

**Bushfire strategic study**  
277 Cargo Road, Orange NSW

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## 1. Introduction

A planning proposal will be submitted to Orange City Council for a proposed urban residential zoning and lot size at 277 Cargo Road, Orange NSW. The site has an area of approximately 11 hectares. The site forms part of the Witton Place Candidate Area comprising the land bounded by Cargo Road, Broken Hill Railway Line, Neals Lane and west of the existing urban area along Witton Place. The Witton Place Candidate Area is approximately 43 hectares in size. The site is not mapped as bushfire prone land.

Orange City Council have requested a Strategic Bushfire study as part of the planning proposal.

## 2. Objectives

The objective of the investigation was to conduct a Strategic Bushfire Study to assess if the proposal is appropriate in the bushfire hazard context.

## 3. Scope of work

Barnson Pty Ltd was commissioned by Landorange Partnership Pty Ltd to prepare a Strategic Bushfire Study in accordance with NSW RFS (2019) *Planning for Bushfire Protection* at 277 Cargo Road, Orange NSW and the Witton Place Candidate Area. The scope was to assess the bushfire landscape, land-use, access and egress, emergency services, infrastructure and adjoining land.

## 4. Site

The assessment area is 277 Cargo Road, NSW which forms part of the Witton Place Candidate Area (Figure 1). The Witton Place Candidate Area comprises 5 lots with a total area of 43 hectares.

Lot/DP	Address
Lot A DP408148	277 Cargo Road, Orange
Lot 10 DP1116060	349 Cargo Road, Orange
Lot 9 DP1116060	349 Cargo Road, Orange
Lot 4 DP1099080	4 Neals Lane, Orange
Lot 1 DP529849	4 Neals Lane, Orange

## 5. Method

The bushfire strategic study was undertaken as a desktop assessment using available aerial photography.

The NSW Rural Fire Service (2015) *Guide for Bush Fire Prone Land Mapping Version 5b* identifies the introduction of Category 3 vegetation and the requirement for Council to incorporate Category 3 vegetation into Council's bush fire prone land maps. Category 3 vegetation is defined as a medium bush fire risk. It is higher than Category 2 vegetation but lower than Category 1. It is represented as dark orange on a Bush Fire Prone Land map and has a 30m buffer distance. Category 3 vegetation includes grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrublands.

Aerial photograph review was undertaken to determine the presence of Category 3 vegetation on and around the Witton Place Candidate Area for a distance of 100m. Google Earth aerial photography dated October 2023 was adopted to assess the presence of Category 3 vegetation.

Indicative APZ were determined by review of Google Earth elevation profiles and aerial photographs. The most conservative slope and vegetation type to a distance of 140m were used to determine the minimum indicative APZ in accordance with Table A1.12.3 in NSW RFS (2019) *Planning for Bush fire Protection*. The site is located in the Central Ranges and has a FFDI of 80.

## **6. Bushfire strategic study**

### **6.1 Bushfire landscape assessment**

#### **6.1.1 Surrounding vegetation, topography and weather**

Land-use within the candidate area is predominantly grazing land. Several dwellings with maintained yards and associated infrastructure occur in the north eastern section, western section and central southern section.

Stands of pine trees exist in the central and western sections of the site. Remnant eucalypts occur along the southern boundary. The existing bush fire prone area mapping does not map the areas of pine trees and remnant eucalypts as Category 1 or Category 2 vegetation (Figure 2).

Grazing land is classified as Category 3 vegetation.

Land-use to the north comprises Cargo Road and grazing with several areas containing residential dwellings. Cargo Road is considered maintained land. Land to the north is classified as Category 3 vegetation.

Land-use to the east is large lot residential with maintained yards. Land to the east is not classified as bush fire prone land.

Land-use to the south includes a rail corridor, several dams, residence and grazing land. The rail corridor, dams and residence are not classified as bush fire prone land. The grazing land is classified as Category 3 vegetation.

Land-use to the west includes Neals Lane, residences and grazing land. Cabonne Council have mapped areas west of Neals Lane as Category 3 land (Figure 3).

Figure 3 describes the vegetation categories for the site and within 100m of the site.

The site is located on an upper slope with gently inclined slopes of less than 5° occurring in all directions.

The average annual rainfall is 890mm and monthly rainfall varies between 47 and 95mm. The lowest rainfall occurs in autumn. Winter rainfall is most reliable often characterized by a large number of rainy days of low rainfall. Summer rainfall is less reliable and often characterized by storms of high intensity.

Summers are warm to hot with maximum temperatures averaging 26°C and winters are cool to cold with maximum temperatures averaging 11°C (Appendix 1).

The bushfire risk period is between October and March with minimal bushfire risk over winter. Summer winds are predominantly from the east or south east which is the existing urban interface.

#### **6.1.2 Potential fire behaviour and fire runs**

Bushfires will move quickly upslope through the existing grassland areas to the north, south and west.

### 6.1.3 Bushfire history

There is no recent history within the Witton Place Candidate Area or within 5km.

### 6.1.4 Bushfire access

The site is accessed from Cargo Road to the north and Neals Lane to the west. Future plans indicate access to the candidate area will also occur to the east from Bowman Avenue. Future development plans will be designed to ensure suitable emergency services access.

## 6.2 Land-use assessment

### 6.2.1 Development risk profile

The highest point within the development occurs in the central section of the development and expected to be surrounded by maintained parkland and residential lots. Residential lots will occur along boundaries which are buffered by public road reserves and rail corridor.

### 6.2.2 Development land-use

Subdivision plans have not been finalised but expected to include residential lots with open space areas including parkland and detention basins. The final subdivision plan will comply with NSW RFS (2019) *Planning for Bushfire Protection*. Lots will generally increase in size from east to west and towards Cargo Rd and the rail line for buffers for noise/vibration. The larger lots have potential for increased managed buffers. Most of the proposed open space for the Witton Place Candidate Area will have perimeter roads adjacent to part of these spaces.

The development is less likely to support special fire protection purposes such as aged care or schools due to distance from services.

### 6.2.3 Siting of land-uses and impacts on APZ

#### 6.2.3.1 277 Cargo Road

Bush fire hazards were identified on the northern, western and southern sides of the development. Maintained residential land is present to the east of the site and are considered managed land and not a bush fire hazard.

Each side of the development was assigned a number for ease of identification. Figure 4 depicts the numbering identification for each side.

Table 1 describes the side, vegetation and slope within 140m of the development.

APZ are required on Sides 1, 2, 3 and 4 of the development. Table 2 and Figure 5 describes the minimum required APZ as per Table A1.12.3 in NSW RFS (2019) *Planning for Bush fire Protection*.

The pine tree stand which influences the APZ on Sides 3 and 4 will be managed as parkland following development of the Witton Place Candidate Area and may include removal of some trees to enable management in accordance with NSW RFS asset protection zones. Development of the Witton Place Candidate Area will mean that APZ on Sides 2, 3 and 4 will not be required as the vegetation formation will be classified as managed land in the form of residential lots or managed parklands.

**Table 1.** Vegetation and slope to 140m around the site

Side	Distance (m)	Vegetation/Land-use	Vegetation formation	Bushfire hazard	Effective slope
1	0 to 30	Cargo Road	Managed land	No	>0° to 5°
	30 to 140	Grazing	Grassland	Yes	>0° to 5°
2	0 to 90	Grazing	Grassland	Yes	0°
	90 to 120	Cargo Road	Managed land	No	0°
	120 to 140	Residential	Managed land	No	0°
3	0 to 85	Pine tree stand	Pine plantation	Yes	0°
	90 to 140	Grazing	Grassland	Yes	>0° to 5°
4	0 to 140	Pine tree stand	Pine plantation	Yes	0°
	140 to 140	Pine tree stand	Pine plantation	Yes	>0° to 5°
5	0 to 70	Residential	Managed land	No	>0° to 5°
	70 to 140	Residential	Managed land	No	0°
6	0 to 80	Residential	Managed land	No	0°
	80 to 140	Residential	Managed land	No	>0° to 5°

**Table 2.** Asset protection zones

Side	Minimum APZ (m)	Availability
1	11	Yes, Cargo Road
2	10	Yes
3	25	Yes
4	25	Yes
5	Not applicable	Not applicable
6	Not applicable	Not applicable

### 6.2.3.2 Witton Place Candidate area

Bush fire hazards were identified on the northern, western and southern sides of the development. Maintained residential land is present to the east of the site and are considered managed land and not a bush fire hazard.

Each side of the development was assigned a number for ease of identification. Figure 6 depicts the numbering identification for each side.

Table 3 describes the side, vegetation and slope within 140m of the development.

APZ are required on Sides 1, 2, 3 and 4 of the development. Table 4 and Figure 7 describes the minimum required APZ as per Table A1.12.3 in NSW RFS (2019) *Planning for Bush fire Protection*.

Neals Lane provides the minimum required APZ on Side 2 of the development.

The APZ on Side 4 will be located on the site. Development of the approved subdivision at the end of Bowman Avenue will mean that APZ on Side 4 will not be required as the vegetation formation will be classified as managed land in the form of residential lots.

Pine tree stands and remnant vegetation on the site will be managed as parkland following development of the Witton Place Candidate Area. The presence of the parklands is not expected to impact on the bushfire risk to the Candidate Area.

**Table 3.** Vegetation and slope to 140m around the site

Side	Distance (m)	Vegetation/Land-use	Vegetation formation	Bushfire hazard	Effective slope
1	0 to 30	Cargo Road	Managed land	No	>0° to 5°
	30 to 140	Grazing	Grassland	Yes	>0° to 5°
2	0 to 15	Neals Lane	Managed land	No	0°
	15 to 130	Grazing	Grassland	Yes	0°
	130 to 140	Grazing	Grassland	Yes	>0° to 5°
3	0 to 40	Rail corridor	Managed land	No	>0° to 5°
	40 to 140	Grazing	Grassland	Yes	>0° to 5°
4	0 to 105	Grazing	Grassland	Yes	>0° to 5°
	105 to 140	Residential	Managed land	No	>0° to 5°
5	0 to 80	Residential	Managed land	No	0°
	80 to 140	Residential	Managed land	No	>0° to 5°

**Table 4.** Asset protection zones

Side	Minimum APZ (m)	Availability
1	11	Yes, Cargo Road
2	11	Yes, Neals Lane
3	11	Rail corridor
4	11	Yes
5	Not applicable	Not applicable

### 6.3 Access and egress

#### 6.3.1 Capacity of road network

The subdivision plan has not been finalised. The capacity of the road network is expected to comply with LEP requirements and NSW RFS (2019) *Planning for Bushfire Protection*.

#### 6.3.2 Key access routes

The Witton Place Candidate Area is situated on the western fringes of the Orange urban area. Key access routes are expected to be to the east towards Orange.

#### 6.3.3 Potential isolation

The Witton Place Candidate Area proposes to have road connections to Cargo Road and Bowman Avenue at a minimum. These connections are to the north and east away from potential bushfire interface and will provide alternative access/egress points in an emergency that have sufficient capacity for each stage of development.

The 277 Cargo Road site has one access onto Cargo Road until the Witton Place Candidate Area is developed. The furthest lot is approximately 500m from the road connection. The future subdivision design will include internal roads that moves people towards the key access/egress points and not through higher risk bush fire lands.

### 6.4 Emergency services

The growth of urban areas is likely to increase the potential demand for emergency services. The existing urban interface is currently with bushfire prone land. The proposal will result in the interface moving to the west in stages.

The final subdivision plan will be in accordance with LEP requirements and NSW RFS (2019) *Planning for Bushfire Protection* which reduces the potential risk to emergency services in bushfire events.

Perimeter roads or rail corridors will provide part or all of the required APZ on completion of the Witton Place Candidate Area thereby decreasing the bush fire risk for the entire urban area. The Witton Place Candidate Area is expected to largely be used for detached low density residential housing on the perimeter of the urban area.

The development is less likely to support special fire protection purposes such as aged care or schools due to distance from services. There is a low probability these higher risk land-uses increasing demand for emergency services.

## **6.5 Infrastructure**

### **6.5.1 Water supply**

The site will be serviced by the town reticulated water supply. The design of the reticulated water supply network has not been finalised. The design is expected to comply with LEP requirements and NSW RFS (2019) *Planning for Bushfire Protection*.

### **6.5.2 Life safety issues**

The site will be serviced by underground piped gas and electricity. The design of the services network has not been finalised. The design is expected to comply with LEP requirements and NSW RFS (2019) *Planning for Bushfire Protection*.

## **6.6 Adjoining land**

The Candidate Area is bounded by Cargo Road, Neals Lane, rail corridor and existing residential lots. Cargo Road, Neals Lane and the rail corridor will provide APZ to the development which will be further enhanced by the expected setbacks required due to noise and vibration buffer requirements. All bushfire management measures on the Witton Place Candidate Area will be managed within the site or adjoining managed land.

## **7. Report limitations and intellectual property**

This report has been prepared for the use of the client to achieve the objectives given the clients requirements. The Australian Standard 3959, *Construction of buildings in bushfire prone areas*, and the NSW Rural Fire Service, *Planning for bushfire protection* (2019) have been used as guidelines in this report. Where limitations or uncertainties are known, they are identified in the report. No liability can be accepted for failure to identify conditions or issues which arise in the future and which could not reasonably have been predicted using the scope of the investigation and the information obtained.

This report including data contained, its findings and conclusions remain the intellectual property of Barnson Pty Ltd. A licence to use the report for the specific purpose identified is granted after full payment for the services involved in preparation of the report. This report should not be used by persons or for purposes other than those stated, and not reproduced without the permission of Barnson Pty Ltd.



## 8. References

Google Earth Pro (2024) 277 Cargo Road, Orange NSW (2023 historical image) ([https://earth.google.com/web/search/277+Cargo+Road,+Orange/@-33.2855478,149.0582594,910.0718095a,713.12267904d,35y,0h,0t,0r/data=CoABGIYSUAokMHg2YjEwMmRhODQ1ZWU4NTQ5OjB4ZGZkOWYwNWZhZGJjMDZkGe04j9SMpEDAlleg10ULdoWJAKhYyNzcgQ2FyZ28gUm9hZCwgT3JhbmdlGAIgASImCiQJ2cXAtsx7REAR2cXAtsx7RMAZzUWrgxMdRkAhtZoppS\\_SUcA](https://earth.google.com/web/search/277+Cargo+Road,+Orange/@-33.2855478,149.0582594,910.0718095a,713.12267904d,35y,0h,0t,0r/data=CoABGIYSUAokMHg2YjEwMmRhODQ1ZWU4NTQ5OjB4ZGZkOWYwNWZhZGJjMDZkGe04j9SMpEDAlleg10ULdoWJAKhYyNzcgQ2FyZ28gUm9hZCwgT3JhbmdlGAIgASImCiQJ2cXAtsx7REAR2cXAtsx7RMAZzUWrgxMdRkAhtZoppS_SUcA)) (accessed 27/5/2024)

NSW RFS (2015) *Guide for Bush Fire Prone Land Mapping, Version 5b*

NSW RFS (2019) *Planning for Bushfire Protection* (Planning & Environment Services: Sydney NSW)

## Figures

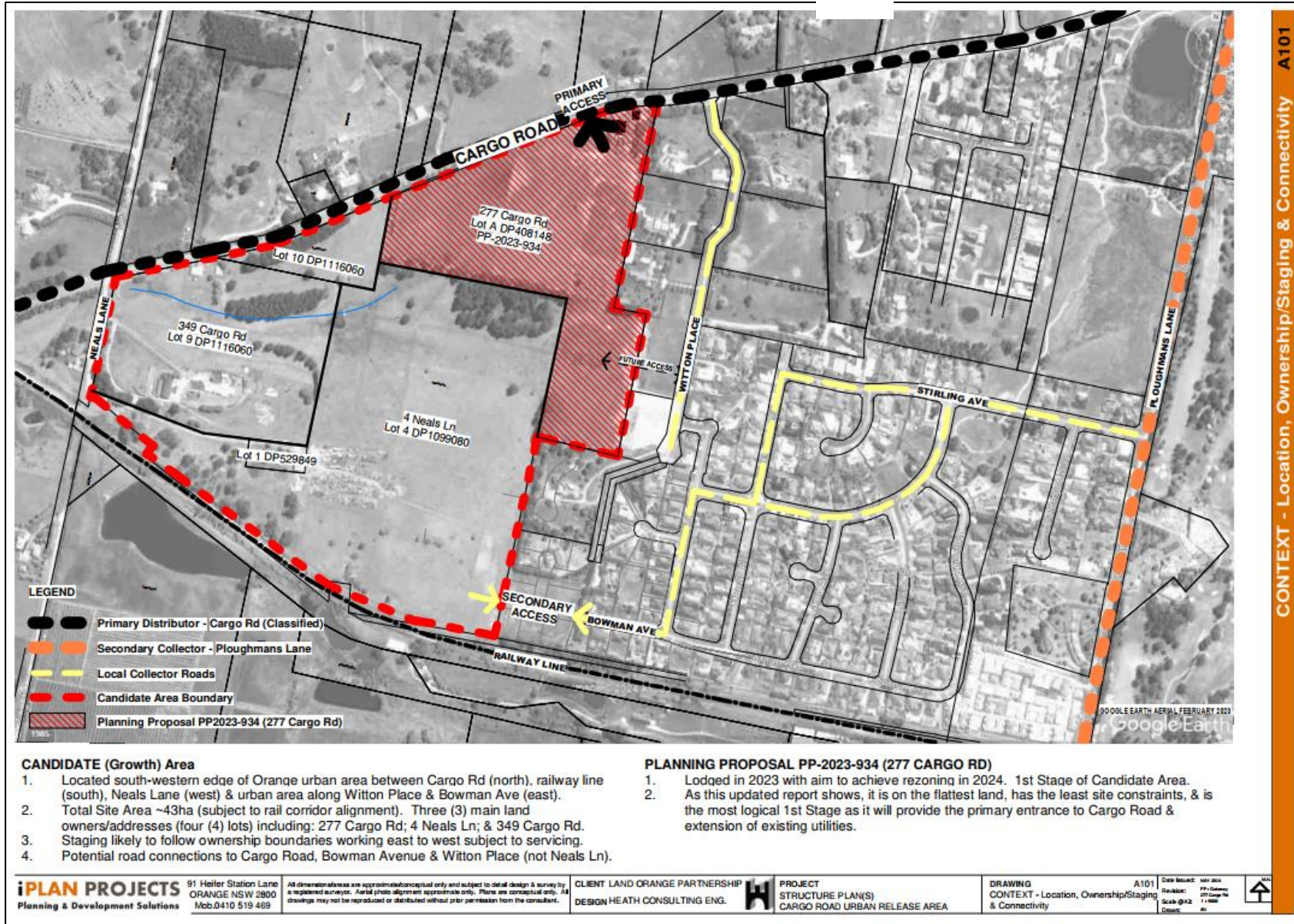


Figure 1. Locality map

277 Cargo Road, Orange NSW

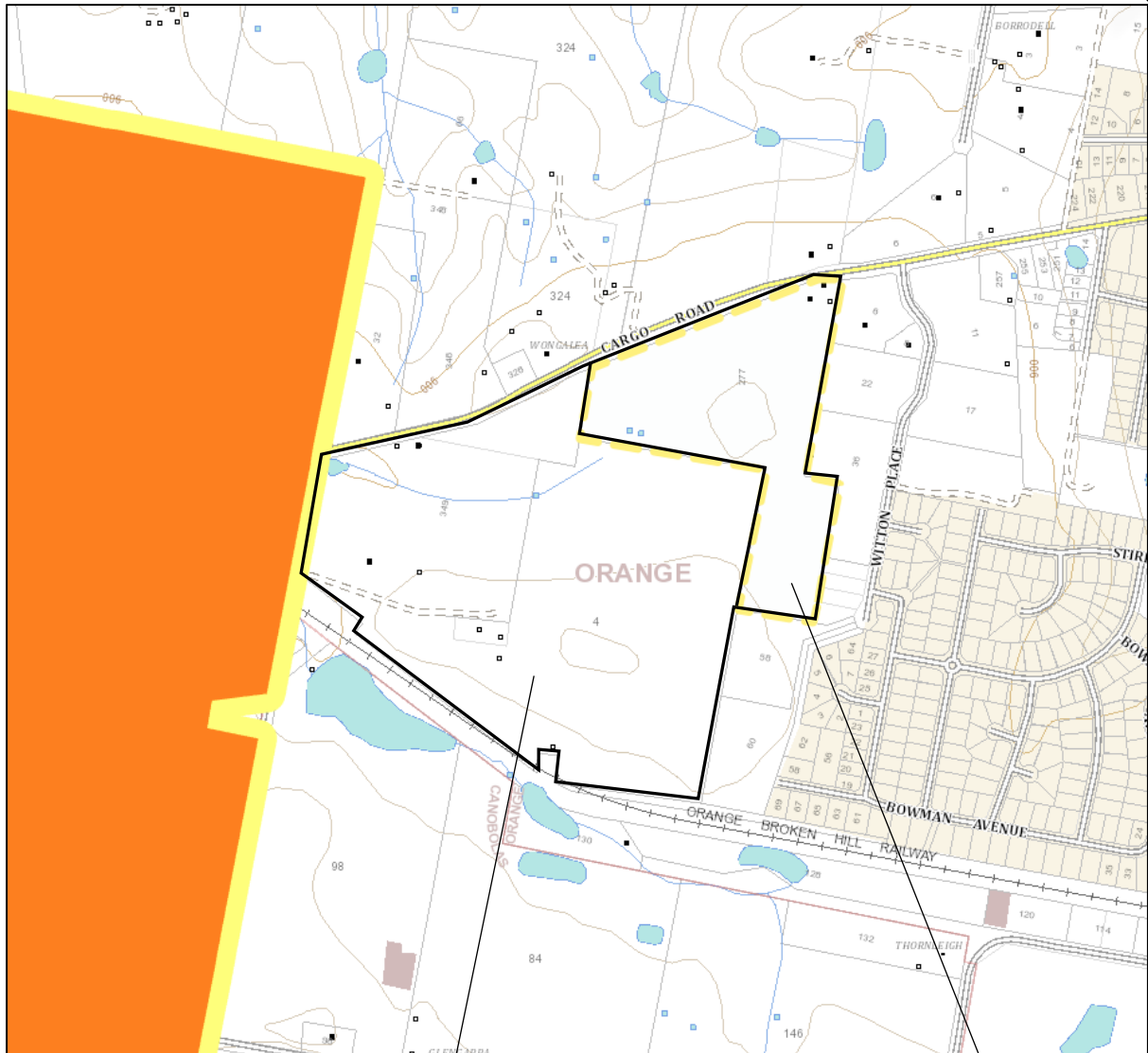
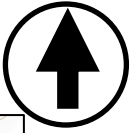


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Consulting Eng

Date: 25/5/2024



Witton Place Candidate Area

277 Cargo Road

### Legend

- Lot boundary
- Category 3 vegetation
- 30m buffer

**Figure 2.** Existing bushfire mapping

277 Cargo Road, Orange NSW



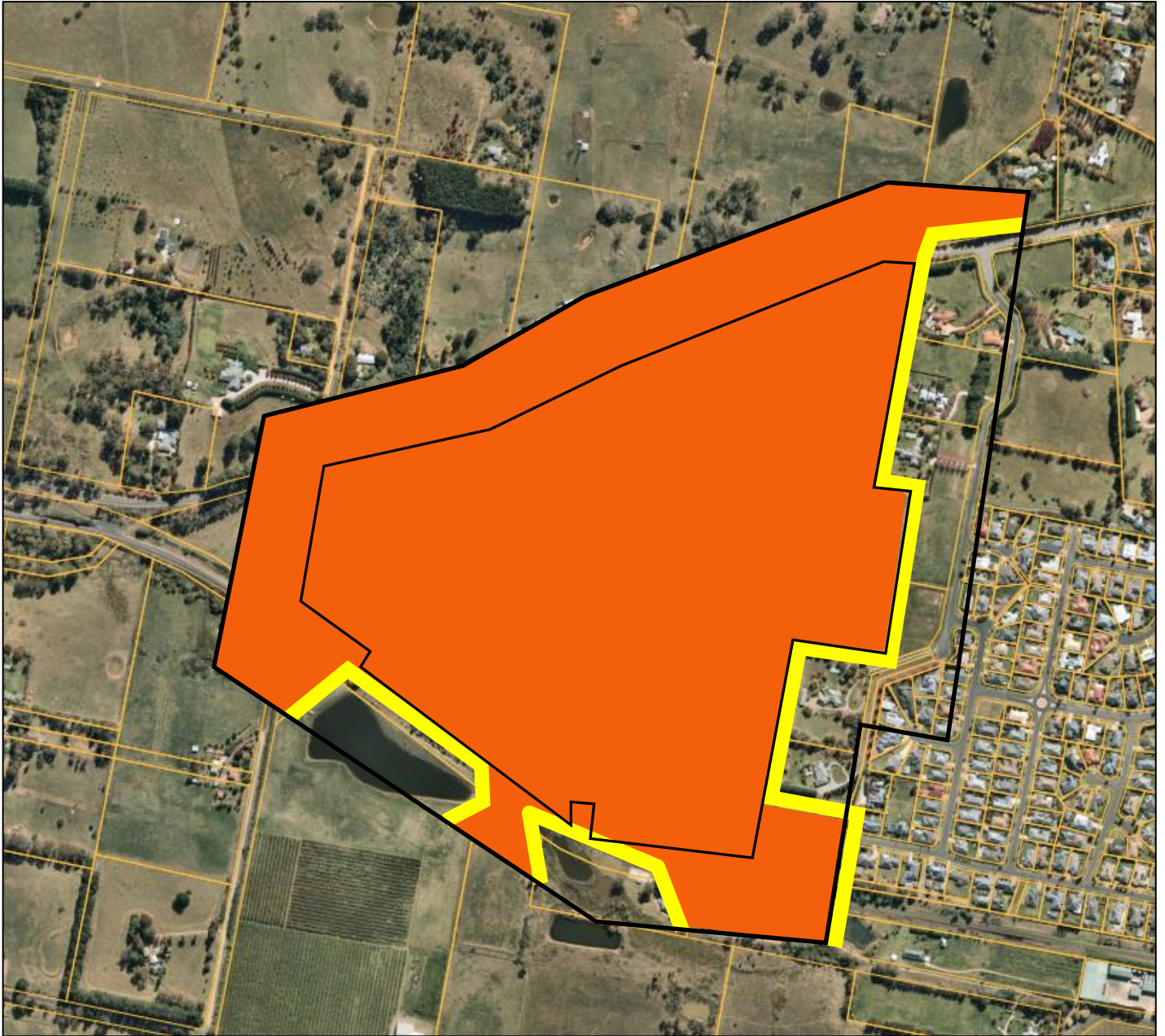
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Job: R44810bf

Drawn by: -

Date: 29/5/2024





**Legend**

- Lot boundary
- 100m investigation area
- Category 3 vegetation
- 30m buffer

Approximate Scale 1: 8,600



**Figure 3.** Vegetation categories

277 Cargo Road, Orange NSW



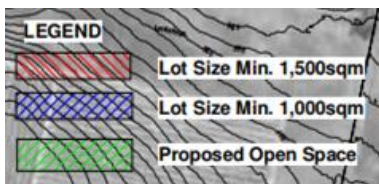
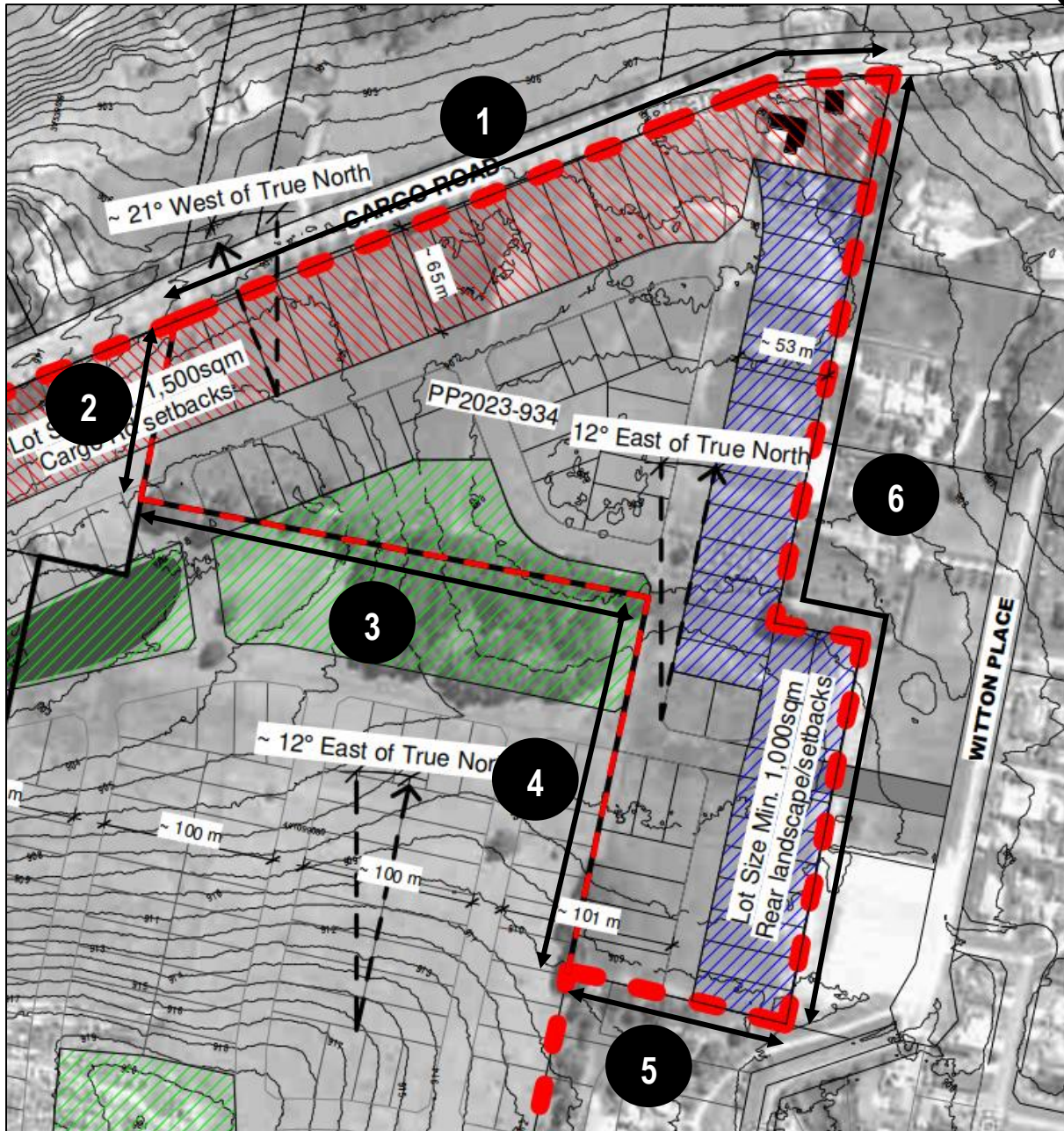
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Approximate Scale 1: 3,900



**Figure 4. Identification of sides – 277 Cargo Road**

277 Cargo Road, Orange NSW



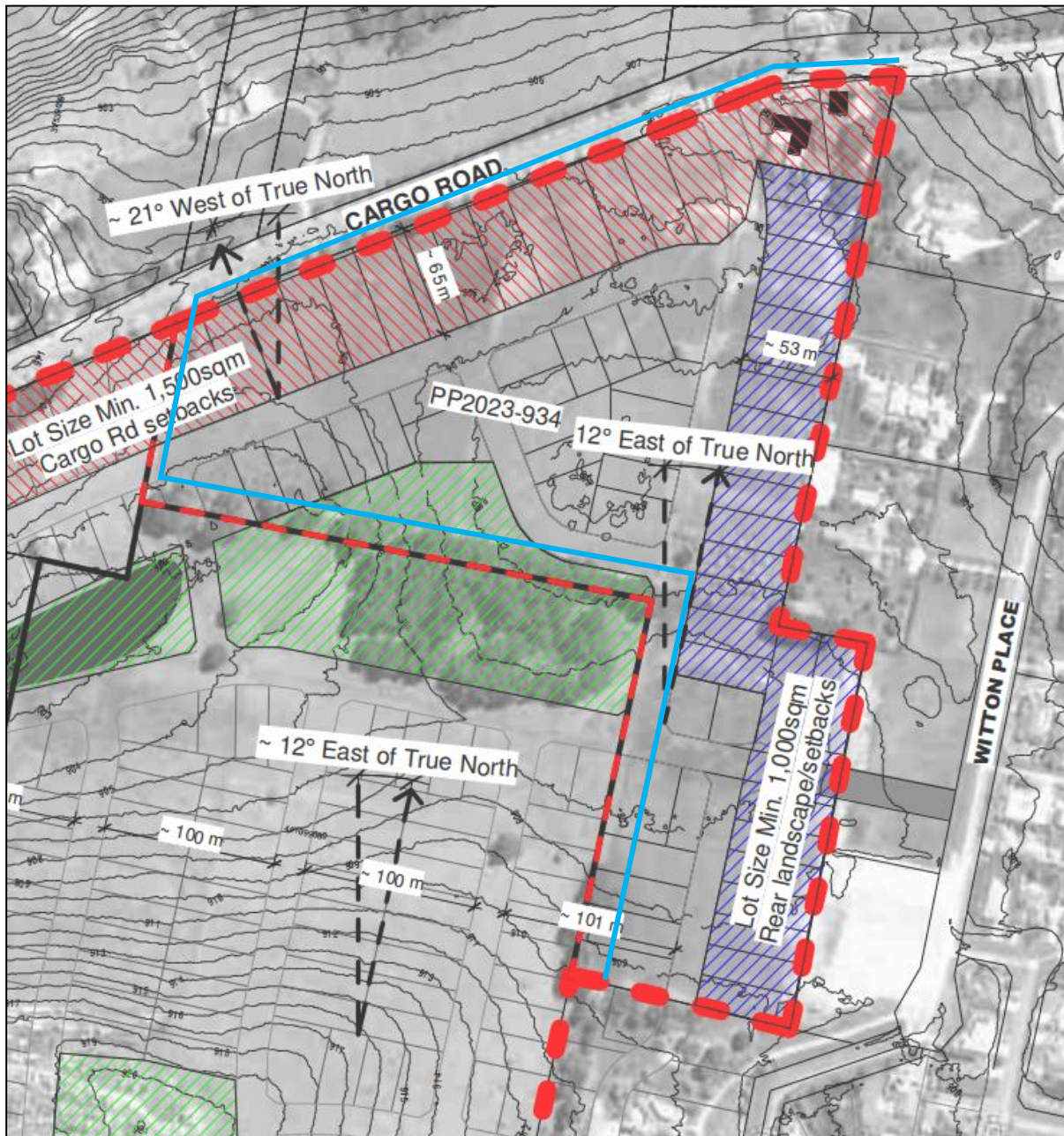
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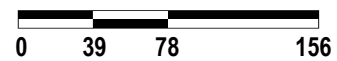
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Approximate Scale 1: 3,900



### Legend

— Minimum APZ



**Figure 5.** Asset protection zones – 277 Cargo Road

277 Cargo Road, Orange NSW



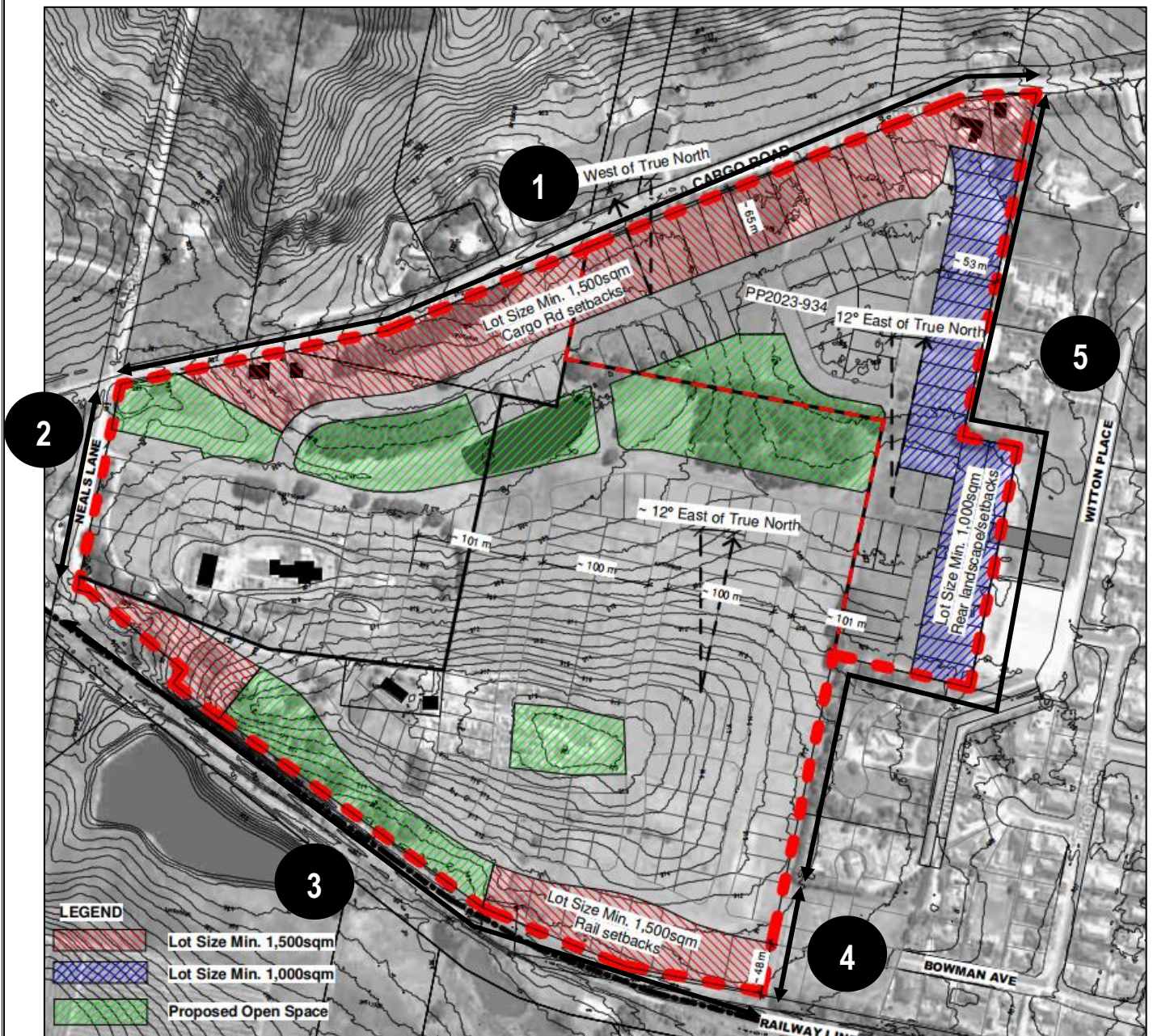
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Approximate Scale 1: 5,800



**Figure 6.** Identification of sides – Witton Place Candidate Area

277 Cargo Road, Orange NSW



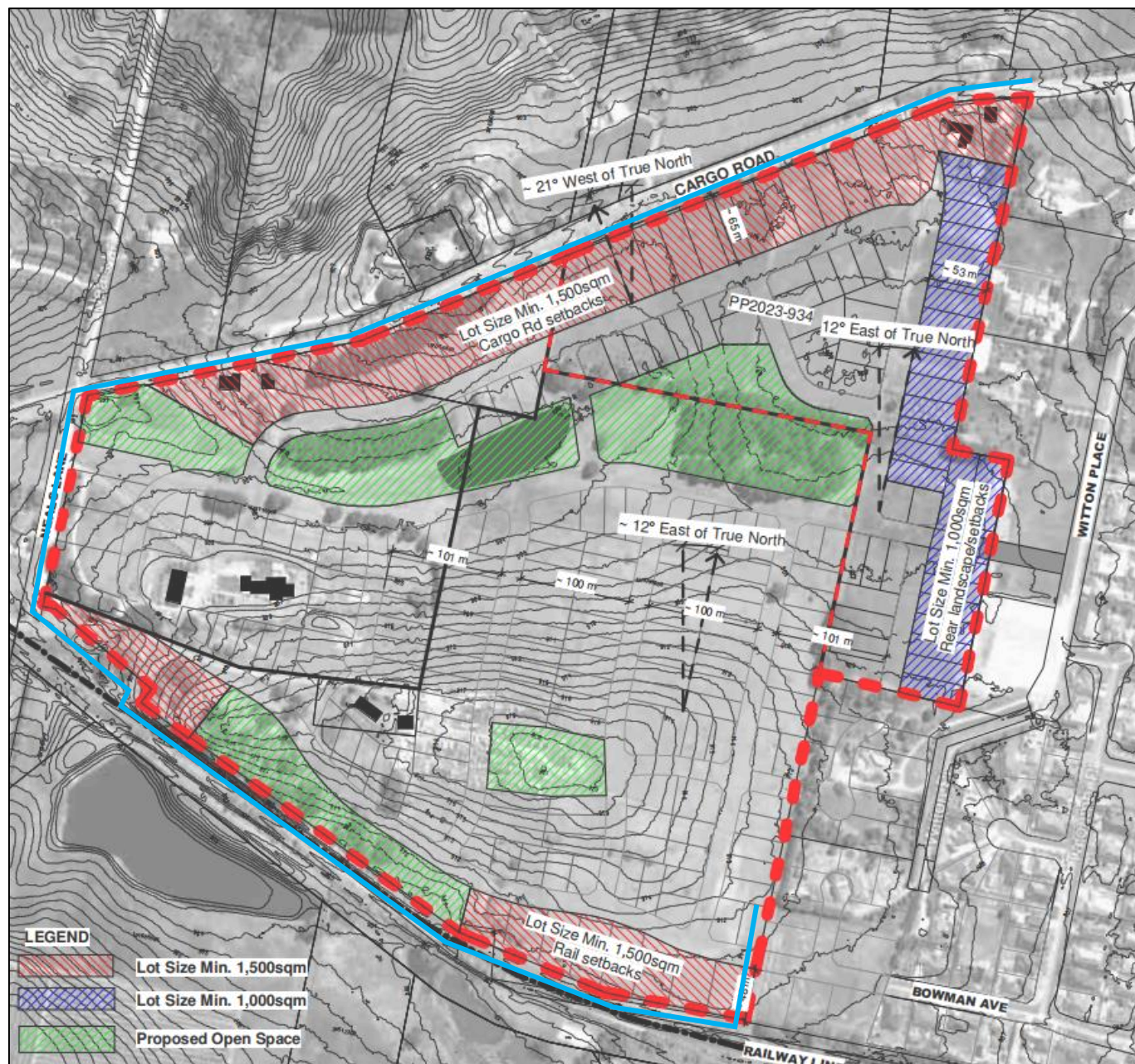
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### Legend

 Minimum APZ

Approximate Scale 1: 5,800



**Figure 7. Asset protection zones – Witton Place  
Candidate Area**

277 Cargo Road, Orange NSW



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