Section 4

Environmental Setting

PREAMBLE

This section describes the existing environmental setting within and adjacent to the Quarry Site. Emphasis is placed in this section upon providing information about environmental features that would contribute to or would influence the assessment of a wide range of environmental parameters. Information in this section is provided on the local and Quarry Site topography, meteorology, land ownership, land zoning, land uses and residences.

The impacts of the Proposal upon each of these environmental features and the design and operational safeguards to be adopted by the Applicant are incorporated in this Section.

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4.1 TOPOGRAPHY

Bogo Quarry is situated on the eastern side of a small hill located 900m directly south of the junction of Paynes Road and the Hume Highway, approximately 5km east of Bookham and 20km west of the town of Yass in the Southern Tablelands region of New South Wales. The hill, which rises to approximately 600m AHD, forms part of a series of near parallel ridgelines oriented generally in a north-south direction.

Approximately 1.4km to the south of the Project Site, the locally significant Bald Hill rises to approximately 700m AHD. Other significant local features include Black Ridge, which is a north-south aligned ridge between the Yass River and the Hume Highway at Conroys Gap rising to 800m AHD approximately 2.5km east of the Quarry Site, and Sugarbag Hill, a sprawling hill located 4km south-southeast of the Quarry Site rising to approximately 720m AHD. **Figure 4.1** shows the local topographic setting of the Quarry Site.

The small hill within the Quarry Site has steep natural side slopes to the south and west (typically between 10º to 30º). The side slopes to the north are slightly gentler (typically approximately 5º to 20º). The eastern side of the hill where the extraction area is located has been significantly modified with extraction occurring between 560m AHD and 600m AHD.

The topography within the Quarry Site rises slightly to the southeast with the lowest elevation (550m AHD) located near the centre of the Quarry Site (where the weighbridge, office, processing plant and concrete batching plant are, or would be located). The southeastern corner of the Quarry Site (where the asphalt plant would be located) has an elevation of approximately 560m AHD.

4.2 METEOROLOGY

4.2.1 Source of Data

The meteorological data presented in this section has been sourced from the Bureau of Meteorology Yass (Linton Hostel), (Station No. 070091), located approximately 20km east of the Quarry Site. The available meteorological data is presented in **Table 4.1**.

4.2.2 Temperature

The hottest months of the year are January and February with mean daily maximum temperatures of 29.4^{o}C and 29.0^{o}C with mean daily minimum temperatures in both months of 13.9^{o}C. The coldest month of the year is July with a mean daily maximum of 11.6^{o}C and mean daily minimum temperature of 1.1^{o}C.

4.2.3 Rainfall

The average annual rainfall for Yass is 647.6mm. October is statistically the wettest month of the year receiving an average of 64.4mm over 7.1 rain days while February is the driest month receiving an average of 43.9mm of rain over 3.9 days. On average, there are 74.2 rain days per year (≥1mm) with the winter and spring months having 50% more rain days (45.1) than the autumn and summer months (29.1).

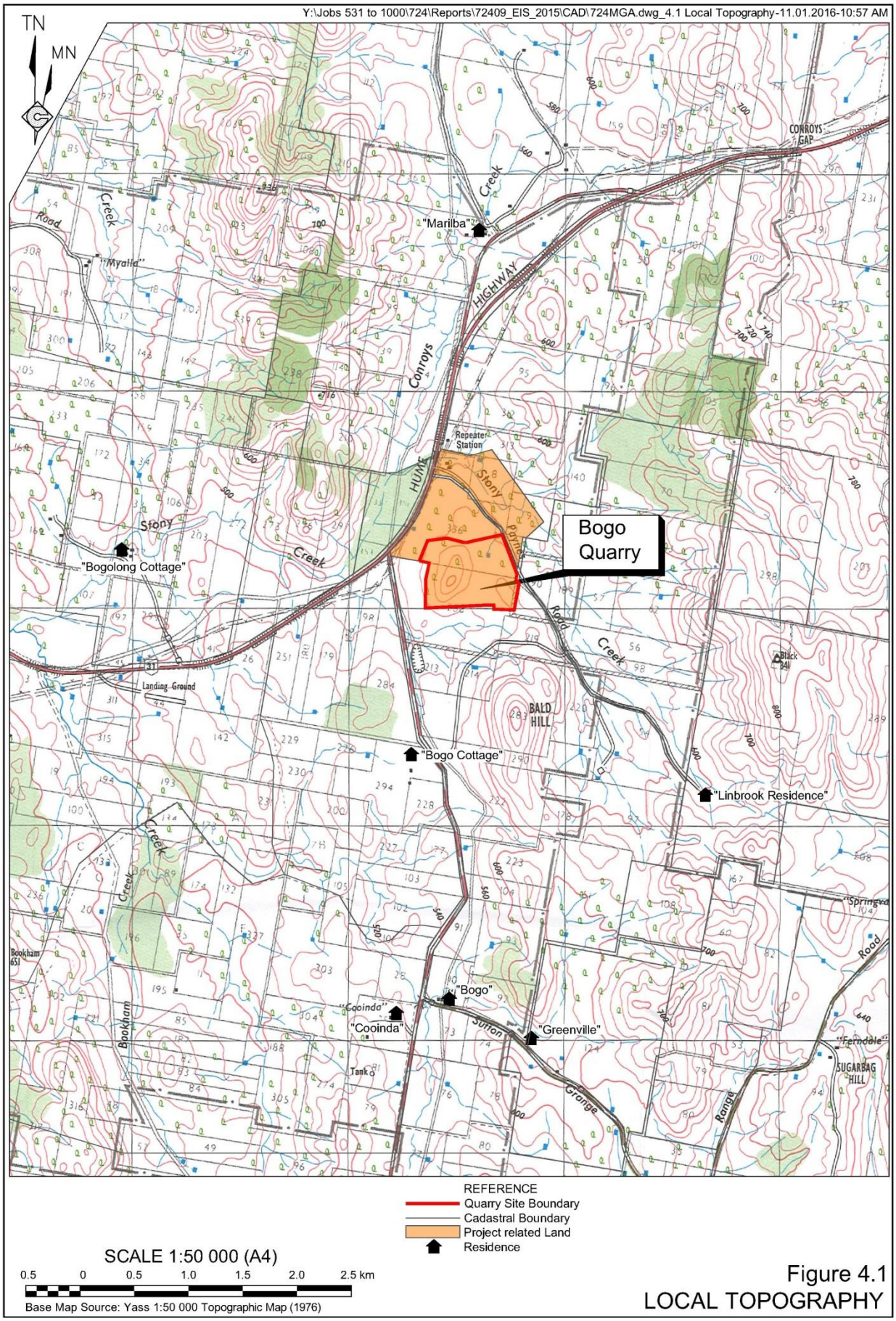

Figure 4.1
LOCAL TOPOGRAPHY

Table 4.1
Mean Monthly Meteorological Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
TEMPERATURE (ºC) (62 years of records)													
Mean Maximum	29.4	29.0	25.8	21.2	16.4	12.6	11.6	13.4	16.7	20.5	24.3	27.7	20.7
Mean Minimum	13.9	13.9	11.1	7.0	4.1	2.2	1.1	1.9	4.0	6.3	9.3	11.9	7.2
Rainfall (mm) (109-111 years of records)													
Mean (105 yrs)	50.5	43.9	46.5	49.1	49.8	58.1	59.4	59	56.5	64.4	55.7	54.6	647.6
Mean number of days of rain ≥ 1mm	4.9	3.9	4.2	4.9	5.9	7.6	8.5	8.3	7.6	7.1	6	5.3	74.2
Highest (105 yrs)	176.2	187.6	254.1	205.5	219.8	174.0	178.8	141.3	149.4	157.6	201.5	201.1	1227.9
Lowest (105 yrs)	0.0	0.0	0.0	0.0	0.0	3.6	5.0	2.6	11.7	0.6	1.0	0.3	211.5
FROST FREQUENCY (days/month) (55 years of records)													
Mean Monthly	0	0.1	0.2	2.1	6.6	10.6	12.8	10.1	7.1	2.4	0.4	0	52.3
FOG FREQUENCY (days/month) (55 years of records)													
Mean Monthly	0.4	0.5	1.2	2.8	5.9	7.5	6.9	4.3	1.8	0.7	0.4	0.2	32.6
RELATIVE HUMIDITY (%) (21 & 36 years of records)													
Mean 9:00am	60	66	70	74	82	88	87	82	75	66	62	59	73
Mean 3:00pm	41	41	44	49	60	70	68	62	56	50	45	40	52
WINDS (km/hr) (41years of records)													
Mean 9am Wind Speed	7.8	7.4	7	5.9	4.9	4.9	5.2	7.1	8.3	9.5	9.4	8.5	7.2
Mean 3pm Wind Speed	14.2	12.4	11.8	10.9	9.2	9.3	10.4	12.6	13.6	13.7	14.8	15.1	12.3
Source: Bureau of Meteorology Yass (Linton Hostel) Station (No. 070091)													

4.2.4 Temperature Inversions

Temperature inversions are significant noise enhancing phenomena which invariably occur of an evening/overnight with clear skies and when wind speeds are low or calm conditions prevail. They invariably occur when frosts and/or fogs are present. Based on the mean frequency of fogs and frosts (see **Table 4.1**), it is expected that temperature inversions could occur throughout approximately one-third of winter evenings.

4.2.5 Wind

The wind data presented in this section has been drawn from the Bureau of Meteorology Yass (Linton Hostel) Station (No. 070091). The recorded wind data reveals the following.

- In the morning, the prevailing winds are from the northwest during the cooler months (March – August) and from the southeast during the warmer months (September – February).
- Afternoon winds tend to be from the northwest and southwest in spring and summer and from the northwest and west during autumn and winter.
- Winds speeds average 10km/hr to 20km/hr throughout the year and are generally stronger in the afternoon with calm conditions occurring approximately 46% of the time at 9.00am, reducing to 20% by 3.00pm.

Figure 4.2 presents the wind rose data obtained from the Yass (Linton Hostel) Bureau of Meteorology Station.

4.3 LAND OWNERSHIP, ZONING AND LAND USE

4.3.1 Land Ownership

Figure 4.3 shows the land ownership on and surrounding the Quarry Site and **Table 4.2** lists the residences surrounding the Quarry. The Quarry is located on land owned by Bogo Quarry Pty Ltd, a company with common directors with the Applicant.

Table 4.2
Residences Surrounding Bogo Quarry

Residence Name	Owner	Approximate Distance of Residence from Limit of Extraction:
"Bogolong Cottage"	Refax Pty Limited	2.9km west
"Marilba"	Marilba Pastoral Co Pty Ltd	2.9km north
"Linbrook" Residence	Linbrook Pty Ltd	2.9km southeast
"Cooinda"	RT Walker	3.8km south
"Bogo Cottage"	Bogo Pty Ltd	1.4km south
"Bogo"	Bogo Pty Ltd	3.6km south
"Stony Creek" #	Bogo Quarry Pty Ltd	0.8km north
"Grenville"	MJ & RM Lees	4.1km south
# Proposal-related Land Ownership Source: Yass Valley Council 2015		

4.3.2 Land Zoning

The land on which the Quarry is located is zoned RU1 Primary Production under the Yass Valley Local Environmental Plan 2013. Extractive industries are permitted with development consent within this zone.

4.3.3 Land Uses and Residences

The land adjacent to the Quarry Site is currently used for agriculture, predominantly cattle and sheep grazing. However, the most dominant land use near the Bogo Quarry is the Hume Highway, the major interstate route between Sydney and Melbourne. Additionally, it is noted that the recently approved Conroy's Gap Wind Farm lies approximately 2.2km to the east of Bogo Quarry.

The closest private residence to Bogo Quarry (i.e. "Bogo Cottage") is located approximately 1.4 km to the south adjacent to Burrinjuck Road.

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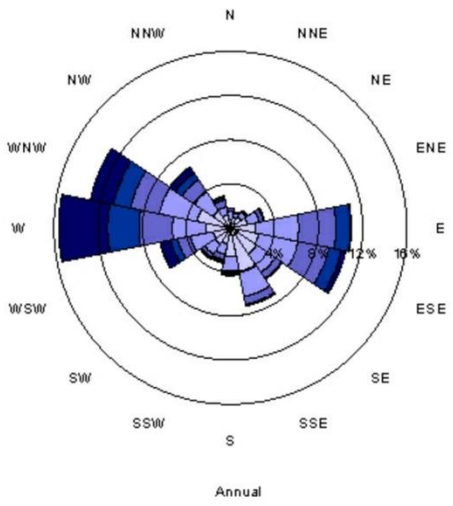
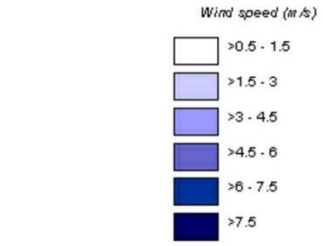
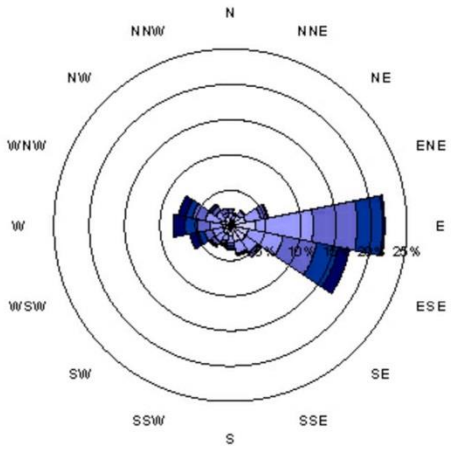
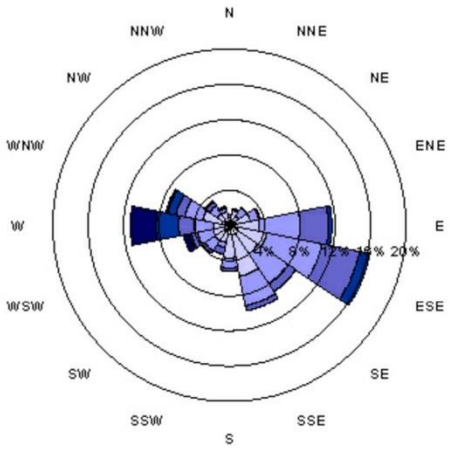


Annual

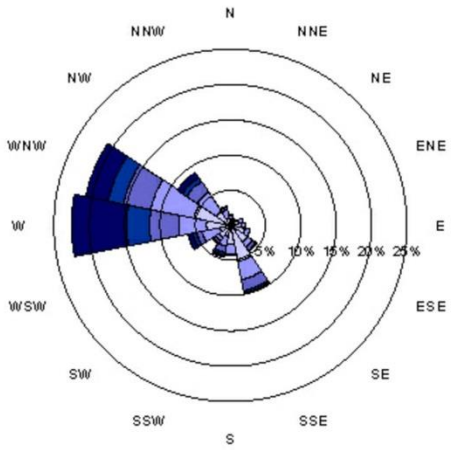




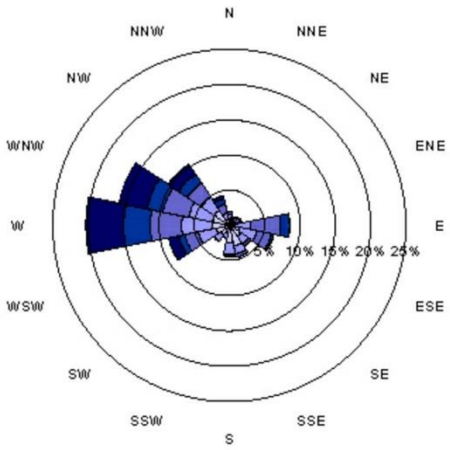
Summer



Autumn



Winter



Spring

Source: Yass (Linton Hostel) Bureau of Meteorology Station

Figure 4.2
WIND ROSES

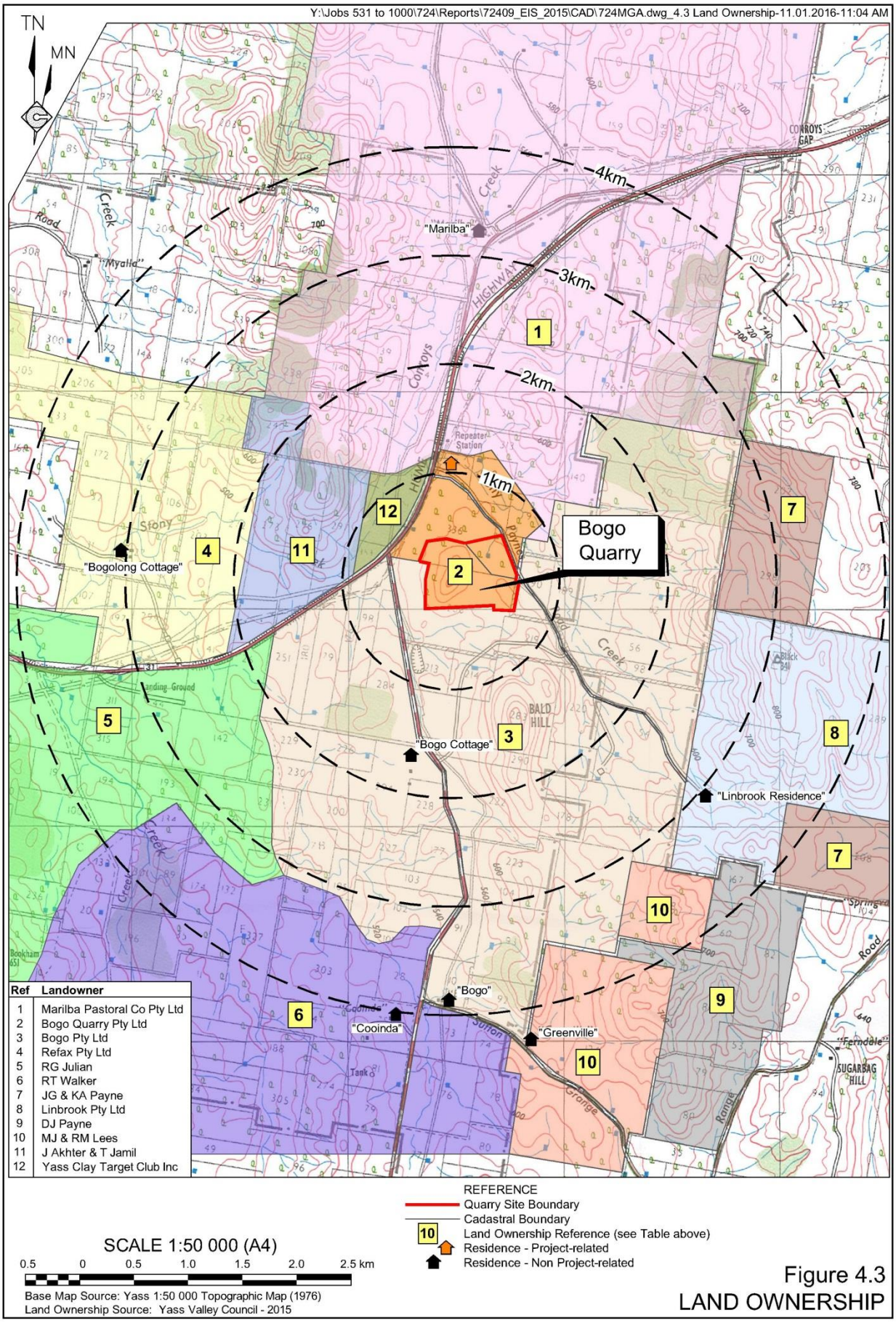


Figure 4.3
LAND OWNERSHIP

4.4 BUSHFIRE MANAGEMENT

The operational areas within the Quarry Site are sufficiently cleared for there not to be a significant increase to the risk of a bushfire. In the event that a bushfire approaches the Quarry Site, there would be sufficient area within the Quarry for personnel to seek refuge until the fire risk is contained or passes.

Additionally, if required, the Applicant would assist the Rural Fire Service through provision of access to the dams on site to supply water for bushfire fighting.

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