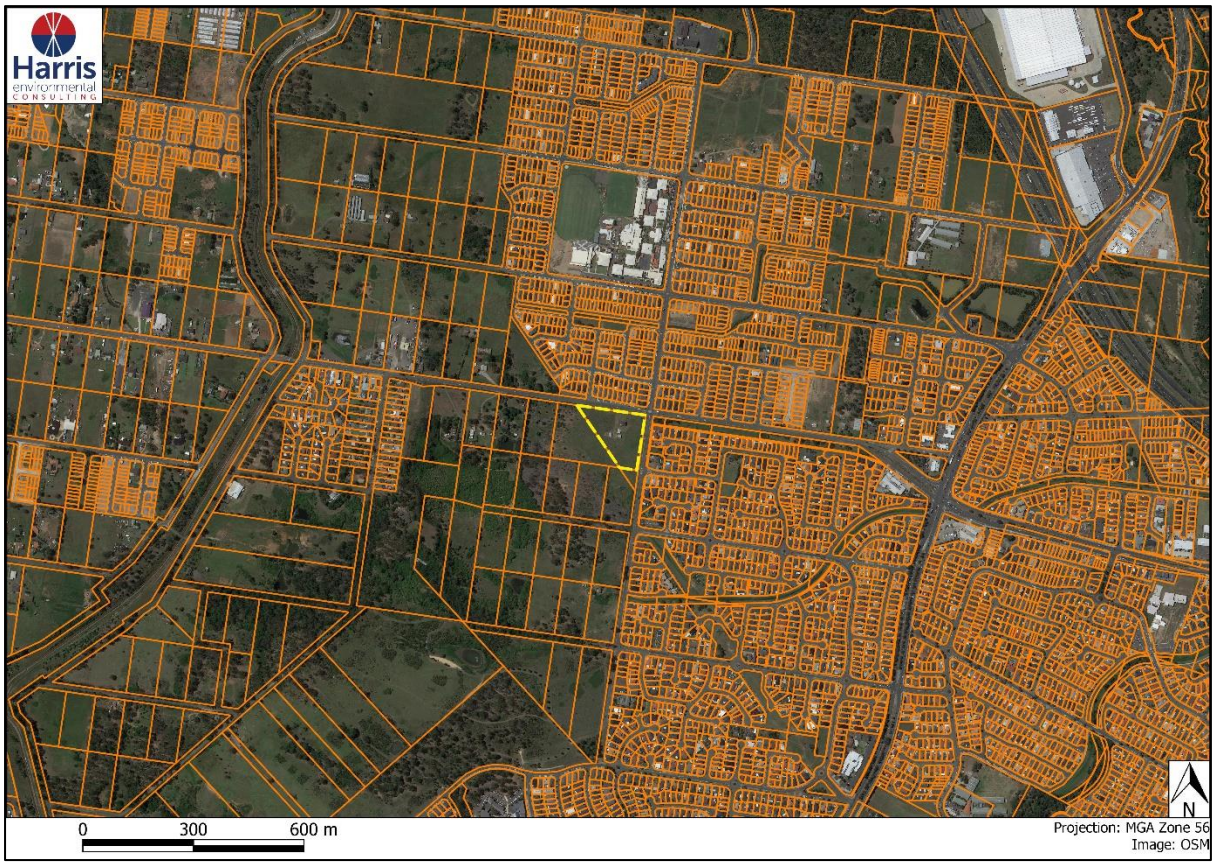


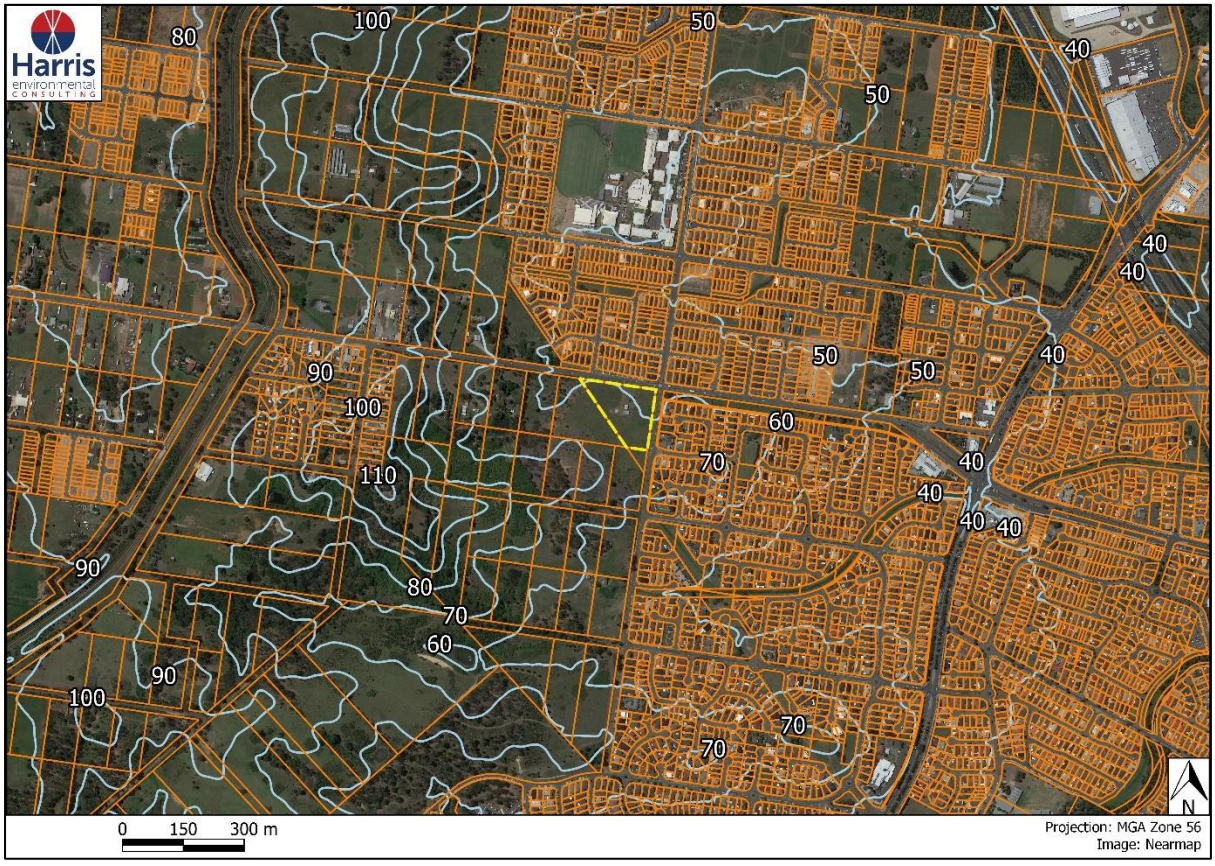
FIGURE 4 700 M EXTENDED VIEW OF SUBJECT SITE

2.2. Topography

The Australian Standard AS3959-2018 identifies that the slope of the land under the classified vegetation is much more important than the slope between the site and the edge of the classified vegetation. The slope that would most significantly influence fire behaviour was determined over 100 m from the proposal, using 10-metre contour intervals and shown in Figure 5.

Figure 5 shows the site is characterised by a gentle slope that falls to the northeast. The bushfire-prone vegetation located west of the site is upslope.

FIGURE 5 SLOPE (10 M CONTOURS)



3 PLANNING LAYERS

The following planning layers are described as follows and shown in the Figures below:

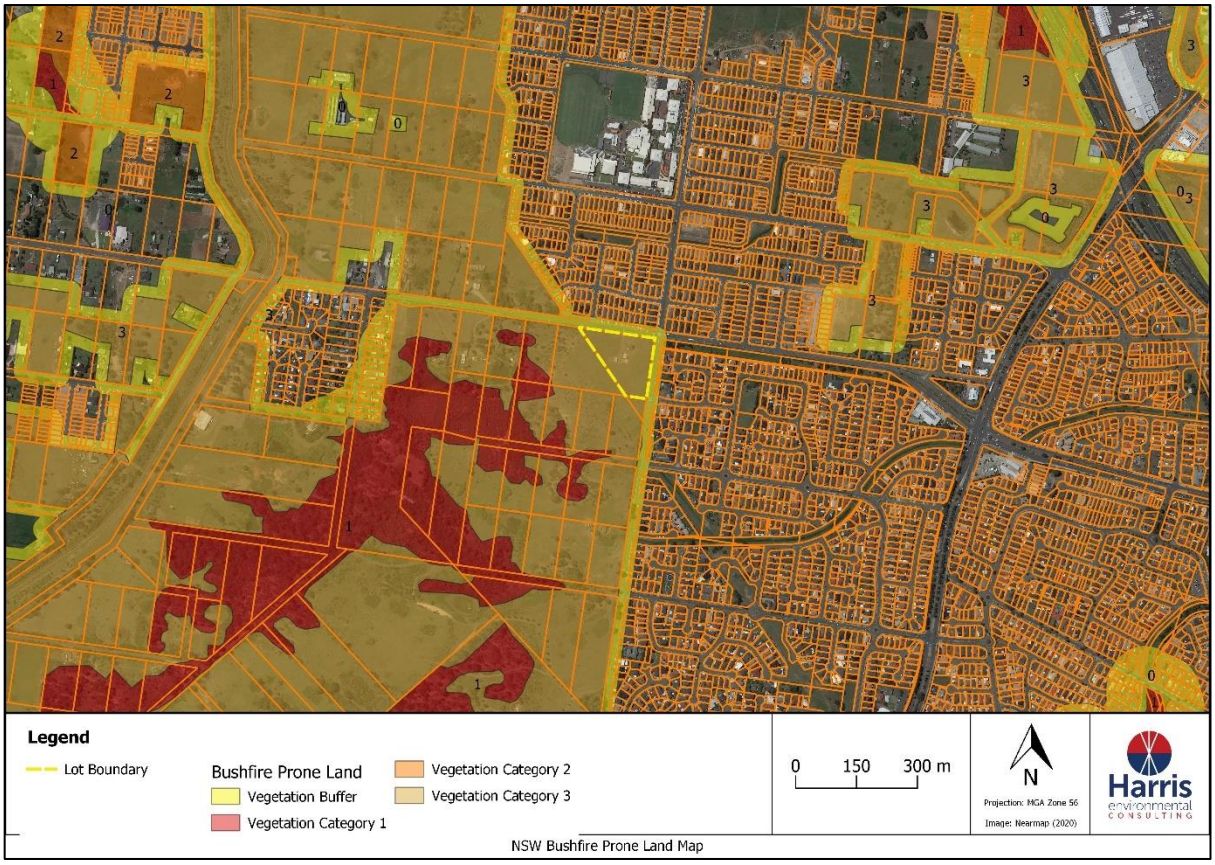
3.1. Bushfire Prone Land

The subject site is mapped as “Vegetation Category, 3” as shown in Figure 6.

Vegetation Category 3 is considered to be medium bush fire risk vegetation. It is higher in bush fire risk than Category 2 (and the excluded areas) but lower than Category 1. It is represented as dark yellow on a Bush Fire Prone Land Map and will be given a 30-metre buffer. This category comprises grasslands, freshwater wetlands, semi-arid woodlands, alpine complex arid shrublands.

The proposed development locations within the subject lot were not mapped bushfire-prone before the updated Bush Fire Prone Land Map in October 2021. The previous Bush Fire Prone Land Map shows only the southeast corner boundary of the subject lot was mapped “Vegetation Buffer” and is provided in Appendix III.

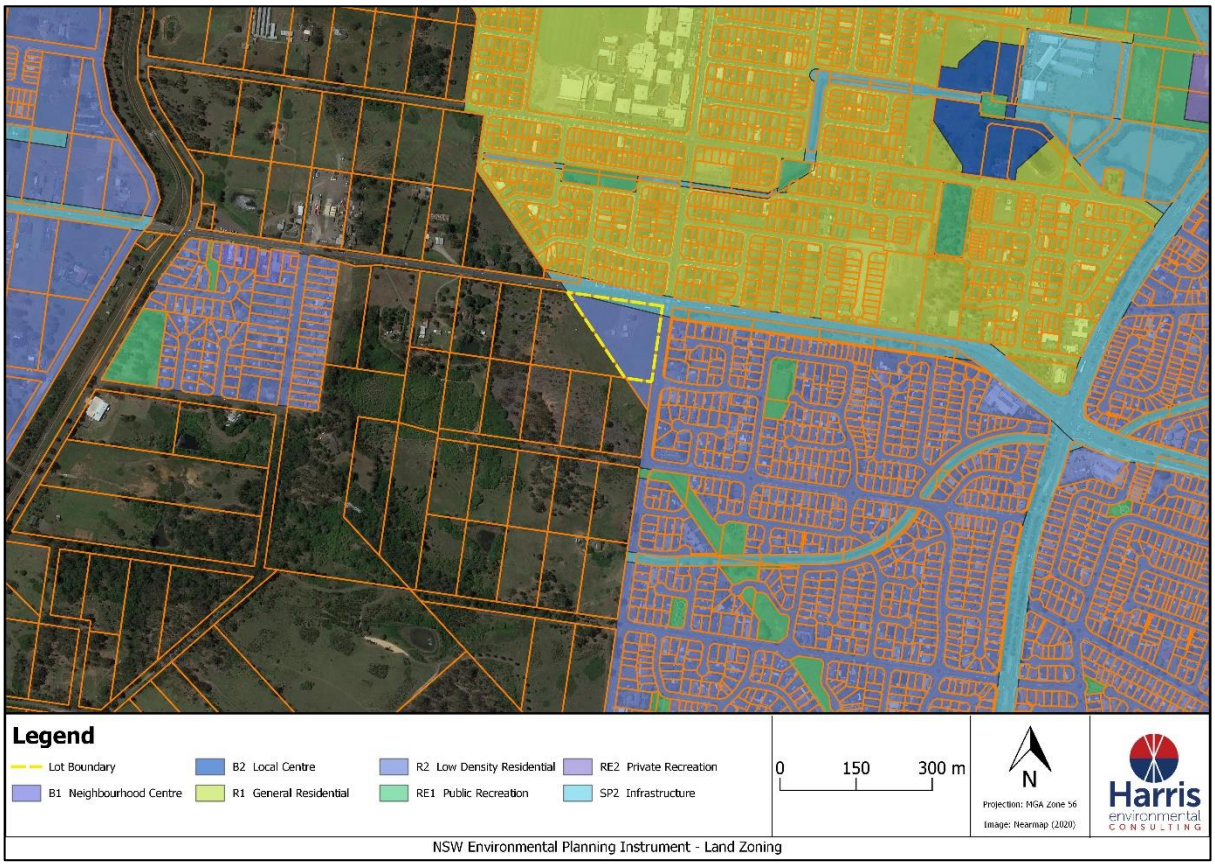
FIGURE 6 BUSHFIRE PRONE MAP



3.2. Land Environment Planning and Zoning

The subject lot is currently zoned as 'R2 Low Density Residential' and 'SP2 Infrastructure', as shown in Figure 7.

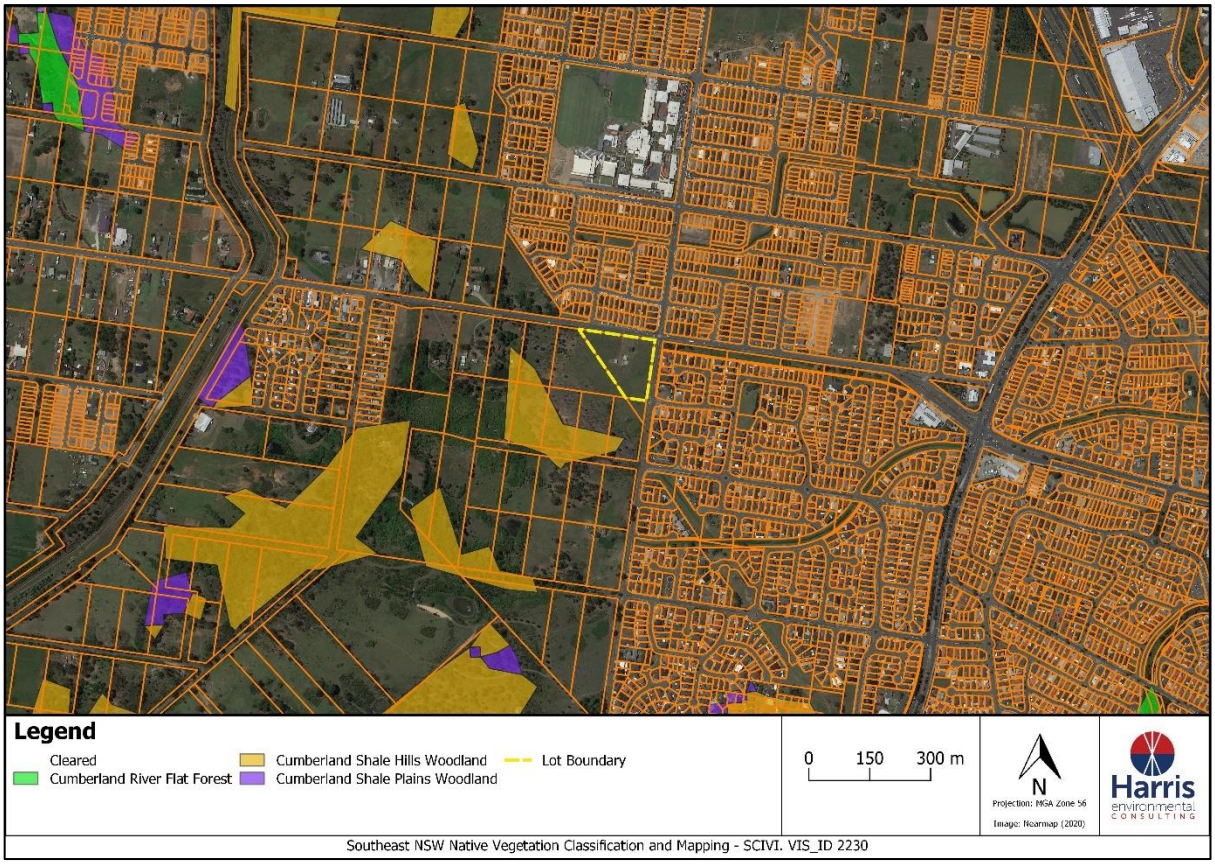
FIGURE 7 LEP ZONE MAP



3.3. Southeast Native Vegetation Maps

The NSW Southeast Native Vegetation mapping (OEH, 2016) shown in Figure 8 has classified the vegetation within the lot and surrounding land as “Cumberland Shale Hills Woodland” and cleared land.

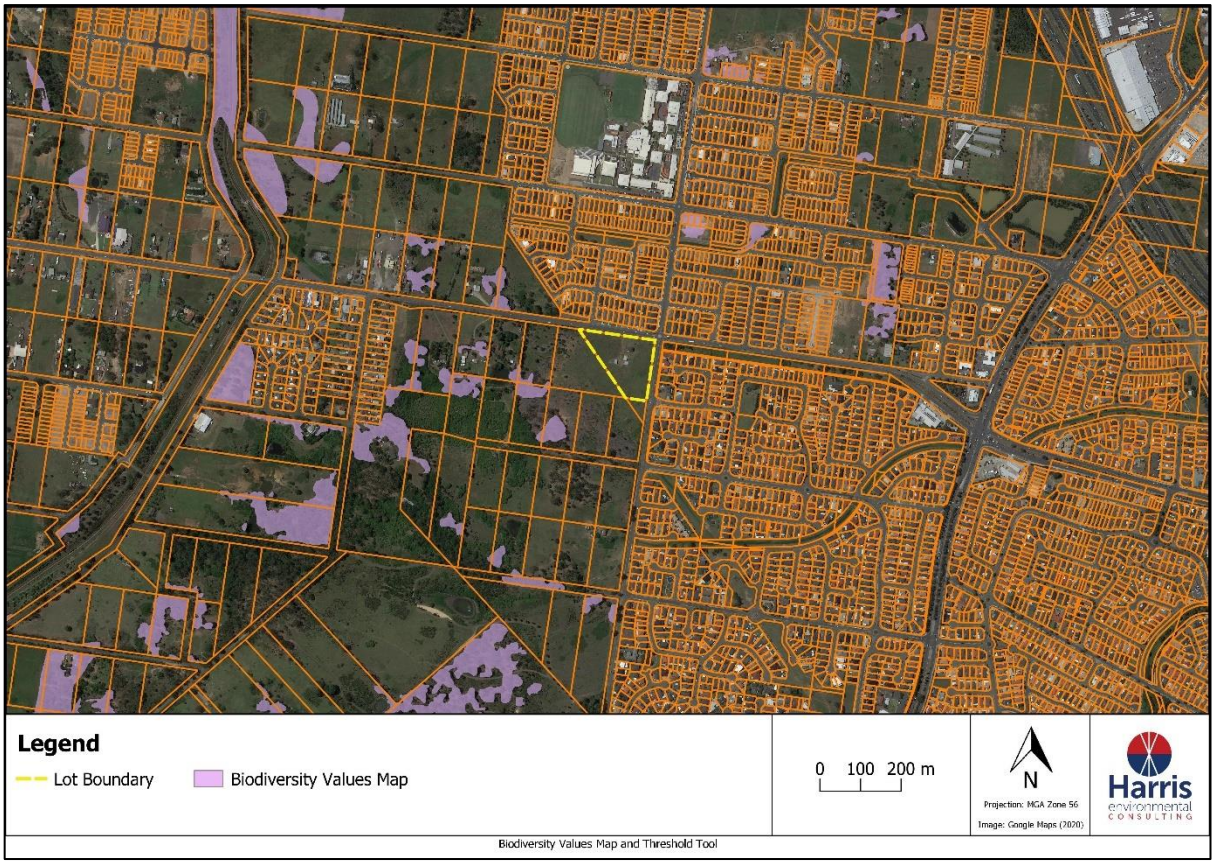
FIGURE 8 VEGETATION MAPPING



3.4. Biodiversity Values

As of 06/06/22, no land is identified within the subject lot as having high biodiversity value under the Biodiversity Offsets Scheme under the Biodiversity Conservation Act 2016, (NSW Department of Planning, Industry and Environment, 2022) as shown in Figure 9.

FIGURE 9 BIODIVERSITY VALUE MAP



4 DEVELOPMENT PROPOSAL

The subject land comprises 1.825 hectares and forms a triangular shape off Second Avenue and Fifteenth Avenue. The proposal involves the development of a commercial area including a proposed service station, childcare centre and McDonald's takeaway & food premises within the northeast of the site. The remaining land is considered residue land. The development plans are provided in Figure 10.

4.1. Class 5-8 Commercial Development

The Bushfire Protection Measures for Class 5-8 buildings include measures relating to access, water supply and services, and emergency and evacuation planning, including the objectives:

- to provide safe access to/from the public road system for firefighters provide property protection during a bush fire and for occupant egress for evacuation.
- to provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development.
- to provide adequate services of water for the protection of buildings during and after the passage of bush fire, and
- to locate gas and electricity so as not to contribute to the risk of fire to a building and provide for the storage of hazardous materials away from the hazard wherever possible.

4.2. Special fire Protection Purpose (SFPP) Development

As defined in the RF Act 1997, childcare centres are considered for Special Fire Protection Purpose.

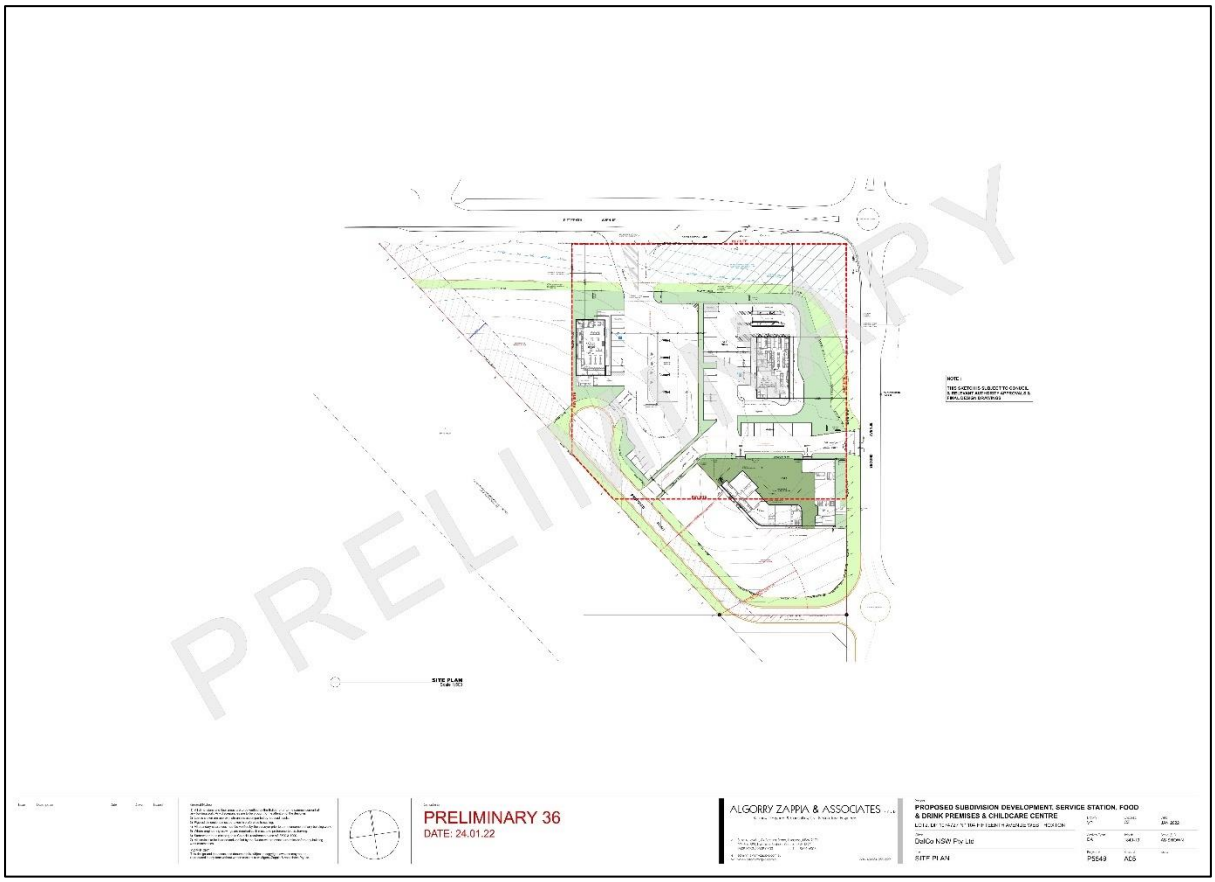
The specific objectives for SFPP are as follows:

- Minimise levels of radiant heat, localised smoke, and ember attack through increased APZ, building design and siting.
- Provide an appropriate operational environment for emergency service personnel during firefighting and emergency management.
- Ensure the capacity of existing infrastructure (such as roads and utilities) can accommodate the increase in demand during emergencies as a result of the development; and
- Ensure emergency evacuation procedures and management, which provides for occupants' special characteristics and needs.

4.3. Hazardous Industry

Under the National Construction Code (NCC), the proposed Service Station is classified as a Class 6 building. Although the NCC does not provide for any bush fire specific performance requirements for these classes of buildings, compliance with AS3959 and the NASH Standard must be considered when meeting the aims and objectives of PBP 2019. Where a hazardous industry is proposed on BFPL, PBP 2019 requires a performance-based assessment to demonstrate how the proposal can accommodate a suitable package of bushfire protection measures (BPM) commensurate with the assessed level of risk.

FIGURE 10 PROPOSED PLAN



5. BUSHFIRE THREAT ASSESSMENT

5.1. Bushfire Vegetation Formations

The bushfire vegetation formations within 140 m of the subject site are shown in Figure 11 and Table 1. The 140 m setback is identified as a red line. Only the vegetation within the setback must be classified when any development application is sought. The following bushfire vegetation formations are identified.

In accordance with *Planning for Bush Fire Protection (2019),* this vegetation is classified as "Grassland".

The vegetation within 140 m and within the 60 m wide electrical easement, has historically been removed of tree vegetation and maintained to a Grassland classification. Within the previous year 2021-2022 weeds and exotic vegetation have been allowed to regrow. In consideration of the weeds, the vegetation formation is classified 'Woodland'.

Photos 1 – 4 show the surrounding vegetation.

TABLE 1 VEGETATION FORMATIONS

	Vegetation Formation	Effective Slope	Distance between façade and hazard
Service Station	Grassland & Woodland	Upslope	22 m 87 m
Bowser Station	Grassland	Upslope	40 m
McDonald's	Grassland	Upslope	70 m
Child Care Centre	Grassland & Woodland	Upslope	36 m 68 m

FIGURE 11 VEGETATION FORMATIONS WITHIN 140 M

Photo 1 *View of upslope grassland on the southern elevation*

Photo 2 *View of upslope grassland on the southwestern elevation*

Photo 3 *View of downslope grassland on the western elevation*

Photo 4 *View of managed residential lots on the northern and eastern elevations*

5.2. Asset Protection Zones (APZ)

Method 2 AS3959:2018 and Tables A1.12.5 and Table A1.12.1 *PBP 2019* have been used to assess the width of the required APZ for the development proposed in the design layout using the vegetation and slope data identified. Method 2 AS3959:2018 has been used to determine the width of the BAL and flame length for the Woodland vegetation.

Tables 2-5 show the relevant setbacks for the vegetation formations identified.

A Fire Danger Index (FDI) of 100 and flame temperature of 1090 K was used for the proposed petrol station and McDonald's takeaway. A flame temperature of 1200 K was used for the SFPP Childcare Centre.

The Australian Standard AS3959 – 2018 is the enabling standard that addresses the performance requirements of parts 2.3.4 and Part GF5.1 of the Building Code of Australia for constructing the Class 1, 2 and Class 3 buildings within a designated Bushfire Prone Area. The PBP 2019 provides the minimum distances for FFDI 100.

Table 5.3a (PBP 2019) requires any potential building footprint not to be exposed to radiant heat levels exceeding 29 kW/m^2. Based on the proposed development, including SFPP and hazardous industry (Service Station) further setbacks for BAL 12.5 and SFPP (<10kW/m^2) have been applied to the proposed building footprints.

The Asset Protection Zone is provided entirely as Inner Protection Area (IPA) required over the entire subject lot. This IPA circumscribes the hazard on the southwest, the building line is consistent with the incorporation of the APZ as, shown in Figure 12.

An Outer Protection Area (OPA) is not proposed.

The management of the lot for Asset Protection Zone Purposes includes:

- Formal Asset Protection Zone setback (<29kW/m^2) on southwest boundary meeting deemed to satisfy APZ. All proposed buildings are located outside the APZ.
- Road widening on the northeast boundary. This development will permanently remove the hazard within this area, and no further management is required with the development of the road. Until this occurs this area is to be managed as an IPA.
- The remaining subject lot (developed land) will be required to be maintained and landscaped to an Inner Protection Zone (IPA) standard.
- All land within the lot, including APZ (<29kW/m^2), road widening and remaining developed land is to be managed as an Inner Protection Zone.
- Land within the APZ, including the entire subject lot, is to ensure bushfire hazard reduction can be provided.

For the placement of combustible materials in the IPA:

- No combustible materials are to be located within the Formal Asset Protection Zone setback (<29kW/m^2) on the southwest boundary.
- Combustible materials can be placed within the development area. This area is to be managed as an IPA. Flammable materials are to be separated from any combustible material so they do not act as a catalyst for combustion.

TABLE 2 APZ AND BAL DETERMINATION FOR SERVICE STATION

	SOUTHWEST	*SOUTHWEST*	*NORTH*	*EAST*
Gradient	Upslope	Upslope	Managed	Managed
Vegetation	Grassland	Woodland		
Distance between façade and hazard	22 m	87 m	≥140 m	≥140 m
PBP 2019 BAL 12.5 required APZ	22 - < 50 m		> 100 m	> 100 m
AS3959 Method 2 BAL 12.5 required APZ		22 m		
BAL Required	**BAL 12.5**	**BAL 12.5**	**BAL 12.5**	**BAL 12.5**

TABLE 3 APZ AND BAL DETERMINATION FOR BOWSER STATION

	SOUTHWEST	*NORTH*	*EAST*
Gradient	Upslope	Managed	Managed
Vegetation	Grassland		
Distance between façade and hazard	40 m	≥140 m	≥140 m
PBP 2019 BAL 12.5 required APZ	22 - < 50 m	>100 m	>100 m
BAL Required	**BAL 12.5**	**BAL 12.5**	**BAL 12.5**

TABLE 4 APZ AND BAL DETERMINATION FOR FOOD AND DRINK PREMISES

	SOUTHWEST	*NORTH*	*EAST*
Gradient	Upslope	Managed	Managed
Vegetation	Grassland		
Distance between façade and hazard	70 m	≥140 m	≥140 m
PBP 2019 BAL 12.5 required APZ	22 - < 50 m	>100 m	>100 m
BAL Achievable	**BAL LOW**	**BAL LOW**	**BAL LOW**
BAL Required	**BAL 12.5**	**BAL 12.5**	**BAL 12.5**

TABLE 5 APZ AND BAL DETERMINATION FOR CHILDCARE CENTRE

	SOUTHWEST	***SOUTHWEST***	***NORTH***	***EAST***
Gradient	Upslope	Upslope	Managed	Managed
Vegetation	Grassland	Woodland		
Distance between façade and hazard	36 m	36 m	≥140 m	≥140 m
PBP 2019 10kW/m^2 required APZ	36 m		>100 m	>100 m
AS3959 2018 Method 2 10kW/m^2 required APZ		36 m		
BAL Required	**BAL 12.5**	**BAL 12.5**	**BAL 12.5**	**BAL 12.5**

TABLE 6 FLAME LENGTH USING METHOD 2 (NBC, 2020)

	Service Station	**Child Care Centre**
Elevation	Southeast Elevation	Southeast Elevation
Fuel load	Woodland	Woodland
Vegetation Slope	4.8 degrees Upslope	4.8 degrees Upslope
Site Slope	3.6 degrees Upslope	3.6 degrees Upslope
Distance to Vegetation from the facade	22 m	36 m
Flame Temp (K):	1090	1200
Radiant Heat Flux (kW/m^2)	**11.74 kW/m^2**	**9.49 kW/m^2**
Flame Length	8.3 m	8.3 m
Level of Construction	**BAL 12.5**	**BAL 12.5**
BAL Threshold BAL 29	**10 m**	**14 m**

FIGURE 12 ASSET PROTECTION ZONE

5.3 Relevant Construction Standard

The Australian Standard AS3959 – 2018 is the enabling standard that addresses the performance requirements of both parts 2.3.4 and Part GF5.1 of the Building Code of Australia for the construction of Class 1, 2 and Class 3 buildings within a designated Bushfire Prone Area.

The following variations to AS 3959 apply in NSW for NSW G5.2 (a)(i) of Volume One and NSW 3.10.5.0(c)(i) of Volume Two of the NCC.

- Clause 3.10 of AS 3959 is deleted, and any sarking used for BAL-12.5, BAL-19, BAL-29 or BAL-40 shall:
    - be non-combustible; or
    - comply with AS/NZS 4200.1,
- Be installed on the outside of the frame and have a flammability index of not more than five as determined by AS 1530.2; and clause 5.2 and 6.2 of AS 3959 is replaced by clause 7.2 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL.
- Clause 5.7 and 6.7 of AS 3959 are replaced by clause 7.7 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL.

5.3.1 Petrol Station, Petrol Bowser & Food and Drink Premises

The following was determined for this site:

Relevant fire danger index……GFDI 130
Flame temperature ……1090 K

The Proposed Petrol Station, Petrol Bowser and McDonald's Food and Drink Premises can be constructed to meet **BAL 12.5**.

5.3.2 Childcare Centre

The following was determined for this site:

Relevant fire danger index……GFDI 130
Flame temperature ……1200 K

The proposed Childcare Centre can be constructed to meet **BAL 12.5**.

Where a garage or carport is beneath a building, it is required to comply with the AS3959 – 201,8 and it shall conform with the construction requirements of the AS3959 – 2018, as applicable to the subject building.

Alternatively, any construction separating the garage or carport (including walls and flooring systems) from the remainder of the building shall conform with one of the following:

a) The separating construction shall have an FRL of not less than 60/60/60 for loadbearing construction and –/60/60 for non-loadbearing construction when tested from the garage or carport side and shall have openings protected by the following:

i. *Doorways*—by self-closing fire doors with an FRL of –/60/30, conforming with AS 1905.1 and tested by AS 1530.4.

ii. *Windows*—by fire windows with an FRL of –/60/– when tested in accordance with AS 1530.4 and permanently fixed in the closed position.
iii. *Other openings*—by construction with an FRL of not less than –/60/– when tested by AS 1530.4.

5.4 Safe Operational Access

The Planning for Bushfire Protection (*2019*) requires the provision of safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area.

The subject lot is located between Fifteenth Avenue and Second Avenue. This is a two-wheel drive, the road surfaces and bridges are sufficient to carry fully loaded firefighting vehicles and provides appropriate access to water.

As the proposal involves an SFPP component, the development is required to comply with Table 6.8b Planning for Bushfire Protection (*2019*) for the non-perimeter as follows:

- minimum 5.5m carriageway width kerb to kerb.
- parking is provided outside of the carriageway width.
- hydrants are located clear of parking areas.
- there 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 cross fall does not exceed 3 degrees; and
- a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

Proposed access to the developments will have dual entry and exits from Fifteenth Avenue and Second Avenue. The proposed trafficable width through Lots 2 and 3 is via a proposed 6m wide sealed roadway. All parking is provided outside of the carriageway. The proposed internal access is a through road connecting Fifteenth Ave with Second Ave and does not provide a trafficable length of greater than 500m.

5.5 Emergency Management

The owners are advised to obtain the *NSW Rural Fire Service – "Guidelines for the Preparation of Bush Fire Evacuation Plans"* & *'Bush Fire Survival Plan'* In the event of emergency, the owners should ensure they are familiar with the RFS Bush Fire Alert Levels and use their Bush Fire Survival Plan.

5.6 Adequate Water and Utility Services

Reticulated water is proposed to be supplied to subject lot.

Hydrants should not be located within any road carriageway and should comply with spacing, sizing and pressures specified in *AS 2419.1 – 2005.* Hydrants are not located within any road carriageway and all above-ground water service pipes external to the building are metal, including and up to any taps.

Any bottled gas will be installed and maintained in accordance with AS1596 and the requirements of the relevant authority. If gas cylinders need to be kept close to the buildings, the release valves must be directed away from the building and away from any combustible material. Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.

Electrical transmission lines, if above ground, will be managed in accordance with specifications issued by Energy Australia.

6. LANDSCAPING

An APZ is required to be established and should be maintained for perpetuity.

When landscaping, vegetation should be located greater than 2 m from any part of the roofline of a dwelling or the shed. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 m from an exposed window or door. Trees should have lower limbs removed up to a height of 2 m above the ground.

Appendix 5 (PBP) provides guidelines for landscaping and Bushfire Provisions within the APZ. To incorporate bushfire protection measures into future development, the owner is advised to consider the following:

- Avoid planting trees species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopy.
- Avoid planting deciduous species that may increase fuel at surface/ground level by the fall of leaves.
- Avoid climbing species to walls and pergolas.
- Locate combustible materials such as woodchips/mulch, flammable fuel stores (LPG gas bottles) away from the building.
- Locate combustible structures such as garden sheds, pergolas and materials such as timber furniture away from the building.
- Ensure any vegetation planted around the house is a suitable distance away so these plants do not come into physical contact with the house as they mature.
- The property should be developed to incorporate suitable impervious area surrounding the house, including courtyards, paths and driveways.

The IPA is the area closest to the building and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and act as 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 building, consisting of a mown lawn and well maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

Trees

- tree 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 the ground.
- tree canopies should be separated by 2 to 5m; and
- 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 should be provided.

- shrubs should not be located under trees;
- shrubs should not form more than 10% ground cover; and
- clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

Grass

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

7 INDICATIVE LAYOUT DESIGN COMPLIANCE WITH PBP 2019

The following PBP 2019 requirements can be met with this proposal:

- Subdivision - Tables 5.3A, 5.3B and 5.3C, (PBP, 2019);
- Special Fire Protection Purpose - Table 6.8
- Hazardous Industry – Bushfire Protection Measures

The following Tables 7, 8 ,9 and 10 provide the performance criteria, acceptable solution, and comment on this proposal's demonstration of compliance. Indicative design is conceptual and will be required to comply at DA stage.

The Bushfire Protection Measures for Hazardous Industry can be met:

- The bushfire risk is limited to the western elevation interfacing within a well-developed precinct of West Hoxton Park;
- There is limited connectivity between the upslope woodland remnants which are interspersed between grassland that could support a fully developed bush fire threat to the subject site;
- There is adequate access and defendable spaces to all aspects of the identified hazard within the site; and
- Per the requirements outlined in the BCA for a Class 6 building of this nature, the building will include external fire hydrants, associated boosters and an extensive fire suppression and prevention system.

TABLE 7 PBP 2019 TABLE 7.4 A COMPLIANCE

Performance criteria		Acceptable Solution	Demonstration of compliance
Asset Protection Zones	APZs are provided commensurate with the construction of the building; and A defendable space is provided.	An APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.	Complies Complies
	APZ's are managed and maintained to prevent the spread of a fire towards the building.	In accordance with the requirements of Appendix 4.	Complies
	APZ is provided for perpetuity	Is wholly within boundaries of the development site.	Complies
	APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	APZs are located on lands with a slope less than 18 degrees.	Complies
Landscaping	Landscaping is managed to minimise flame contact, reduce heat levels, minimise embers and reduce the effect of smoke on residents and fire fighters.	Landscaping in accordance with Appendix 4.	Will be required to comply.

TABLE 8 PBP 2019 TABLE 5.3 B & 6.8 B COMPLIANCE

	Performance criteria	Acceptable Solution	Demonstration of compliance
Access (General Requirements)	Firefighter vehicles are provided with safe, all-weather access to structures and hazard vegetation.	Property access roads are two-wheel drive, all weather roads.	Can comply. Final design will be required to comply.
	The capacity of access roads is adequate for firefighting vehicles.	the capacity of road surfaces and any bridges/ causeways are sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes), bridges and causeways are to clearly indicate load rating.	Can comply. Final design will be required to comply.
	There is appropriate access to water supply.	hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005;	Final design will be required to comply.
	non-perimeter access roads are designed to allow safe access and egress for firefighting vehicles while occupants 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. there 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 cross fall does not exceed 3 degrees; and a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	Final design will be required to comply.

TABLE 9 PBP 2019 TABLE 7.4A COMPLIANCE

	Performance Criteria	Acceptable Solution	Demonstration of Compliance
Water Supply	Adequate water supplies are provided for firefighting purposes.	Reticulated water is to be provided to the development, where available; and a static water supply is provided were no reticulated water is available.	Required to comply.
	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. Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	
	Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.	
	The integrity of the water supply is maintained.	All above-ground water service pipes are metal, including and up to any taps. 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 follow: • Lines are installed with short pole spacing (30m), unless crossing gullies, gorges, or riparian areas. • No part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 *Guideline for Managing Vegetation Near Power Lines.*	Required to comply.

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 and 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. If gas cylinders need to be kept close to the building, safety valves are directed away from the building and at least 2m away from any combustible material, so they do not act as a catalyst to combustion. Polymer-sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used. Above-ground gas service pipes external to the building are metal, including and up to any outlets.	Required to comply.

TABLE 10 PBP 2019 TABLE 6.8 COMPLIANCE

	Performance Criteria	Acceptable Solution	Demonstration of Compliance
Asset Protection Zone	**SFPP:** radiant heat levels of greater than 10kW/m² (calculated at 1200K) will not be experienced on any part of the building. APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised. APZs are managed and maintained to prevent the spread of fire to the building. The APZ is provided in perpetuity.	the building is provided with an APZ in accordance with Table A1.12.1 in Appendix 1. APZs are located on lands with a slope less than 18 degrees. The APZ is managed in accordance with the requirements of Appendix 4 of PBP 2019 and is wholly within the boundaries of the development site. APZ are wholly within the boundaries of the development site;	Complies with Table A1.12.1 in Appendix 1 for Grassland and Method 2 AS3959 2018 10kW/m² (calculated at 1200K) for Woodland. The APZ is not located on land than exceeds 18 degrees. All land within the specified APZ in the subject lot is to be managed in accordance with Appendix 4 of PBP 2019. Complies

Landscaping	Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Landscaping is in accordance with Appendix 4. And fencing is constructed in accordance with section 7.6 of PBP 2019.	Can comply.
Construction Standards	The proposed building can withstand bush fire attack in the form of wind, embers, radiant heat and flame contact.	A construction level of BAL-12.5 under AS 3959 or NASH Standard and 7.5 of PBP is applied.	Can comply.
Access	fire fighting vehicles are provided with safe, all-weather access to structures. The capacity of access roads is adequate for firefighting vehicles. There is appropriate access to water supply.	Access is provided in accordance with property access requirements of Table 5.3b. The capacity of road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges and causeways are to clearly indicate load rating. There is suitable access for a Category 1 fire appliances to within 4m of the static water supply where no reticulated supply is available.	Can comply. Final design will be required to comply
Water Supply	An adequate water supply for firefighting purposes is installed and maintained.	Reticulated water is to be provided to the development;	Can comply
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 follow: - lines are installed with short pole spacing (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 accordance with the specifications in ISSC3 *Guideline for Managing Vegetation Near Power Lines.*	Can comply

8 PROPOSAL COMPLIANCE WITH PBP TABLE 2.4.1

This assessment addresses the broader strategic bushfire protection requirements for proposed rezoning as required by the *Environmental Planning and Assessment Act 1979 s.9.1 (2).* Direction, 4.4 Consideration of the bushfire risk, evacuation, and environmental constraints which may affect bushfire protection strategy are identified as critical issues in *Section 4.4.1 of 'Planning for Bush Fire Protection* (PBP) (RFS 2019). Table 4.2.1 (PBP 2019) provides the specific assessment considerations for a bush fire strategic study.

Compliance demonstration to Table 4.2.1 requirements is provided below in the following tables:

- Table 11: likelihood of a bushfire, its potential severity and intensity and the potential impact on life and property in the context of the broader landscape.
- Table 12: most appropriate locations within the masterplan area or site layout for the proposed land use.
- Table 13: existing and potential proposed networks both within and external to the masterplan area.
- Table 14: future impact of new development on emergency services.
- Table 15: issues associated with infrastructure and utilities
- Table 16: new development on adjoining landowners and their ability to undertake bushfire management

TABLE 11 LANDSCAPE ASSESSMENT

Considerations	Comments
The bushfire hazard in the surrounding area including: • Vegetation • Topography • Weather	The subject lot consists of a large agricultural paddock that is located on the edge or the urban interface, with existing urbans areas to the north and east. To the west, agricultural land dominates the landscape intermixed with medium residential lots. The surrounding land exhibits minimal changes in slope, with gentle slopes to creek and drainage lines. The overall topography of the land is relatively flat. The area experiences a warm temperate climate with high summer rainfall, low relative humidity throughout the year with northwest to southerly winds.
The potential fire behaviour that might be generated based on above	Any potential fires can be managed with APZ and BALs
Any history of bushfire in the area	There are no historical fires on the subject site.
Potential fire runs into the site, and the intensity of such runs	Any potential fires can be managed with APZ and BALs
The difficulty in accessing and suppressing a fire, the continuity of bushfire hazards or fragmentation of landscape fuels and the complexity of the associated terrain.	Any potential fires can be managed with APZ and BALs

TABLE 12 LAND USE

Assessment Considerations	Comments
The risk profile of different development layout based on the above landscape study	Indicative design is conceptual and has the ability to comply with PBP at DA stage based on proposed development layout and surrounding landscape.
The proposed land use zones and permitted uses	Can comply
The most appropriate siting of different land uses based on risk profiles within the site (i.e., not locating development on ridge tops, SFPP development to be located in lower risk areas of the site	Siting is appropriate. SFPP development can be relocated on the subject lot to comply with requirements.
The impact of the siting of these uses on APZ provision	Minimum

TABLE 13 ACCESS AND EGRESS

Assessment Considerations	Comments
The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile	The access will be required to meet the acceptable solutions of Table 5.3 b & 6.8 b PBP 2019.
The location of key access routes and direction of travel	The direction of travel is away from the hazard
The potential for the development to be isolated in the event of a bushfire	The potential for development to be isolated is low

TABLE 14 EMERGENCY SERVICES

Assessment Considerations	Comments
Consideration of the increase in demand for emergency services responding to a bushfire emergency, including the need for new stations/ brigades	The subject site is located within the existing residential area of West Hoxton. The development is not expected to significantly increase the demand for emergency services. The development access will meet all requirements of PBP 2019 at the DA stage.
Impact on the ability of emergency services to carry out fire suppression in a bushfire emergency	The development will comply with will meet all requirements of PBP 2019 at the DA stage

TABLE 15 INFRASTRUCTURE AND UTILITIES

Assessment Considerations	Comments
The ability of the reticulated water system to deal with a major bushfire event in terms of pressures, flows and spacing of hydrants	Fire hydrant, spacing, design and sizing will comply with the relevant clauses of Australian Standard AS 2419:1:2005.
Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc	The location and design of gas services will be installed in accordance with AS/NSZ 1596:2014 and the requirements of relevant authorities. The location of the electricity services will be provided so that the possibility of ignition of the surrounding bushland or the fabrics of the buildings is limited

TABLE 16 ADJOINING LAND

Assessment Considerations	Comments
Consideration of the implications of a change in land use on adjoining land, including increased pressure on BPMS through the implementation of Bushfire Management Plans	This proposal does not affect the bushfire protection of the district as the proposal will meet PBP 2019 requirements at the DA stage.

9 PROPOSAL COMPLIANCE WITH PBP DIRECTION 4.3

The follow table provides summary of requirements applied under Direction 4.3 Planning for Bushfire Protection

TABLE 17 DIRECTION 4.3 CONSIDERATIONS

Considerations	Comments
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.	To be undertaken Complete
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)	This assessment is undertaken in accordance with PBP 2019. APZ provide control that avoids placing inappropriate developments in hazardous areas Hazard reduction is not prohibited within APZ
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,	Complies with IPA requirements. No OPA proposed. Complies with IPA requirements, therefore considered that OPA is achieved.
(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 defined under section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with.	The proposal includes SFPP development and appropriate APZs have been applied.
(c) contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,	Can comply
(d) contain provisions for adequate water supply for firefighting purposes	Can comply
(e) minimise the perimeter of the area of land interfacing the hazard which may be developed,	Can comply
(f) introduce controls on the placement of combustible materials in the Inner Protection Area.	Can comply

10 CONCLUSION

This strategic study has provided an assessment of whether this proposal is appropriate in the bushfire hazard context.

The proposed development includes development classified Hazard Industry, Commercial (Class 5-8) and Special Fire Protection Purpose.

The proposed development is located within the urban agricultural interface within the existing township of West Hoxton. Consistent with the residential area across the Liverpool LGA, the development is located within a medium density residential area, with access to the major road network.

The subject site location is characterised by cleared pastureland and gentle slope, with Grassland vegetation located on the south-west elevations of the site.

The subject site is located on the existing through public roads, Fifteenth Avenue and Second Avenue. The development is located adjacent to the existing residential area and has the ability to comply with PBP access requirements and does not impede access to the bushfire threat.

The Asset Protection Zone is entirely provided over the entire subject lot as an Inner Protection Area (IPA) as well as the Formal Asset Protection Zone setback (<29kW/m^2) on southwest boundary. An Outer Protection Area (OPA) is not proposed based on the size of the hazard of Grassland and Woodland.

The following controls in the form of a legal agreement should be placed on the lot:

- All land within the subject lot to be managed as an IPA for perpetuity or until development permanently removes the hazard.
- No buildings or combustible materials are to be located within the Formal Asset Protection Zone setback (<29kW/m^2).

In conclusion, development is considered to provided proposed appropriate locations to minimise the risk to life and property from bush fire attack. Furthermore, any bushfire risk can be met by complying with the requirements of APZ and BAL setbacks as identified by the PBP 2019.

11 REFERENCES

Keith, D. (2004) "*Ocean Shores to Desert Dunes*" Department of Environment and Conservation, Sydney.

Newcastle Bushfire Consulting (2020). *Bushfire Attack Assessor*. Couch Family Trust.

NSW Department of Planning and Environment (2002). *Native vegetation mapping in the Blue Mountains 1999-2002 VIS_ID 2239.* NSW Australia.

NSW Department of Planning and Environment (2020). *Planning Portal.* Accessed at: https://www.planningportal.nsw.gov.au/.

NSW Office of Environment and Heritage (2020). *Biodiversity Value Map v.10.* Accessed at: https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap.

NSW Rural Fire Service (2019) *Planning for Bushfire Protection. A Guide for Councils, Planners, Fire Authorities and Developers*. *November 2019.*

NSW Rural Fire Service (2012) *Macarthur Bushfire Management Committee Bush Fire Risk Management Plan*

Standards Australia (2018) *AS3959, Construction of buildings in bushfire-prone areas.*

Tozer MG, Turner K, Keith DA, Tindall D, Pennay C, Simpson C, MacKenzie B, Beukers P, Cox S 2010. *Native Vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands*. Cunninghania 11:359-406.

APPENDIX I DEFINITIONS

Asset Protection Zone- A fuel reduced area surrounding a buffer zone between a bushfire hazard and an asset. The APZ includes a defendable space within which firefighting operations can be carried out. The size of the required APZ varies with slope, vegetation and FFDI.

Bush fire prone area- an area of land that can support a bush fire or is likely to be subject to bushfire attack, as designated on a bush fir prone land map

Bush fire prone vegetation (BFPV) – A map prepared by Council in accordance with RFS guidelines and defining area of vegetation by BFPV categories

Bushfire prone land map (BFPL) A map prepared in accordance with RFS guidelines and certified by the Commissioner of the NSW RSS under section 146 (2) of the Environmental Planning and Assessment Act (1979)

Effective Slope: The land beneath the vegetation which most significantly effects fire behavior, having regard to the vegetation present.

Fire Danger Index (FDI) The chance of a fire starting, its rate of spread, its intensity, and the difficulty potential for its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long- and short-term drought effects.

Grasslands- Grassed areas capable of sustaining a fire. Under Australia standard 3959 Construction of buildings in bushfire -prone areas, identified as low open shrubland, hummock grassland, closed tussock grassland, tussock grassland, open tussock, sparse open tussock, dense sown pasture, sown pasture, open herbfield and sparse open herb field. Grass, whether exotic or native, which is regularly maintained at or below 10 cm in height (includes maintained lawns, golf course, maintained public reserves, parklands, nature strips and commercial nurseries) are regarded as managed land

Inner Protection Area (IPA): the component of an APZ which closest to the asset (measured from unmanaged vegetation). It consists of an area maintained to minimal fuel loads so that a fire path is not created between the hazard and the building.
fire hazard: the potential for land o carry a bush fire, utilising materials or fuels that can be ignited

Managed land- Managed land is land that has vegetation removed or maintained to limit the spread and impact of bushfire. It may include existing developed land (i.e., residential, commercial, or industrial) roads, golf course fairways, playgrounds or sports fields, vineyards, orchards, cultivated ornamental gardens, and commercial nurseries.

APPENDIX II NBC BUSHFIRE ATTACK CALCULATOR

NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 14/06/2022 **Assessment Date:** 9/06/2022

Site Street Address:	104 Fifteenth Avenue, West Hoxton		
Assessor:	Katherine Harris; Harris Environmental Consulting		
Local Government Area:	Liverpool	**Alpine Area:**	No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001/Vesta/Catchpole
Rate of Fire Spread: Noble et al., 1980
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005
Peak Elevation of Receiver: Tan et al., 2005
Peak Flame Angle: Tan et al., 2005

Run Description: South West

Vegetation Information

Vegetation Type:	Grassy and Semi-Arid Woodland (including Mallee)		
Vegetation Group:	Forest and Woodland		
Vegetation Slope:	4.8 Degrees	**Vegetation Slope Type:**	Upslope
Surface Fuel Load(t/ha):	10.5	**Overall Fuel Load(t/ha):**	20.2
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta	

Site Information

Site Slope	3.6 Degrees	**Site Slope Type:**	Upslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	36

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K):**	1200

Calculation Parameters

Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100

Program Outputs

Level of Construction	BAL 12.5	**Peak Elevation of Receiver(m)**	6.33
Radiant Heat(kW/m2):	9.49	**Flame Angle (degrees):**	78
Flame Length(m):	8.3	**Maximum View Factor:**	0.106
Rate Of Spread (km/h):	0.9	**Inner Protection Area(m):**	36
Transmissivity:	0.803	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	9443		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	10	14	21	28	35	6

Run Description:	South West		
Vegetation Information			
Vegetation Type:	Grassy and Semi-Arid Woodland (including Mallee)		
Vegetation Group:	Forest and Woodland		
Vegetation Slope:	4.8 Degrees	**Vegetation Slope Type:**	Upslope
Surface Fuel Load(t/ha):	10.5	**Overall Fuel Load(t/ha):**	20.2
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope	3.6 Degrees	**Site Slope Type:**	Upslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	22
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K):**	1090
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100
Program Outputs			
Level of Construction	BAL 12.5	**Peak Elevation of Receiver(m)**	5.38
Radiant Heat(kW/m2):	11.74	**Flame Angle (degrees):**	74
Flame Length(m):	8.3	**Maximum View Factor:**	0.186
Rate Of Spread (km/h):	0.9	**Inner Protection Area(m):**	22
Transmissivity:	0.828	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	9443		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	7	10	15	21	35	6

APPENDIX III BUSHFIRE PRONE LAND MAP (PRIOR OCTOBER 2021)

NSW Bushfire Prone Land Map. Accessed 17/12/2019