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17 September 2015

Desktop flora and environmental assessment:
6 Oak Street, Schofields (Lot 30 DP 39341)

Prepared by:
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Prepared for:
John Hong
on behalf of Jong and Min Hong
6 Oak Street,
Schofields 2762

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Appendix
1 Brief CVs

1.0 Introduction

This report was prepared for John Hong on behalf of his parents Jong and Min Hong and forms part of the Hong's submission relating to the re-zoning of 2 ha property at 6 Oak Street, Schofields (Lot 30 DP 39341) (the Site, Figures 1a, 1b) under the Riverstone Draft Precinct Plan (Figure 2a).

This report investigated the potential environmental constraints on the Site, based on the publicly available documents. The Site and surrounding land are proposed to be rezoned as follows:

	Land use from aerial photographs	Indicative plan (Figure 2a)	Proposed zoning (Figure 2b)
The Site	Intensive agriculture with house in west	Local Park	RE1 - Public recreation
To north	Intensive agriculture	Townhouses or terraces	R3 – Medium density residential
To east	Scattered canopy trees with cleared understorey	Local park, Water management and then Sporting field	RE1 - Public recreation and SP2 Local Drainage along the relocated creek to the north-east
To south	Canopy trees with cleared understorey and single dwelling	Sydney Metro-Northwest train stabling yard	N1 – General Industry
To west	Road with dense canopy adjoining First Ponds Creek	Road, Local park, Water management	RE1 - Public recreation and SP2 Local Drainage adjoining First Ponds Creek

The Site and adjoining land are currently zoned *RU4 – Primary production small lots* on the Blacktown Local Environment Plan 2015 (Figure 2c).

The brief CVs of the authors of this report are in Appendix 1.

2.0 Environmental Setting

The Site and surrounding land are on gently undulating agricultural land in Schofields (Figures 1a, 1b, 1b-1998, 1b-2009, 1b-2011, 1b-2013, 1b-2014).

On the 1:25 000 topographic map (Figure 1a), the elevation of the Site and surrounding land is between 30-50 m AHD. There are mapped watercourses approximately 50 m to the west (First Ponds Creek) and approximately 20 m north-east.

On the 2015 aerial photograph (Figure 1b-2015), the vegetation on the proposed N1 zoned land to the south of the Site has been cleared. The adjoining narrow band of canopy trees in the south on the Site have been retained.

2.1 Geology and soil landscape

The geology of the Site and adjoining land has been mapped at 1:100 000 scale by Clark and Jones (1991) as Bringelly Shale of the Wianamatta Group (map unit Rwb) with Quaternary deposit (Map unit Qal) associated with the creekline (Figure 3a).

The soil landscape of the Site and adjoining land has been mapped at 1:100 000 scale by Bannerman and Hazelton (1990) as Blacktown (map unit bt) with South Creek (map unit sc) associated with the creekline (Figure 3b).

	Mapped geology	Mapped soil landscape
The Site	Bringelly Shale	Blacktown
To north	Bringelly Shale	Blacktown
To east	Bringelly Shale	Blacktown
To south	Bringelly Shale	Blacktown
To west	Bringelly Shale with Alluvial deposits associated with First Ponds Creek	Blacktown with South Creek associated with First Ponds Creek

3.0 Existing vegetation mapping

Benson (1992) mapped the vegetation of 1:100 000 Penrith sheet using the 1979 aerial photographs and updated with the 1988 and 1989 aerial photographs. The Site is mapped as “Cleared” with a patch of *Grey Box-Ironbark Woodland* (map unit 10d) (Figure 4a) approximately 500 m to the north-east.

These map units are defined as:

Map unit	Main canopy species	Geology	Occurrence
10d - Grey Box-Ironbark Woodland	<i>Eucalyptus moluccana</i> <i>Eucalyptus tereticornis</i> <i>Eucalyptus crebra</i>	Wianamatta Shale	Undulating to hilly country on margins of the Cumberland Plain
Cleared	These areas are generally the better agricultural soils along the alluvial flats or on the Wianamatta Shale country. Small remnants of native vegetation too small to show on the map may occur here.		

NPWS (2002)/ Tozer (2003) mapped the vegetation of the Cumberland Plain using the 1997/1998 aerial photographs. The Site was mapped at 1:100 000 scale as *Shale Plains Woodland with canopy cover >10%* in the south-east corner and *Shale Plains Woodland with canopy cover <10%* canopy cover in the western half (Figure 4b).

The mapped vegetation pattern on the Site does not appear to be consistent with the observed native canopy cover on the 1998 aerial photograph (Figures 1b-1998, 4b). From the 1998 aerial photograph, the following are observed:

	1998 aerial photograph	NPWS (2002)/ Tozer (2003)
The Site	Cleared with glasshouses	Approximately 1/3 unmapped
Close to east boundary	Scattered canopy vegetation over paddock	Shale Plains Woodland with canopy cover >10%
Close to southern boundary	Scattered canopy vegetation over paddock	Shale Plains Woodland with canopy cover <10% canopy cover in the

	1998 aerial photograph	NPWS (2002)/ Tozer (2003)
		western half
North of the Site	Cleared	Not mapped
East of the Site	Scattered Canopy	Shale Plains Woodland with canopy cover >10%
South of the Site	Dense canopy cover	Not mapped
West of the Site	Cleared	Shale Plains Woodland with canopy cover <10%

Ecological Australia (2014) classified the Conservation Significance of the Site and surrounding land (Figure 4c) as:

	Land use	Conservation Significance	Proposed zoning
The Site	Intensive agriculture with house in west, scattered canopy trees close to eastern and southern boundary.	Mostly unmapped with: - Category 3a adjoining the eastern boundary; - Category 3b along south boundary	RE1 - Public recreation
To north	Intensive agriculture	Generally unmapped with Category 2c along watercourse	R3 – Medium density residential with watercourse realigned to the east
To east	Scattered canopy trees with cleared understorey	Category 3a with Category 2c along mapped watercourse	RE1 - Public recreation and SP2 Local Drainage along the relocated creek to the north-east
To south	Canopy trees with cleared understorey and single dwelling	Mainly Category 3b with some unmapped patches	N1 – General industry
To west	Road with dense canopy adjoining First Ponds Creek	Category 2a along mapped watercourse	RE1 - Public recreation and SP2 Local Drainage adjoining First Ponds Creek

Category 3 is described as:

Other Remnant Vegetation: While these areas are within currently certified lands, and are therefore potentially available for development because the impacts have been offset both within the non-certified areas and conservation offsetting outside the Growth Centres Precincts, they present sites of both 3(a) high to moderate ecological value and which should be considered in the allocation of appropriate sympathetic land use zones such as open space, environmental conservation / environmental living etc, and 3(b) exotic and/or poor condition vegetation.

4.0 Environmental constraints mapping for the Riverstone East – North West Growth Centre

The Riparian Protection Area has been mapped for the Growth Centre. The Site is not within the Riparian Protection Area. The Site is approximately 50 m east of the boundary of the Riparian Protection Area associated with First Ponds Creek and approximately 20 m south-west of the Riparian Protection Area associated with the re-aligned creek to the north-east (Figure 5a).

The Native Vegetation Protection Area has been mapped for the Growth Centre. A strip of mapped Native Vegetation Protection Area is close to the eastern and southern boundaries. Neither the majority of the Site (with proposed RE1 zoning) nor the land to the north (with proposed R3 zoning) are within the mapped Native Vegetation Protection Area (Figure 5b).

5.0 Conclusions

Based on the available documents and the historic and current aerial photographs, the Site is similar to the land to the north that is proposed to be zoned *R3 – Medium density residential* with:

- similar intensive agricultural land use;
- at similar elevations;
- on the same geology and soil landscape map units; and
- generally unmapped as having conservation significance (Ecological Australia 2014).

The obvious difference between the Site (proposed to be zoned *RE1 - Public recreation*) and the land to the north (proposed to be zoned *R3 – Medium density residential*) appears to be the NPWS (2002)/Tozer (2003) vegetation mapping. The vegetation mapping appears not to be consistent with that observed on the 1998 aerial photograph used for the mapping.

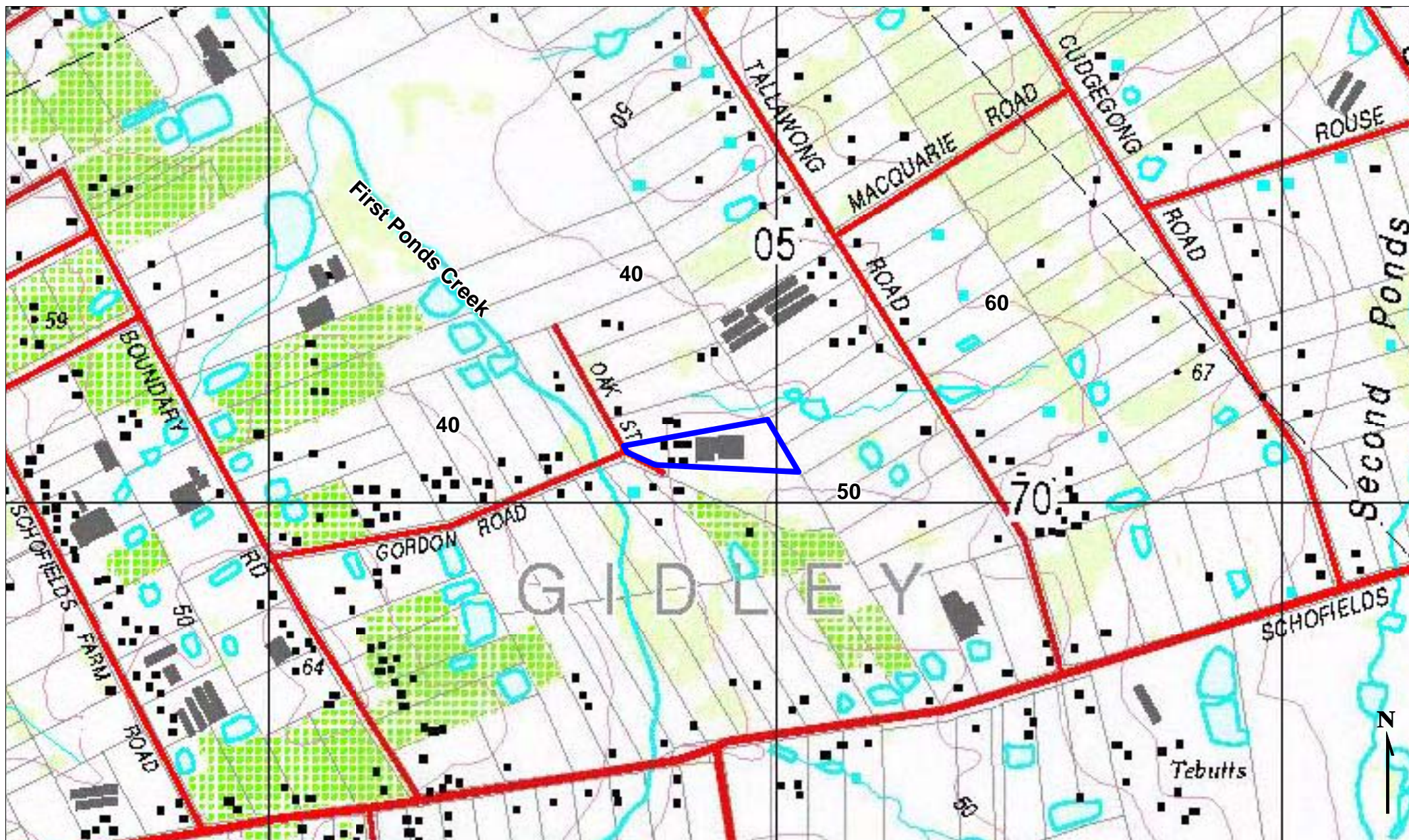
The Site does not appear to support widespread occurrence of canopy trees, similar to those on land to the east (proposed to be zoned *RE1 - Public recreation*).

6.0 Recommendations

It is recommended that:

- The proposed rezoning of the approximately 2 ha of agricultural land on 6 Oak Street, Schofields be consistent with that of the land immediately to the north (proposed to be zoned *R3 – Medium density residential*).
- The scattered canopy trees along the eastern and southern boundaries be retained, where practical.

Figures



Site boundary

0 200 400
metres

Figure 1a.
Site boundary overlaid on the 1:25 000 topographic map
(Riverstone 9030-1S 2000)



 Site boundary




0 200 400
metres

Figure 1b.
Site boundary overlaid on the Penrith 1:25 000 aerial photograph
(Land & Property Information, 1998)



 Site boundary




0 50 100
metres

Figure 1b-1998.
Site boundary overlaid on the Penrith 1:25 000 aerial photograph
(Land & Property Information, 1998)



 Site boundary

0 50 100
metres

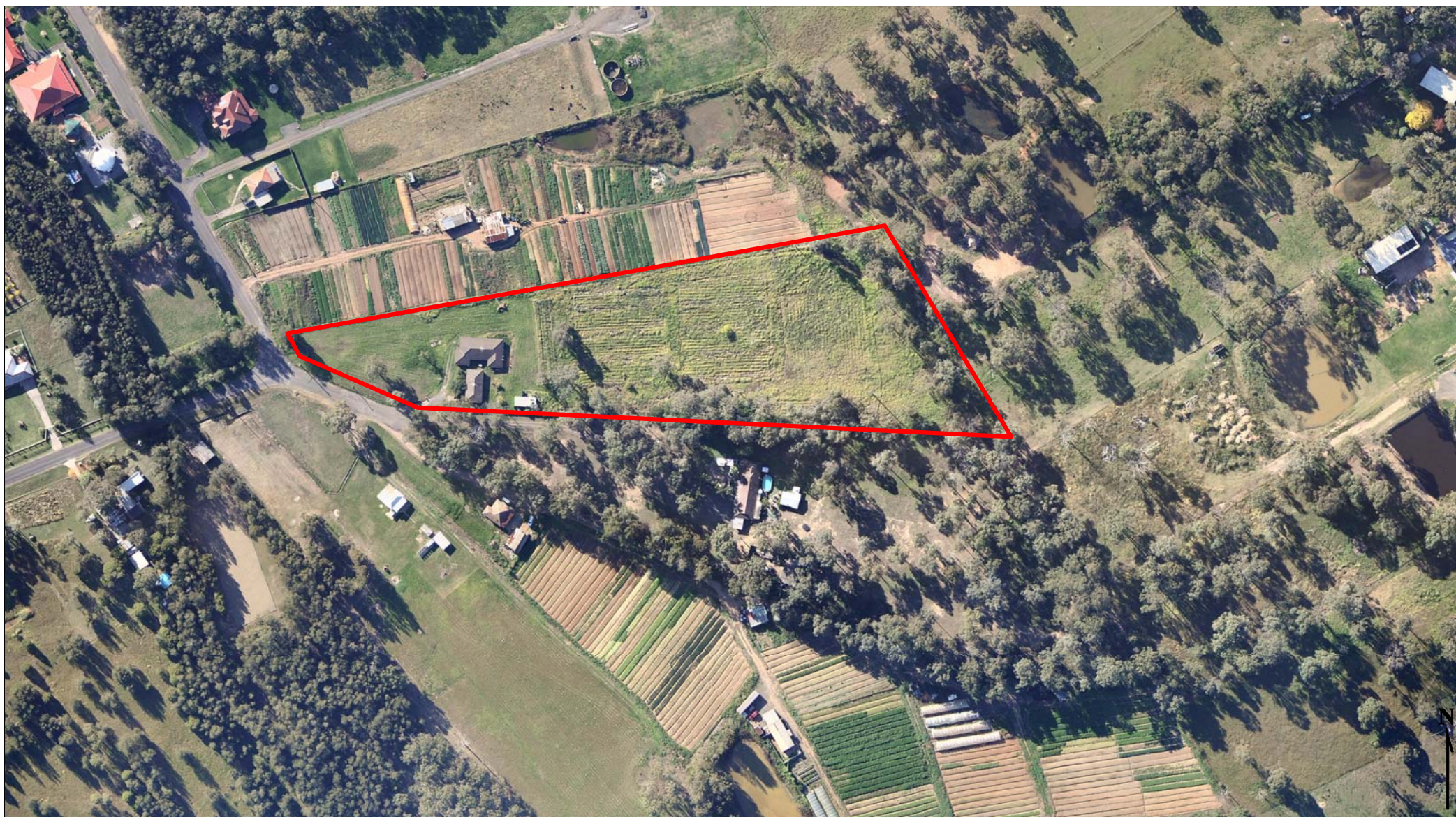
Figure 1b-2009.
Site boundary overlaid on the Nearmap aerial
photograph (dated 20 October 2009)



 Site boundary

0 50 100
metres

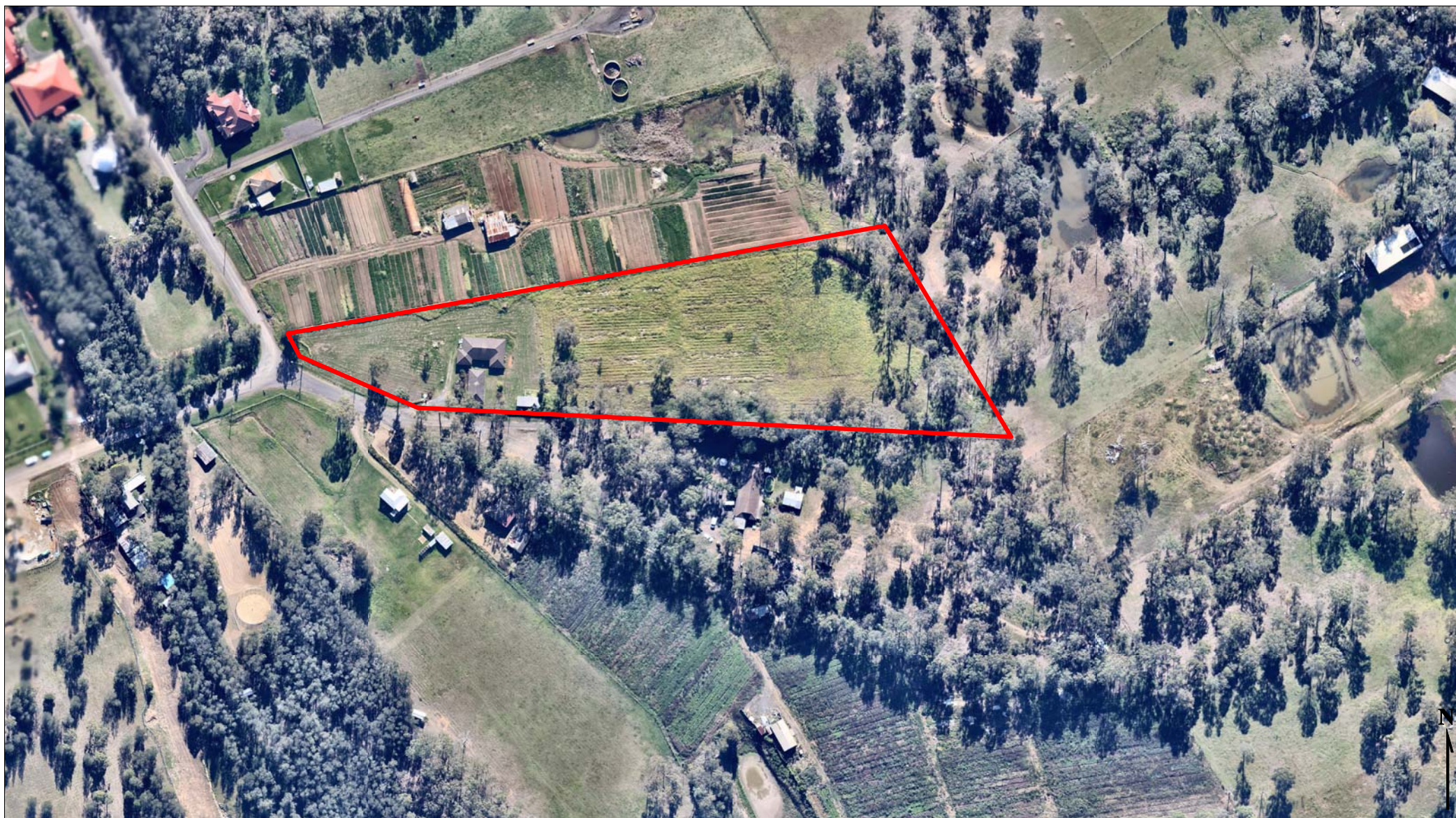
Figure 1b-2011.
Site boundary overlaid on the Nearmap aerial photograph
(dated 17 September 2011)



 Site boundary

0 50 100
metres

Figure 1b-2013.
Site boundary overlaid on the Nearmap aerial photograph
(dated 14 May 2013)



 Site boundary

0 50 100
metres

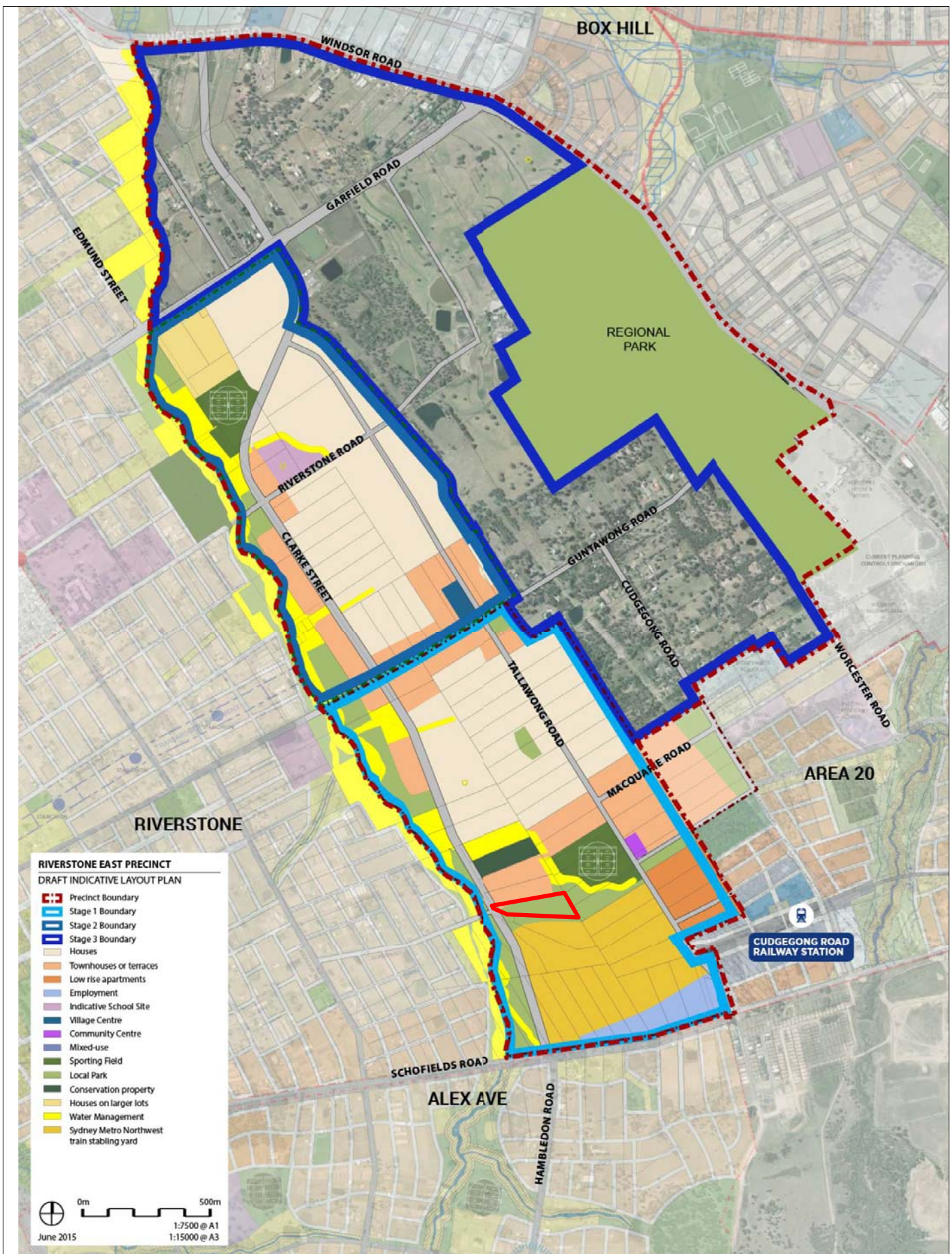
Figure 1b-2014.
Site boundary overlaid on the Nearmap aerial photograph
(dated 17 June 2014)



 Site boundary

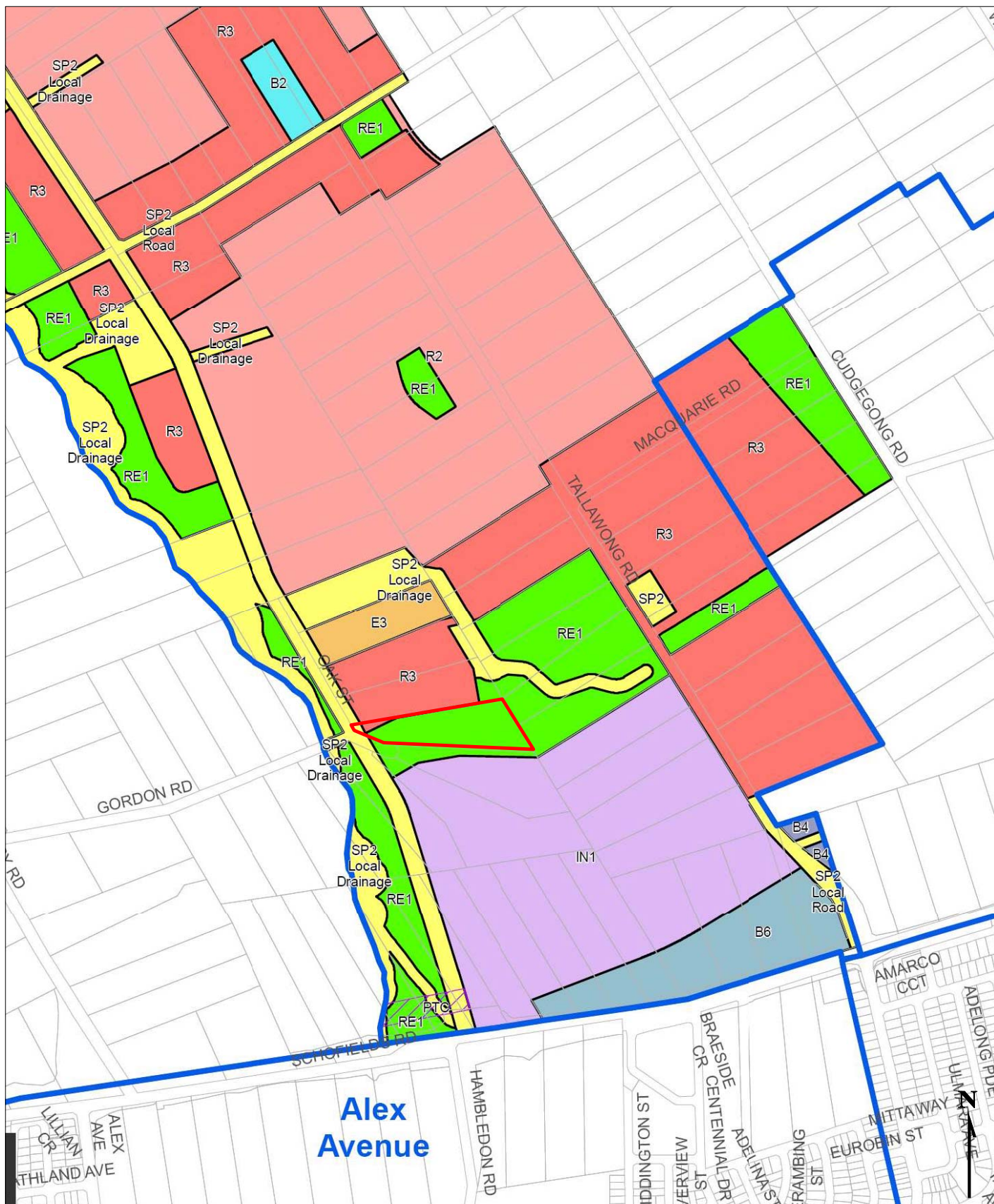
0 50 100
metres

Figure 1b-2015.
Site boundary overlaid on the Nearmap aerial photograph
(dated 5 July 2015)



Site boundary

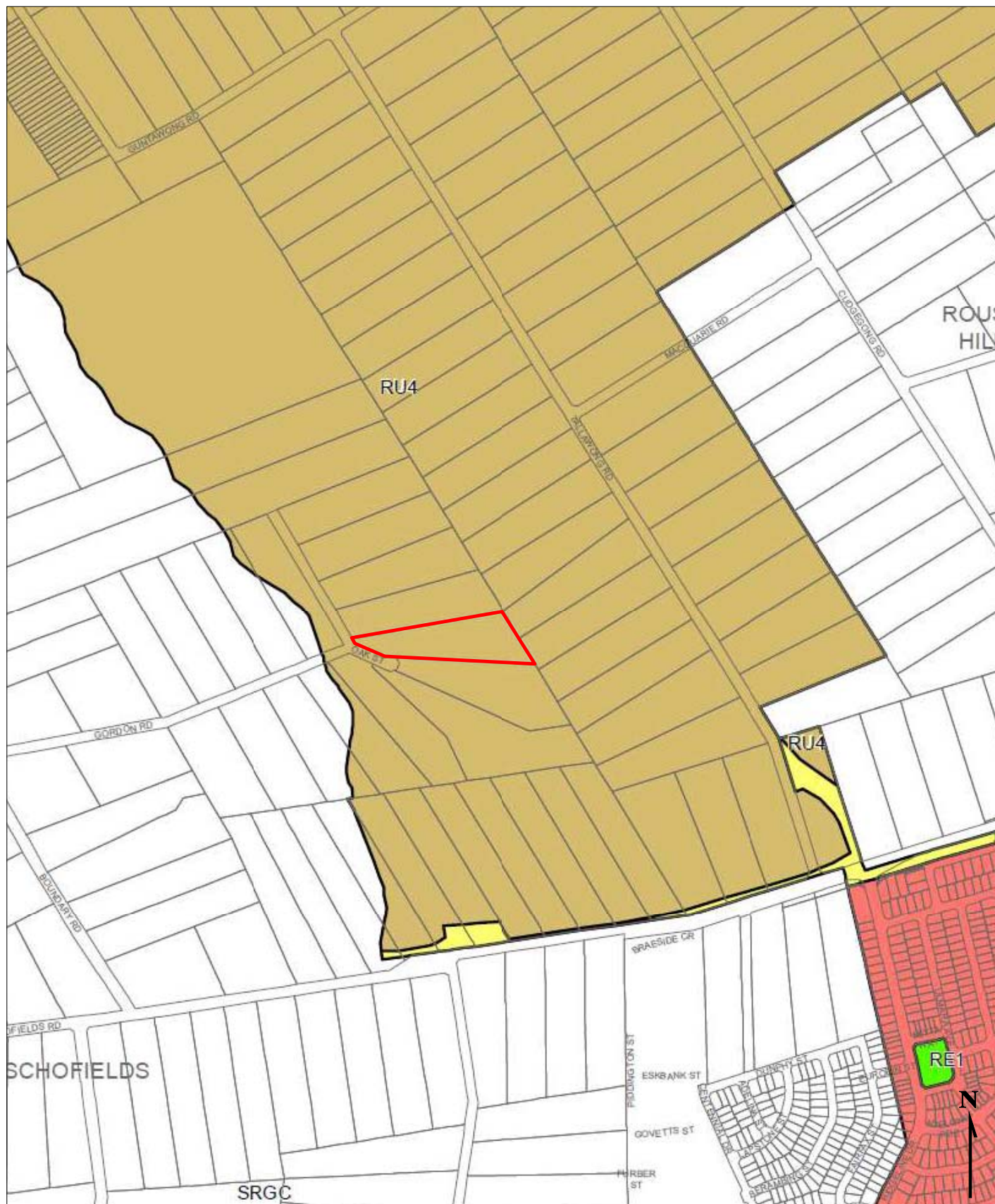
Figure 2a.
Riverstone East Draft Precinct Plan in the North-West Growth Centre
(NSW Department of Planning and Environment, 2015)



- | | |
|---|--|
| Site boundary | B2 - Local Centre |
| E3 - Environmental Management | B4 - Mixed use |
| SP2 - Infrastructure | IN - General industry |
| R3 - Medium density residential | |
| R2 - Medium density residential | |
| RE1 - Public recreation | |

0 200 400
metres

Figure 2b.
Site boundary overlaid on the Riverstone
North West Growth Centre Land Zoning Map



- Site boundary
- RU4 - Primary production small lots
- SP2 - Infrastructure
- R3 - Medium density residential
- RE1 - Public recreation

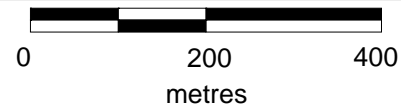
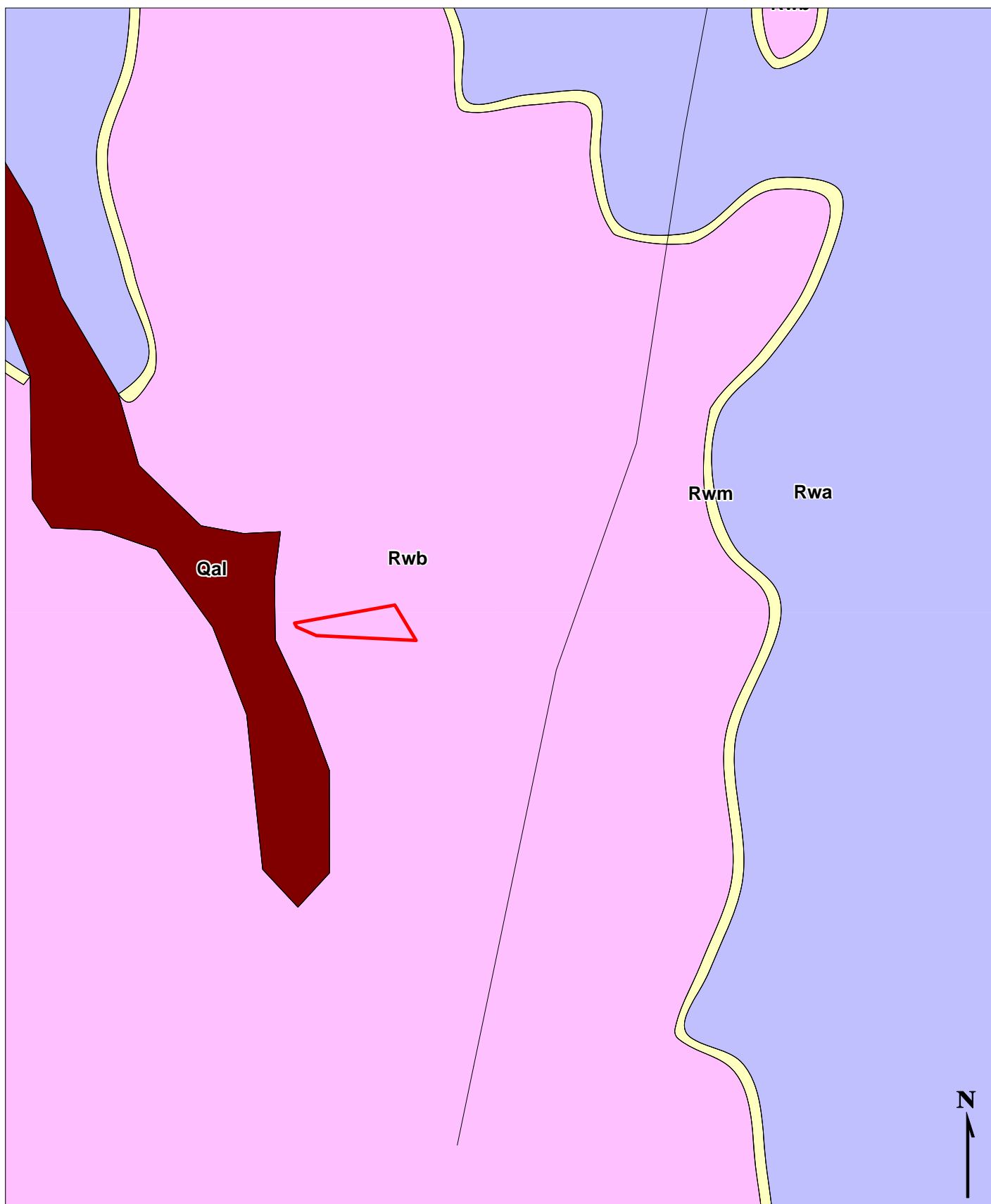


Figure 2c.
Site boundary overlaid on Blacktown Land Zoning Map
(Sheet LZN_012 Blacktown LEP, 2015)



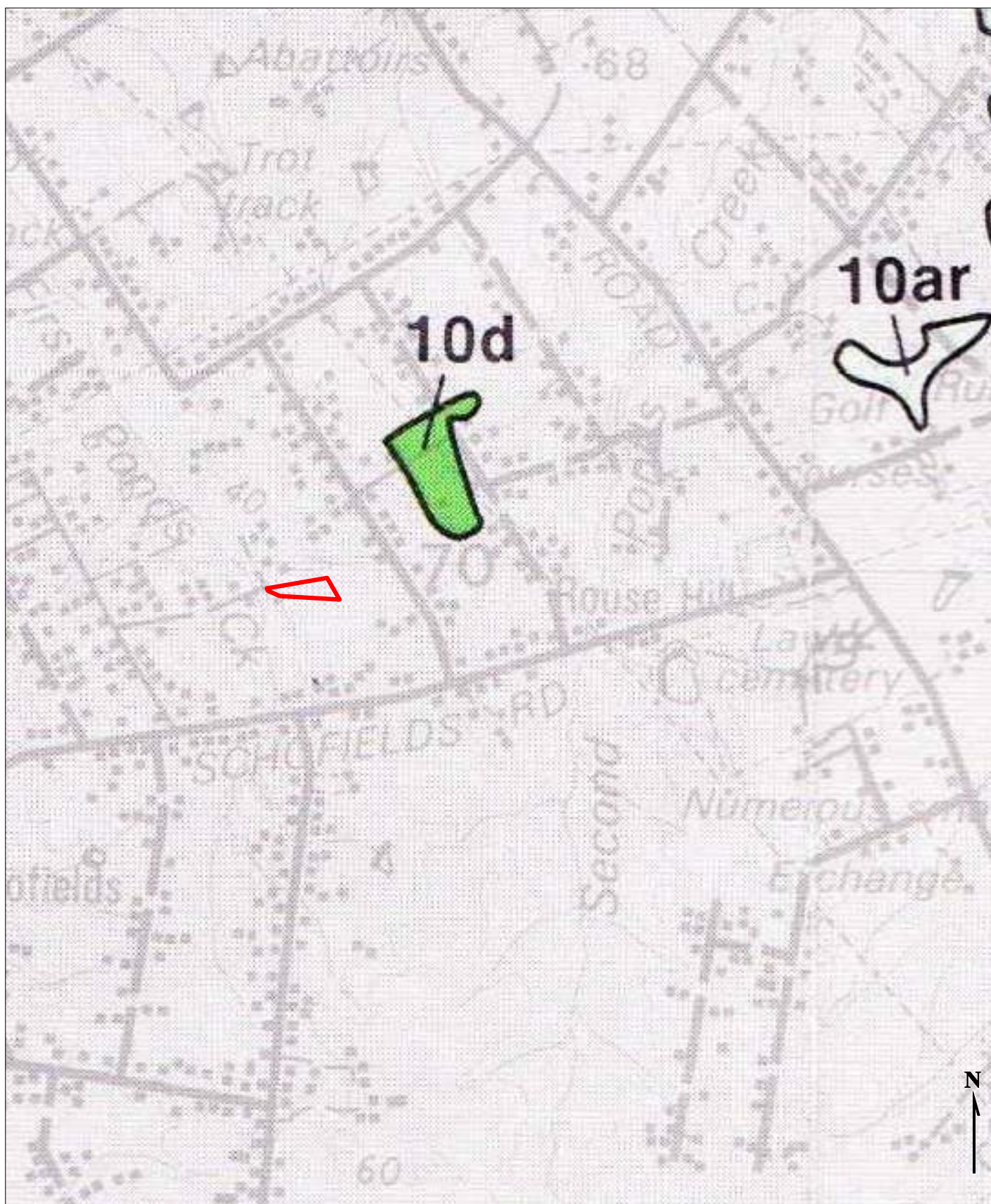
Site boundary

Rwb - Bringelly Shale
 Rwa - Ashfield Shale
 Rwm - Minchinbury Sandstone
 Qal - Quaternary

0 300 600
 metres

Figure 3a.
 Site boundary overlaid on the 1:100 000 Penrith Geological Sheet
 (Clark and Jones 1991)





Site boundary

10ar = Sydney Sandstone Ridgetop Woodland

10d = Greybox Iron-bark woodland

0 500 1000
metres

Figure 4a.
Property boundary overlaid on the vegetation mapping
of Penrith 1: 100 000 map sheet (Benson 1992)

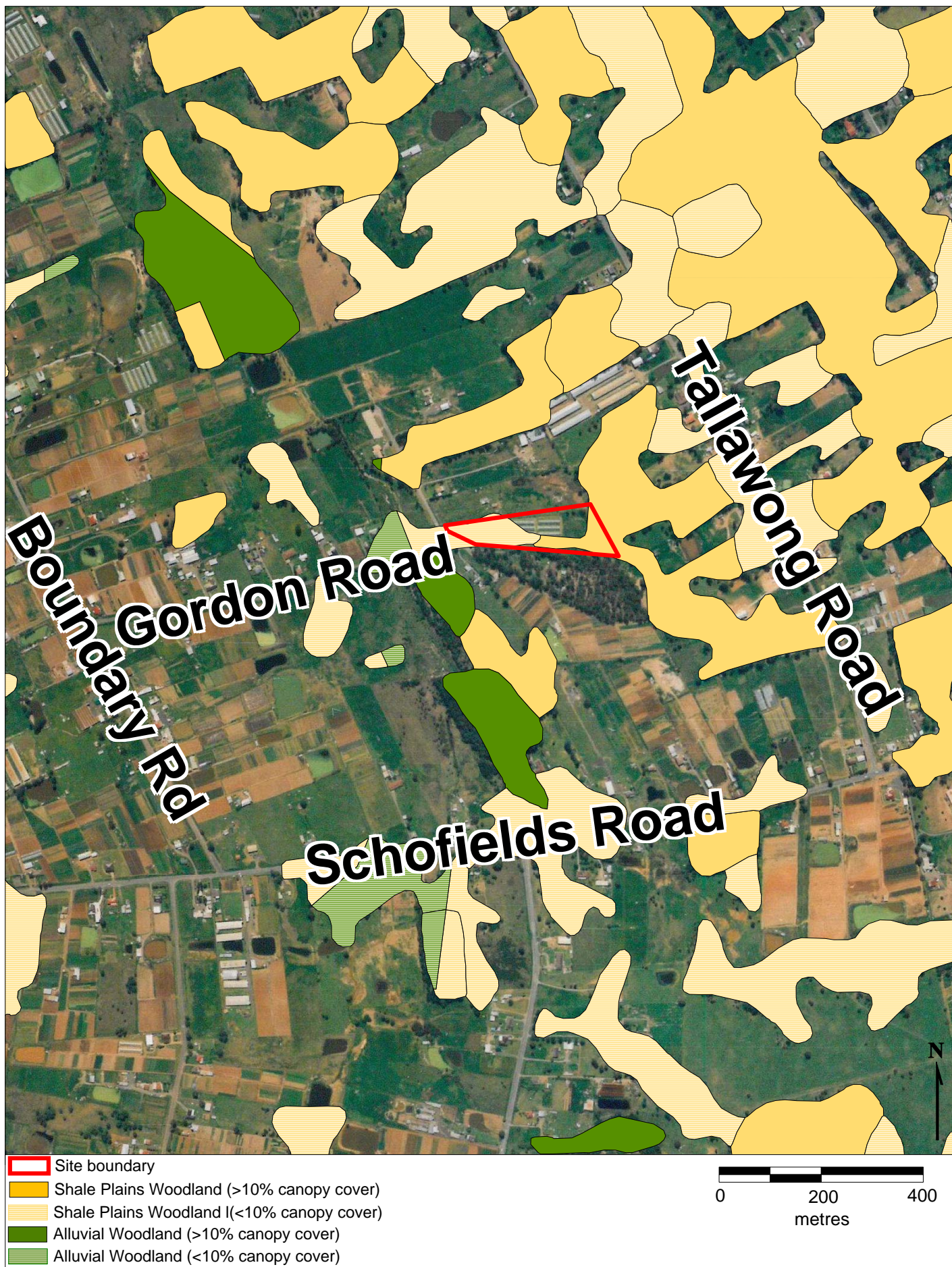


Figure 4b.
Site boundary overlaid on the vegetation mapping of NPWS (2002) / Tozer (2003)
and Nearmap aerial photograph (1998)

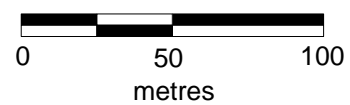
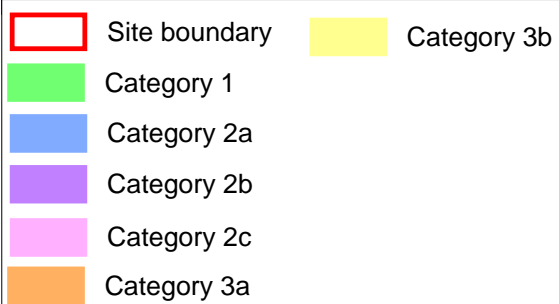
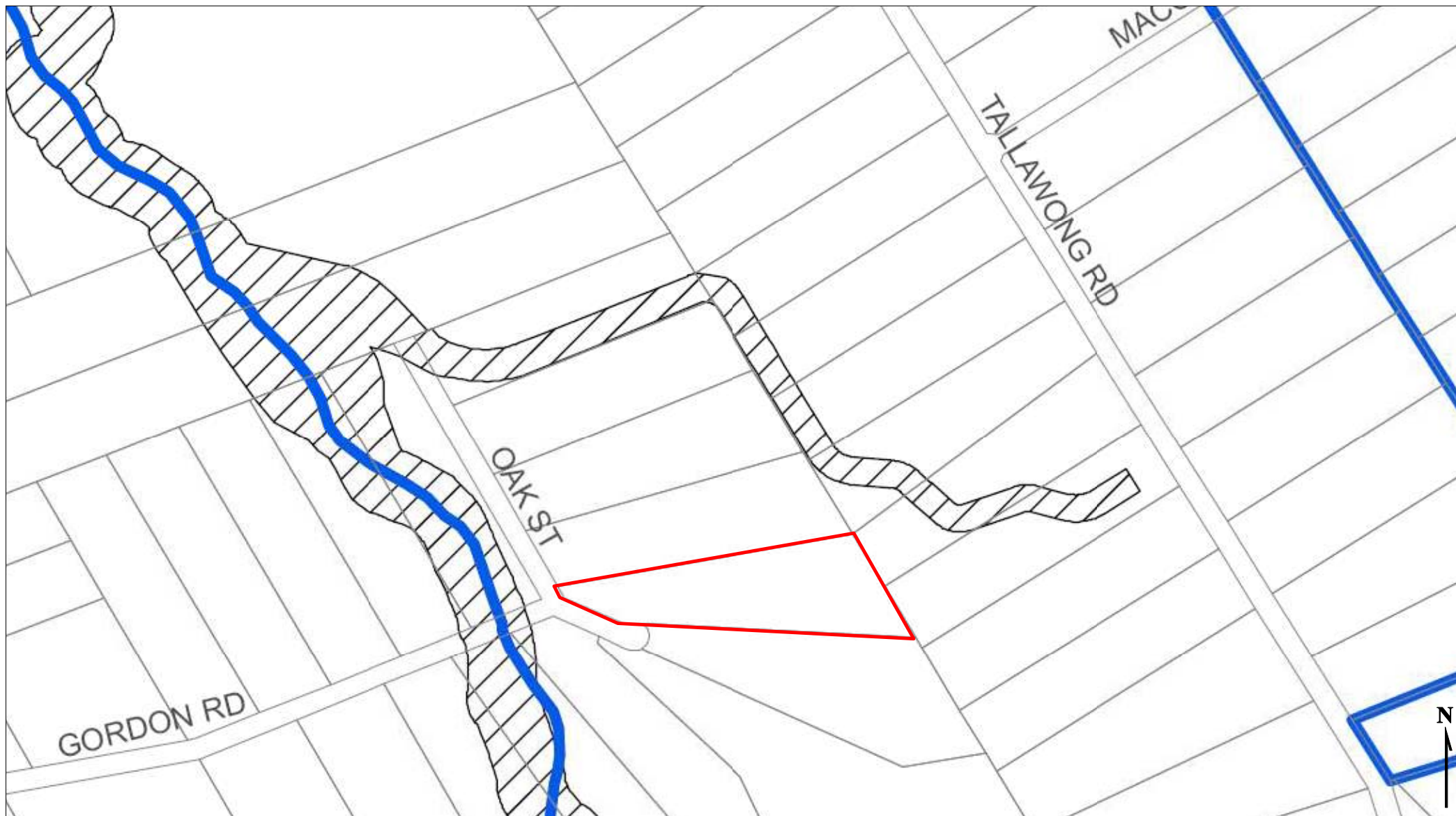


Figure 4c.
Site boundary overlaid on Conservation
Significance Categories within the Riverstone East Precinct
(EcoLogical Australia 2014)



 Site boundary

0 100 200
metres

Figure 5a.
Site boundary overlaid on the Riverstone East - North West Growth Centre -
Riparian Protection Area Map



Appendices

Appendix 1

Company Profile and Brief CVs



ANNE CLEMENTS & ASSOCIATES PTY. LIMITED
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April 2015

Anne Clements & Associates is a group of botanists, ecologists and restoration ecologists who specialise in botanical conservation assessment, as well as developing and implementing optimal conservation strategies. The company has more than 25 years of experience in:

- flora surveys of a wide range of ecosystems;
- flora assessments;
- assessments of impacts;
- vegetation plans of management;
- the implementation of rehabilitation/conservation programs as part of sustainable development of sites; and
- environmental management of development sites.

The company works closely with community groups, fauna consultants, town planners, geologists, engineers, lawyers, land developers and mining companies in planning and implementing optimal conservation strategies as part of sustainable development of sites.

Four of the company's environmental managed sites have won excellence awards for their quality and innovations, including "Excellence of Excellence" in 2000, Gold and Silver in NSW Rivercare 2000, Silver and Excellence in NSW Mineral Resources Excellence Awards and Excellence in the Earthmovers Awards, 2006 Environment Award for Australian Property Industry and 2007 International Green Apple Award.

Brief CVs

The group provides a broad variety of skills and a high level of experience:

Dr AnneMarie Clements

Senior restoration ecologist with M.Sc. (Macquarie Univ.) Thesis - *The vegetation of bushland in the northern Sydney area* and a Ph.D. (Univ. of Sydney) Thesis - *The vegetation of the sand masses of the mid-north coast of New South Wales*. She has more than 25 years experience.

Her major research interests include the re-establishment of native ecosystems, impacts of urban development on vegetation and soil, pattern analysis, effects of inundation and salinity on the plant communities, metal concentrations on plant

growth and bioaccumulation. She has utilised her research in designing and implementing rehabilitation / conservation programs as part of sustainable developments.

Anne is a specialist Certified Environmental Practitioner under the Environmental Institute of Australia and New Zealand CEnvP Program and has been a member of the CEnvP NSW certification panel. She is a certified BioBank Assessor.

Dr Anne Baumann

Ecologist with a PhD in Agricultural Science (University of Sydney), thesis on recruitment of *Melaleuca quinquenervia* at the Myall Lakes. She is also a graduate of the 2009 National Herbarium of NSW Plant Science Internship. Anne has an honours degree in Agricultural Science, holds certificates in Aboriculture and Conservation and Land Management. Previous positions include the Australian Quarantine Inspection Service, NSW Office of Environment and Heritage and Woollahra Council. Anne also has experience in the bushland regeneration industry having worked in both the field and administration.

Since joining Anne Clements & Associates in 2012, Anne has worked on projects involving vegetation surveys and flora assessments, assessments of significance of development proposals, species impacts statements and GIS mapping.

Rosemary Snowdon

Environmental Scientist with a M.Sc. (University of Sydney) Thesis: "The Geochemistry of Soils in the IronCove Catchment"; a Graduate Diploma of Environmental Science (Sydney University) and a B.Sc. majoring in Environmental Geography and Plant Ecology (Sydney University). Previous positions include five years as an Environmental Scientist for Sydney Water, four years as an Environmental Scientist (water quality) at Hornsby Shire Council, one year as an Environmental Officer with the NSW Roads and Traffic Authority, four years as an Environmental Scientist with Anne Clements & Associates and one year as a data analyst at MapInfo Australia.

Tony Rodd

Taxonomic botanist with B.Sc. (University of Sydney) with extensive experience in plant identification. Tony was the Horticultural Botanist at the Royal Botanic Gardens, Sydney for 13 years (1970-82). After leaving the Gardens, he continued as an occasional consultant, including preparation of interpretative material and collection of plants from the wild for the living collections at the Mount Annan and Mount Tomah Botanic Gardens. He has also worked extensively with book publishers, most recently in the role of Chief Consultant for *Botanica* (Random House 1997) and *Flora* (Timber Press / ABC Gardening Australia 2003), and co-author of *Trees: a visual guide* (Weldon Owen 2008). He has a long-standing interest in the taxonomy of Australian palms and has had a major revision of the palm genus *Livistona* published in the journal *Telopea*. For more than 15 years, he has worked with Anne Clements & Associates on many flora surveys and rehabilitation projects.

Dr Margaret Donald

Margaret hold a Ph.D from the Queensland University of Technology; Thesis: *Using Bayesian methods for the estimation of uncertainty in complex statistical models*. She has been a co-author of several published journal articles and currently has

additional articles in press. Margaret's previous positions include a Senior research statistician, responsible for the development and design of databases and acquisition of machine data for Polartechnics Pty.Ltd, in addition to, a Biometrician for Sydney Water. Margaret has been engaged previously by Anne Clements and Associates to undertake statistical analysis of field collected data for the purposes of threatened species recruitment assessment and for advice regarding field experiments.

Ruth Palsson

Ruth Palsson holds a B. Sc. in Botany and Mathematics and a Dip. Ed. (University of Queensland). She taught Mathematics and Science for many years in several states (Tasmania, Queensland and New South Wales) before returning to study. Ruth is studying a Post Graduate Diploma of Science (Botany) at the University of New England and is a graduate of the 2015 Student's Volunteer Botanical Internship Program at the Australian Herbarium in Canberra. Since joining Anne Clements & Associates in February 2015, Ruth has worked on a vegetation survey, a determination of "top of bank", a regeneration site and a native title claim.

Jessica Gardner

Jess is a recent graduate from a B. Sc. (University of New South Wales). In the final year of her bachelor's degree, Jess completed a special project, '*A phylogenetic analysis of select lastreopsid ferns (Dryopteridaceae)*', which will culminate in a published work. Jess is also a recent graduate from the 2015 Student's Volunteer Botanical Internship Program, at the CSIRO/Australian National Herbarium/Centre for Australian National Biodiversity Research. Additionally she has been a volunteer junior botanist at the New South Wales Herbarium under Dr Nathalie Nagalingum's tutelage. Jess has over four years experience in administration and customer service. Since joining Anne Clements and Associates in May 2015, Jess has worked on various projects, including bushland regeneration (planting and weeding), MapInfo Figure generation, and major report generation.