St John of God Richmond Mental Health Facility

Archaeological Report

FINAL REPORT

Prepared for Johnstaff on behalf of St John of God

7 September 2020

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- Johnstaff: Damian Gibson.
- St John of God Hospital: Deborah Shaw.
- Richmond Hill Memorial Representative: Melissa Stubbings.

Biosis staff involved in this project were:

- Sonika Kumar, Lauren Harley, Anne Murray (mapping).

Contents

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Glossary

ACHA	Aboriginal Cultural Heritage Assessment
ADDA	Aboriginal Due Diligence Assessment
AHMS	Archaeological & Heritage Management Solutions
AHIMS	Aboriginal Heritage Information Management System
AR	Archaeological Report
ASR	Archaeological Survey Report
Biosis	Biosis Pty Ltd
BP	Before Present
CBD	Central Business District
Consultation requirements	*Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*
DA	Development Application
DECCW	Department of Environment, Climate Change and Water (now Heritage NSW)
DP	Deposited Plan
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
GPS	Global Positioning System
GSV	Ground Surface Visibility
Heritage Act	*Heritage Act 1977*
Heritage NSW	Heritage NSW, Department of Premier and Cabinet
ICOMOS	International Council on Monuments and Sites
JMCHM	Jo McDonald Cultural Heritage Management
KNC	Kelleher-Nightingale Consulting
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
MGA	Map Grid of Australia
NPW Act	*National Parks and Wildlife Act 1974*
NPWS	National Parks and Wildlife Service

NSW	New South Wales
PAD	Potential Archaeological Deposit
RAP	Registered Aboriginal Party
REF	Review of Environmental Factors
SEARs	Secretary's Environmental Assessment Requirements
SEPP	*State Environmental Planning Policy 2011*
SSD	State Significant Development
Study area	Defined as Lot 11 DP 1134453
the Code	*Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*

Summary

Biosis Pty Ltd (Biosis) was commissioned by Johnstaff to undertake an Aboriginal Cultural Heritage Assessment (ACHA) of the proposed development at St John of God Hospital, 177-235 Grose Vale Road, North Richmond, New South Wales (NSW) (the study area). This Archaeological Report (AR) documents the findings of the archaeological investigations (desktop assessment and field survey) conducted as part of the ACHA. As required under Section 2.3 of The *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010a) (the Code), the AR provides evidence about the material traces of Aboriginal land use to support the conclusions and management recommendations in the ACHA. This project is being assessed as a State Significant Development (SSD) (SSD 10394), and as such this assessment has been formulated to respond to the requirement for an ACHA under the Secretary's Environmental Assessment Requirements (SEARs).

As the proponent is attempting to revise the schematic designs to ensure that the impact area is not contained within any areas of moderate or high archaeological potential, test excavations were not required as part of this ACHA. Current schematic designs illustrate that no areas of moderate or high potential will be impacted as part of this project, with all impacts contained to areas of low potential. If these designs change after the finalisation of the ACHA to include impact to areas of moderate or high potential, the project will be required to stop until test excavations can be conducted and additional Aboriginal community consultation can be undertaken.

The study area is located in a peri-urban area approximately 2.5 kilometres south-west of North Richmond and 70 kilometres north of Penrith central business district (CBD). A review of background information indicates that large portions of the study area have been subject to extensive development and has undergone high levels of disturbance in those areas.

A search of the Aboriginal Heritage Information Management System (AHIMS) register identified 40 Aboriginal cultural heritage sites registered within a 5 kilometre search area, with none of these sites being located within the study area. A review of the environmental context of the study area indicates that it is located across a terrace platform approximately 200 metres away from the Hawkesbury River. Previous predictive modelling in the local area has a tendency to preference proximity to higher-order creek lines, with terrace landforms holding the highest probability for archaeological potential.

A field survey was conducted on 16 January 2020. The overall effectiveness of the survey for examining the ground for Aboriginal sites was deemed low. This was attributed to grass cover restricting ground surface visibility (GSV) combined with a low amount of exposures. The extensive levels of development also hindered the effectiveness of the survey.

No previously unrecorded Aboriginal cultural heritage sites were identified during the field investigation. Based on the level of disturbance within the study area and its environmental context, background research, and field investigation completed by Biosis indicated a combination of low, moderate and high potential for Aboriginal sites or areas of archaeological potential to be present within the study area.

Strategies have been developed based on the archaeological significance of cultural heritage relevant to the study area. The strategies also take into consideration:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.

- Current best conservation practice, widely considered to include:
  - The ethos of the Australia International Council on Monuments and Sites (ICOMOS) Burra Charter.
  - The Code.

The recommendations that resulted from the consultation process are provided below.

Management recommendations

Prior to any development impacts occurring within the study area, the following is recommended:

Recommendation 1: No further assessment required in areas identified as having low archaeological potential

No further investigations are required for areas assessed as having low archaeological potential. The conditions set forth in the SEARs (SSD 10394) must be adhered to. This recommendation is conditional upon Recommendations 5 and 6.

Recommendation 2: Further assessment required in the form of test excavations prior to development within areas of moderate or high archaeological potential

The assessment has identified areas of moderate and high archaeological potential within the study area. At the time of this report, Johnstaff has confined the proposed development to areas that have been assessed as having low potential. If impacts to areas of moderate and high archaeological potential cannot be avoided, subsurface investigations (test excavations) will be required prior to the commencement of works.

If the schematic designs (inclusive of these items) change, any impact areas identified as having high or moderate archaeological potential should be avoided wherever possible (Figure 9).

Impacts which would require further assessment in the form of test excavations within areas of moderate or high archaeological potential includes, but is not limited to, any stockpiling areas, set down areas, installation of services, bulk earthworks, vehicle tracks/vehicle movement, landscaping or areas of revegetation, or any other activities that will result in disturbances to the ground surface.

Recommendation 3: Richmond Hill Memorial Gardens listed as a heritage item

The Richmond Hill Memorial Gardens should be listed on the *Hawkesbury Local Environmental Plan* 2009 (LEP) as a local heritage item.

Recommendation 4: Continued consultation with the registered Aboriginal stakeholders

As per the consultation requirements, the proponent should continue to inform Aboriginal stakeholders about the management of Aboriginal cultural heritage sites within the study area throughout the life of the project. This recommendation is in keeping with the consultation requirements.

Recommendation 5: Discovery of Unanticipated Aboriginal Objects

All Aboriginal objects and Places are protected under the *NSW National Parks and Wildlife Act 1974* (NPW Act). It is an offence to disturb an Aboriginal site without a consent permit issued by Heritage NSW, Department of Premier and Cabinet (Heritage NSW). Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders.

Recommendation 6: Discovery of human remains

If any suspected human remains are discovered during any activity works, all activity in the vicinity must cease immediately. The remains must be left in place and protected from harm or damage. The following contingency plan describes the immediate actions that must be taken in instances where human remains or suspected human remains are discovered. Any such discovery at the study area must follow these steps:

1. Discovery: If suspected human remains are discovered all activity in the vicinity must stop to ensure minimal damage is caused to the remains; and the remains must be left in place, and protected from harm or damage.
2. Notification: Once suspected human skeletal remains have been found, the Coroner's Office and the NSW Police must be notified immediately. Following this, and if the human remains are likely to be Aboriginal in origin, the find will be reported to the Aboriginal parties and Heritage NSW. If the find is likely to be non-Aboriginal in origin and more than 100 years in age, the Heritage Council of NSW will be notified of the find under Section 146 of the *Heritage Act 1977* (Heritage Act).

1 Introduction

1.1 Project background

Biosis was commissioned by Johnstaff to undertake an ACHA of the proposed development of four residential and four amenity buildings at the St John of God Hospital, located at 177-235 Grose Vale Road, North Richmond NSW (the study area) (Figure 1 and Figure 2).

To assist Johnstaff in meeting their Environmental Impact Statement (EIS) submission deadline, Biosis initially provided a concise Archaeological Survey Report (ASR) report, which included an in-depth desktop assessment and results from the field survey, conducted on 16 January 2020. Since the ASR was submitted, Johnstaff have finalised the schematic designs for the project, with the impact area now located within the area of low potential. This report addresses these changes.

This AR documents the findings of the archaeological investigations conducted as part of the ACHA. The AR provides evidence about the material traces of Aboriginal land use to support the conclusions and management recommendations in the ACHA. The project is to be assessed as a SSD under Section 4.36 (previously section 89(c)) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Schedule 1 of the *State Environmental Planning Policy 2011* (SEPP). The ACHA is being conducted as part of the SSD application to address the requirements of the SEARs (SSD 10394).

This investigation has been carried out in accordance with the Code. The Code has been developed to support the process of investigating and assessing Aboriginal cultural heritage by specifying the minimum standards for archaeological investigation undertaken in NSW under the NPW Act. The archaeological investigation must be undertaken in accordance with the requirements of the Code. As the project is an SSD an Aboriginal Heritage Impact Permit will not be required, with the purpose of the assessment to assist the Secretary of the Department of Planning, Industry and Environment in the consideration and determination of the application.

1.2 Study area

The study area comprises of Lot 11 DP 1134453, approximately 600 metres west of the suburb of North Richmond and approximately 17 kilometres north of the Penrith CBD (Figure 1). It encompasses 47 hectares of private land and is currently zoned RU1 Primary Production.

The study area is within the:

- Hawkesbury Local Government Area.
- Parish of Kurrajong.
- County of Cook.

The study area is bounded by Grose Vale Road to the north, the Hawkesbury River to the south, Lot 2 DP 880641 to the east and Lots 6 and 14 DP 703300 to the west (Figure 2).

1.3 Planning approvals

The proposed development will be assessed against Part 4 of the EP&A Act. Other relevant legislation and planning instruments that will inform this assessment include:

- NSW NPW Act.
- NSW *National Parks and Wildlife Amendment Act 2010.*
- Infrastructure SEPP.
- *Hawkesbury Local Environmental Plan 2009* (LEP).
- *Hawkesbury Development Control Plan 2009* (DCP).

1.4 Objectives of the investigation

The objectives of the investigation can be summarised as follows:

- To identify and consult with any registered Aboriginal stakeholders, the Aboriginal representative for the Richmond Hill Memorial Gardens and the Deerubbin Local Aboriginal Land Council (LALC).
- To conduct additional background research in order to recognise any identifiable trends in site distribution and location.
- To search statutory and non-statutory registers and planning instruments to identify listed Aboriginal cultural heritage sites within the study area.
- To highlight environmental information considered relevant to past Aboriginal occupation of the locality and associated land use and the identification and integrity/preservation of Aboriginal sites.
- To summarise past Aboriginal occupation in the locality of the study area using ethnohistory and the archaeological record.
- To formulate a model to broadly predict the type and character of Aboriginal sites likely to exist throughout the study area, their location, frequency and integrity.
- To conduct a field survey of the study area to locate unrecorded or previously recorded Aboriginal sites and to further assess the archaeological potential of the study area.
- To assess the significance of any known Aboriginal sites in consultation with the Aboriginal community.
- To identify the impacts of the proposed development on any known or potential Aboriginal sites within the study area.
- To recommend strategies for the management of Aboriginal cultural heritage within the context of the proposed development.

1.5 Investigators and contributors

The roles, previous experience and qualifications of the Biosis project team involved in the preparation of this archaeological report are described below in Table 1.

Table 1 Investigators and contributors

Name and qualifications	Experience summary	Project role
Taryn Gooley **BASc (Hons) Archaeology**	Taryn has over seven years' archaeological consultancy experience, as well as extensive volunteering experience on archaeological research projects overseas. Taryn has a strong background in project management, leading project teams and volunteer groups in heritage management projects throughout NSW and Western Australia. Her areas of expertise include archaeological and heritage management advice, archaeological excavation and survey, artefact analysis, Aboriginal community consultation, technical report writing, and preparing cultural heritage management plans. Taryn is also accomplished in obtaining approvals under the NSW NPW Act.	• Technical advice
Maggie Butcher **BSc/BA (Hons)**	Maggie is an archaeologist and artefact specialist who has been practicing full time since 2015. Maggie has had experience working as an archaeologist on a number of European heritage projects across New South Wales and is skilled in both excavation, field recording and report writing. Maggie has well developed skills in European archaeology, serving as a key team member on a number of projects in NSW, predominantly Parramatta and Sydney CBD but also in regional areas. These field projects have seen her take part in excavation, planning, site recording, supervising subcontractors, assisting on open days and the subsequent analysis of artefacts including written artefact analysis reports. She is also skilled in undertaking historical heritage assessments, having been the primary author for reports for both Biosis and previously Casey & Lowe Pty Ltd. Maggie has extensive experience working on major State Significant projects as well as Locally Significant sites. Recent State Significant sites include testing at the Ravensworth Homestead, excavations for the Sydney Metro at Barangaroo, Pitt Street North and Blues Point and Parramatta North Growth Centre (Parramatta Female Factory and Orphan School). Recent Locally significant sites include Circular Quay Tower and Parramatta Square.	• Quality assurance
Ashley Bridge **M ArchSci (Adv. with Hons)** **BA Archaeology**	Ashley joined Biosis at the Sydney Office as a Research Assistant – Heritage in 2018. She completed her Masters in Archaeological Science in 2016, having written a thesis on forensic stature in Australian mass casualty scenarios. In the	• Project manager • Report writing • Field investigation

Name and qualifications	Experience summary	Project role
	last year Ashley has undertaken fieldwork for Biosis throughout Sydney, Wollongong and Western NSW, with a focus in both Aboriginal and historical archaeology. This has allowed her to further develop her skills in Aboriginal and historical excavations in Australia, while also honing her skills in reporting and administrative tasks. She also has experience with desktop research and Aboriginal consultation practices in an Australian context.	
Madeleine Lucas **BA (Hons) Archaeology** **BSC**	Madeleine joined Biosis as a Research Assistant in 2019, having completed her honours in archaeology in 2018. Madeleine has excavation experience in both Australia and the United Kingdom, and is developing skills in Aboriginal and historical desktop research, field surveying and significance assessments.	• Background research • Aboriginal consultation
Anne Murray **MGIS-RS** **BEnv**	Anne is a recent graduate with a year of professional experience in GIS in the environmental consulting sector. Prior to joining Biosis in 2018, she worked as a Graduate GIS Specialist for an environmental consultancy, where she was responsible for preparing maps, analysing data and managing databases for consultants and a variety of public and private clients. Anne has completed a Masters of GIS and Remote Sensing. She graduated with distinction and was awarded the Executive Dean's Award for Academic Excellence.	• Mapping

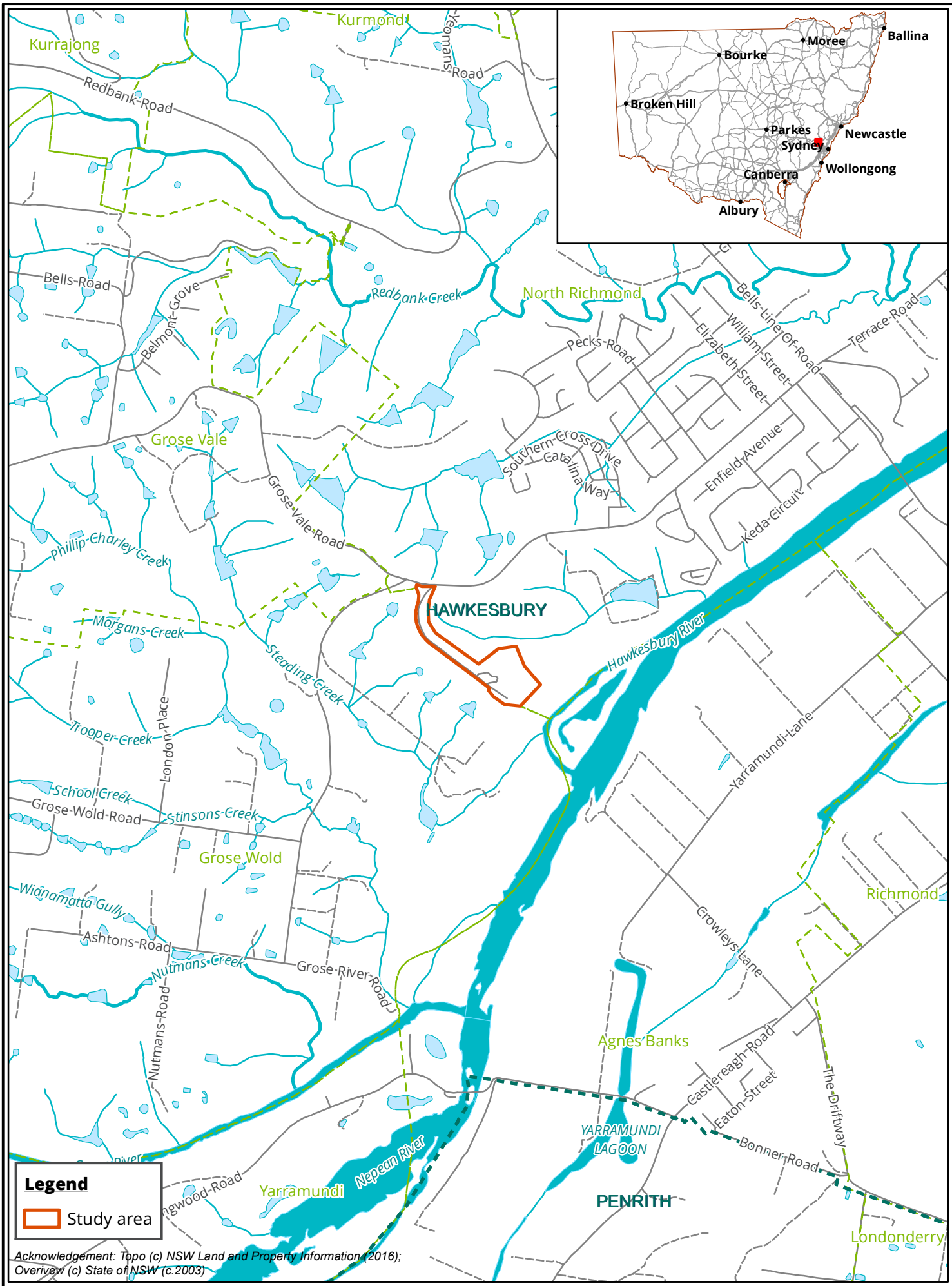

Figure 1 Location of the study area

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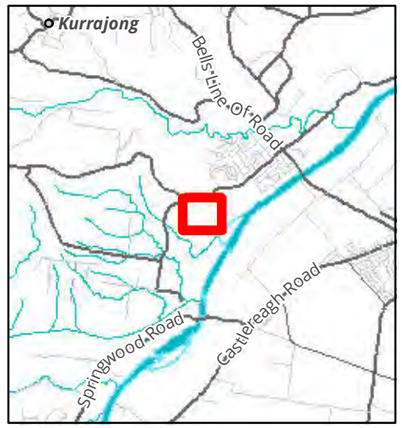
Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 31057
Date: 20 January 2020,
Checked by: ML, Drawn by: SSK, Last edited by: amurray
Location:P:\31000s\31057\Mapping\



Legend

- Study Area
- Lot

Figure 2 Study area detail

0 25 50 75 100

Metres

Scale: 1:2,500 @ A3

Coordinate System: GDA 1994 MGA Zone 56

N

Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Sydney, Newcastle, Wangaratta & Wollongong

Matter: 31057,
Date: 20 January 2020,
Checked by: ML, Drawn by: SSK, Last edited by: amurray
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31057_F2_StudyArea.mxd

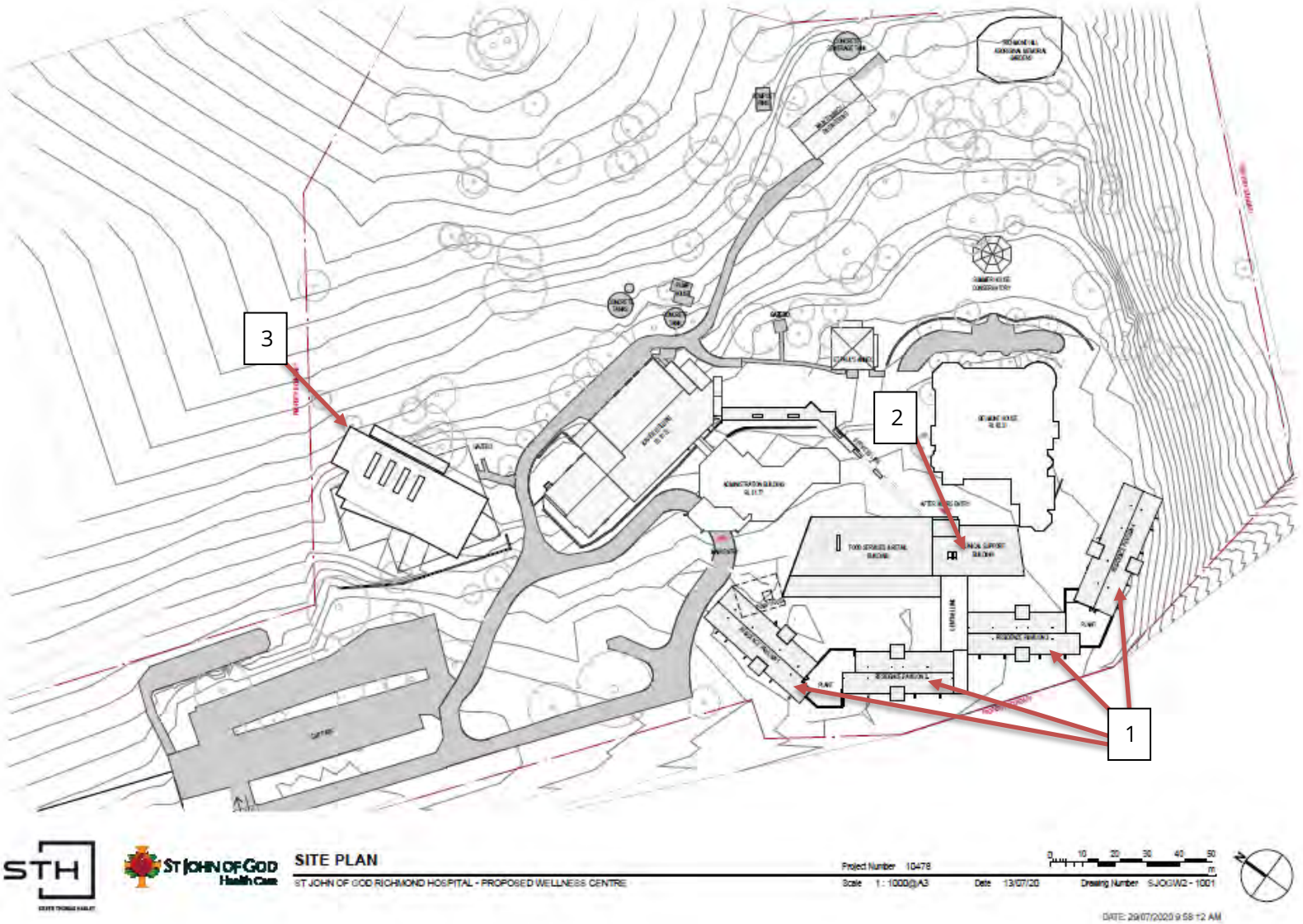
2 Proposed development

The proposed development includes the construction of a building complex comprising of four residential and two amenity buildings (Figure 3). This will involve:

- Demolition of eight existing buildings in the southern portion of the study area.
- Construction of four residential buildings [1] on top of the existing footings of the demolished buildings.
- Construction of a clinical support building [2] and a wellness centre [3], skewed to the existing footings of the demolished buildings and tennis court.
- Installation of services throughout areas of new build, including, but not limited to, gas, electrical and water services.
- Installation of lights and electrical services throughout carpark area.
- Creation of stockpiling and set down areas throughout the designated areas of low potential.

Please note that although there is an existing stock pile area between Aboriginal memorial site and maintenance shed (in the north-east of the study area), this will not be used as part of this development, as it is located outside of the development area. As the study area is located within the confines of a mental health hospital, no works outside of the development area boundaries (areas of low potential) will be able to occur, as per the hospitals health and safety requirements.

Figure 3 Proposed development



3 Desktop assessment

The desktop assessment involves researching and reviewing existing archaeological studies and reports relevant to the study area and surrounding region. This information is combined to develop an Aboriginal site prediction model for the study area, and to identify known Aboriginal sites and/or places recorded in the study area. This desktop assessment has been prepared in accordance with requirements 1 to 4 of the Code.

3.1 Landscape context

It is important to consider the local environment of the study area any heritage assessment. The local environmental characteristics can influence human occupation and associated land use and consequently the distribution and character of cultural material. Environmental characteristics and geomorphological processes can affect the preservation of cultural heritage materials to varying degrees or even destroy them completely. Lastly, landscape features can contribute to the cultural significance that places can have for people.

3.1.1 Topography and hydrology

The study area lies within the Cumberland Lowlands, which is part of the Cumberland Plain. This landform is characterised by low lying, gently undulating plains and low hills on Wianamatta Group shales (Bannerman & Hazelton 1990, p.2) and a broad and shallow basin that stretches westwards from Parramatta to the Hawkesbury-Nepean River and southwards from Windsor to Thirlmere (OEH 2014). The predominant geological formation contained within the study area is the Middle Triassic Wianamatta Group, specifically the Ashfield Shale formation (Figure 4). The Ashfield Shale is a residual landscape, which contains dark-grey to black claystone-siltstone and fine sandstone -siltstone laminate. Aboriginal artefact scatter sites are common across this formation, as are potential archaeological deposits (PADs), grinding grooves, rock shelters and water holes, making it the most archaeologically rich formation in the area (Biosis Pty Ltd 2016).

Topographically, the study area is present on top of the edge of a terrace platform, with a steep slope heading down to the Hawkesbury River on the south-east boundary. According to Speight (2009, p.47), the study area is contained within a system of undulating hills to rolling hills, which is visible towards the northern side of the study area. Common landform elements within this system include low rolling to steep low hills, ridges, hillcrests, moderately inclined sideslopes and drainage lines. A review of topographic maps of the study area indicates that it is dominated by gentle slopes and terrace flats. Landform units present in the vicinity of the study area include crests, ridgelines and hillslopes.

Stream order is recognised as a factor which assists in the development of predictive modelling in Sydney Basin Aboriginal archaeology, and has seen extensive use in the Sydney region, most notably by Jo McDonald Cultural Heritage Management (Jo McDonald Cultural Heritage Management 2000, Jo McDonald Cultural Heritage Management 2005, Jo McDonald Cultural Heritage Management Pty Ltd 2005, Jo McDonald Cultural Heritage Management 2006, Jo McDonald Cultural Heritage Management 2008). Predictive models, which have been developed for the region, have a tendency to favour higher order streams as having a high potential for campsites as these types of streams would have been more likely to provide a stable source of water and by extension, other resources which would have been used by Aboriginal groups.

The stream order system used for this assessment was originally developed by Strahler (1952). It functions by adding two streams of equal order at their confluence to form a higher order stream, as shown in Photo 1. As stream order increases, so does the likelihood that the stream would be a perennial source of water.

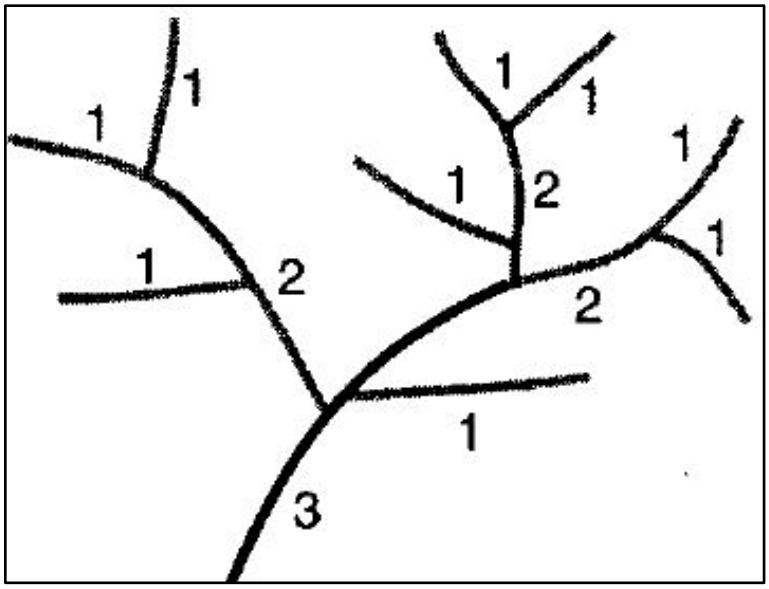


Photo 1 Diagram showing Strahler stream order (Ritter et al. 1995, p.151)

The southern border of the study area is located approximately 200 metres north-west of the Hawkesbury River, which is a perennial water source. A number of non-perennial canal-drains surround the study area approximately 100 metres north -east and east of the study area, 100 metres west of the study area and 100 metres north of the study area. The proximity to a perennial source of water, in addition to the location of the study area on a terrace platform, is a positive indicator for Aboriginal artefacts to exist within the study area. No water courses are located within the study area (Figure 5).

3.1.2 Soil landscapes

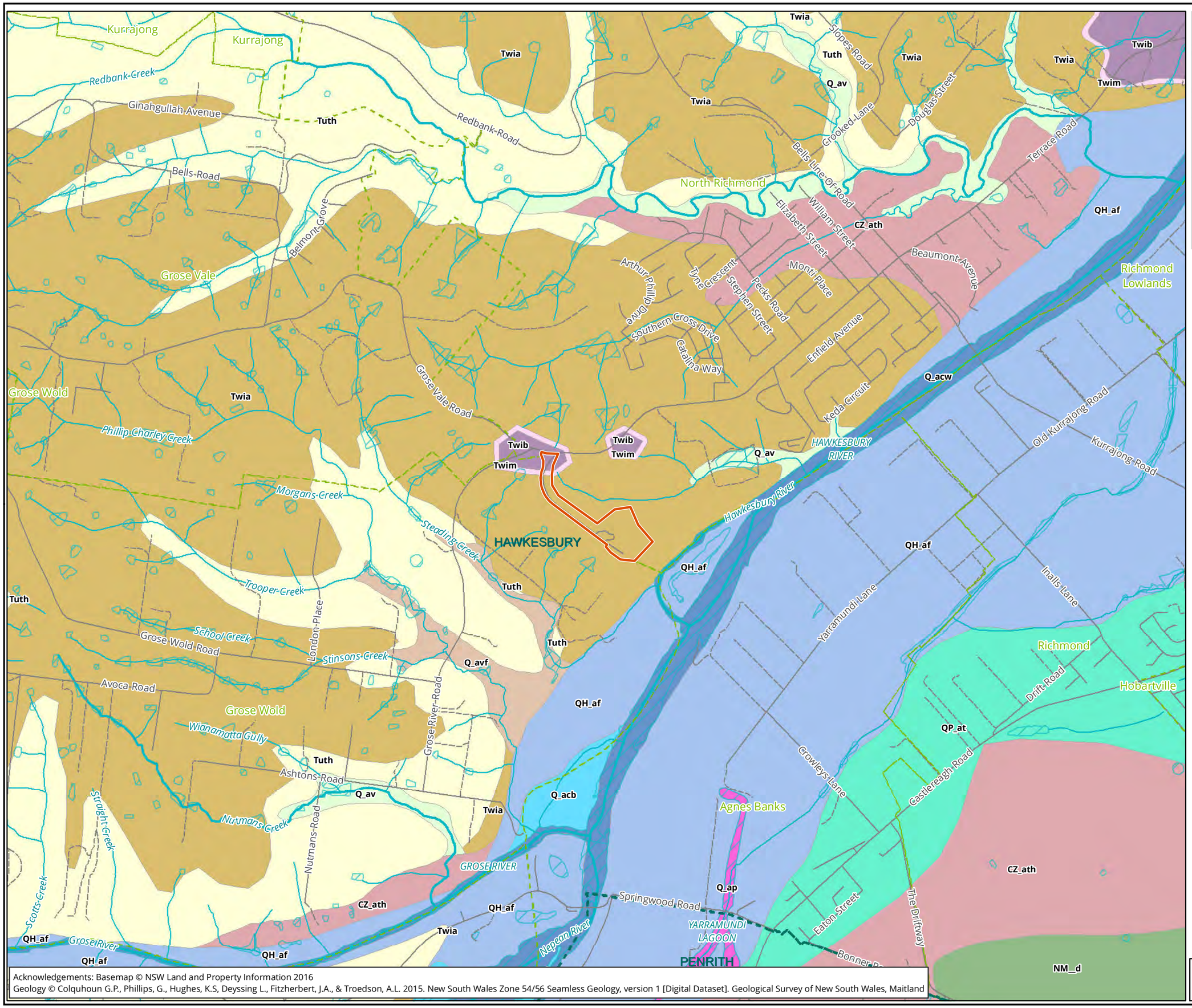
Soil landscapes have distinct morphological and topological characteristics that result in specific archaeological potential. They are defined by a combination of soils, topography, vegetation and weathering conditions. Soil landscapes are essentially terrain units that provide a useful way to summarise archaeological potential and exposure.

The Luddenham soil landscape is the predominant soil type within the study area (Figure 6). The topography of this soil type consists of low rolling to steep low hills with local reliefs of 50-120 metres, slopes of 5-20%, convex narrow ridges and hillcrests with moderately inclined slopes containing drainage lines (Bannerman & Hazelton 1990). The soil types that characterise the Luddenham soil landscape are summarised in Table 2.

The Luddenham soil landscape distribution patterns vary dependant on the landform type it is contained within, therefore altering the depths at which subsurface archaeological artefact deposits are found. The majority of the study area is contained upon a terrace landform, with a total soil depth of approximately 400 millimetres, overlying shale bedrock. The southern portion of the study area is contained on a sloped landform, where soils can reach depths of 1000 millimetres. These depths help to infer whether any archaeological subsurface deposits still exist throughout areas of disturbance.

Table 2 Luddenham soil landscape characteristics (Bannerman & Hazelton 1990, pp.64–65)

Soil Material	Description
lu1 - Friable dark brown loam	Dark brown, friable loam, silt loam or silty clay loam with moderate to strong structure and porous fabric. This material occurs as topsoil (A1 horizon). Surface condition is distinctly friable but may become hard setting when compacted and dry. Colour is dark brown (10YR 3/3, 7.5 YR 3/3) but can range from brownish black (5YR 3/1) to brown (10YR 4/4). This material is occasionally water repellent. The pH varies from moderately acidic (pH 5.0) to slightly acidic (pH 6.5). Roots are common to 10 centimetres becoming fewer with increasing depth. Charcoal fragments occur occasionally.
lu2 – Hard setting brown clay loam	This is a clay loam to fine sandy clay loam with an earthy or porous, rough faced fabric. This material occurs as an A2 horizon and is occasionally hard setting when exposed at the surface. Colour is brown (7.5YR 4/4) but can range between dull yellowish brown (10YR 5/4) and reddish brown (5YR 4/6). The pH varies between strongly acidic (pH 4.0) and slightly acidic (pH 6.5). Shale rock fragments, charcoal fragments and roots are present.
lu3 – Whole coloured, strongly pedal clay	This is a medium clay with strong structure and a smooth-faced, dense fabric. It occurs as subsoil (B horizon). Texture is commonly medium clay but can range from silty day to heavy clay. Colour is reddish brown (5YR 4/6- 8) and can range from bright reddish brown (2.5YR 4/8) to bright yellowish brown (10YR 6/6). The pH ranges from strongly acidic (pH 4.0) lo moderately acidic (pH 5.5). Shale rock fragments are common. Roots are rare and charcoal fragments are absent.
lu4 – Mottled grey plastic clay	A grey, mottled, medium clay with strongly pedal structure and dense, smooth fabric. It occurs as deep subsoil. Texture ranges to heavy clay. Colour is usually light grey (10YR 7/1) but ranges to light reddish grey (2.5YR 7/1). Yellow and red mottles are common. It is usually moist and is very plastic. The pH varies from strongly acidic (pH 4.0) to moderately acidic (pH 5.5). Shale rock fragments and gravel are common. Roots are rare, and other inclusions are absent.
lu5 – Apedal brown sandy clay	This is an apedal massive brown, sandy clay to light clay with a dense earthy fabric. It occurs as subsoil (B horizon). Occasionally weak sub angular blocky or polyhedral structure is evident. Colour is usually brown (7.5YR 4/4-6) but ranges from dull reddish brown (5YR 4/4) to dull yellowish brown (10YR 5/4). This material is moderately acidic (pH 5.0) to neutral (pH 7.0). Roots are common. Up to 10% of the volume may be small (2-6 millimetres) angular, well weathered shale fragments. Charcoal and other inclusions do not occur.



Legend

Study area

Geological units

- CZ_ath - Alluvial terrace deposits- high-stand facies
- NM__d - Londonderry Clay
- Q_acb - Alluvial channel deposits-
- Q_acw - Alluvial channel deposits-
- Q_ap - Alluvial palaeochannel deposits
- Q_av - Alluvial valley deposits
- Q_avf - Alluvial fan deposits
- QH_af - Alluvial floodplain deposits
- QP_at - Alluvial terrace deposits
- Tuth - Hawkesbury Sandstone
- Twia - Ashfield Shale
- Twib - Bringelly Shale
- Twim - Minchinbury Sandstone

Figure 4 Geological units near the study area

0 200 400 600 800 1,000

Metres

Scale: 1:20,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

N

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Albury, Ballarat, Melbourne,
Sydney, Newcastle, Wangaratta & Wollongong

Matter: 31057,
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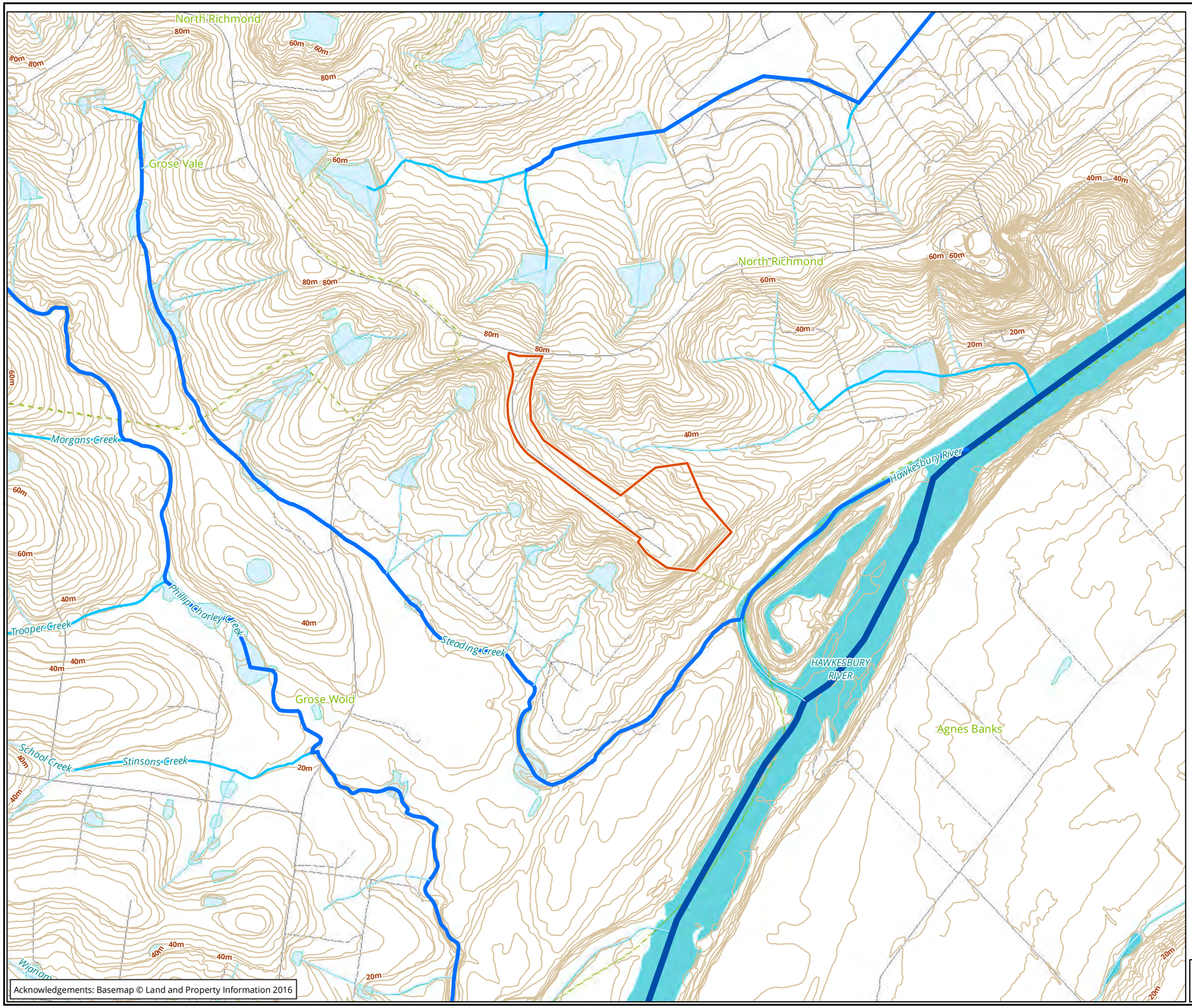

Legend

- Study area
- Contour - 2m interval

Watercourse

- Canal-Drain
- Natural watercourse

Strahler Order

- 1
- 2
- 3
- 9

Figure 5 Hydrology in the vicinity of the study area

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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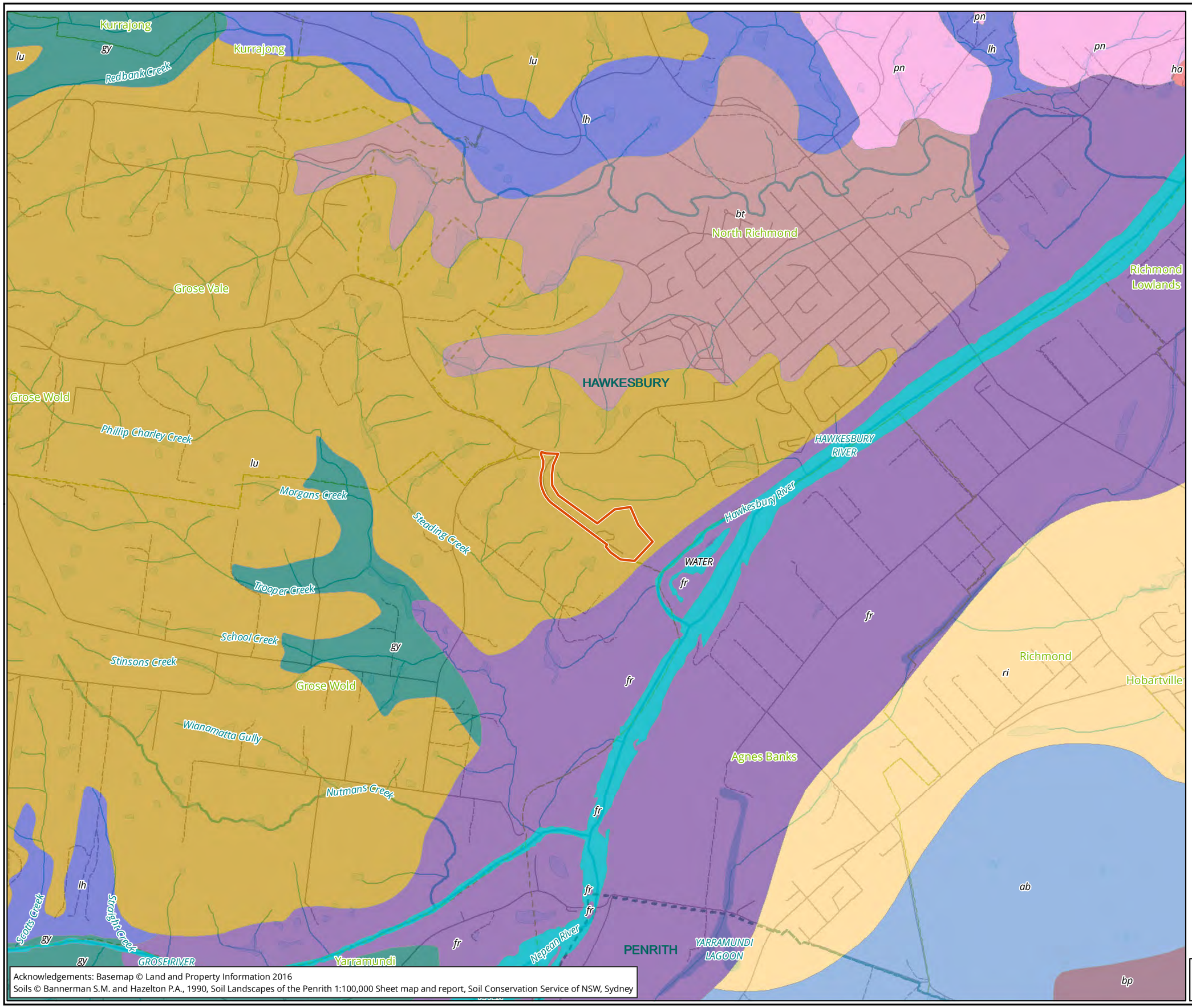
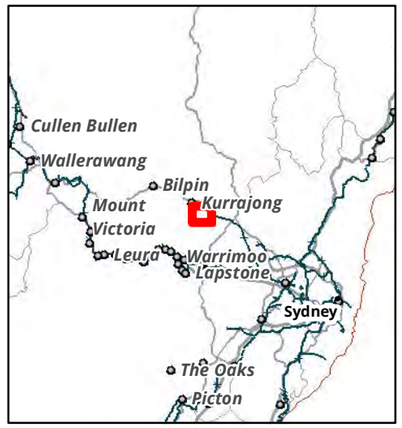
31057_F5_Hydrology.mxd





Legend

Study area

Soil landscape units

- AGNES BANKS
- BERKSHIRE PARK
- BLACKTOWN
- FREEMANS REACH
- GYMEA
- HAWKESBURY
- LUCAS HEIGHTS
- LUDDENHAM
- PICTON
- RICHMOND
- WATER

Figure 6 Soil landscapes in the vicinity of the study area

0 200 400 600 800 1,000

Metres

Scale: 1:20,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

N

biosis

Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Sydney, Newcastle, Wangaratta & Wollongong

Matter: 31057,
Date: 20 January 2020,
Checked by: ML, Drawn by: SSK, Last edited by: amurray
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31057_F6_Soil.mxd

Acknowledgements: Basemap © Land and Property Information 2016
Soils © Bannerman S.M. and Hazelton P.A., 1990, Soil Landscapes of the Penrith 1:100,000 Sheet map and report, Soil Conservation Service of NSW, Sydney

3.1.3 Landscape resources

The type of vegetation found within the Luddenham soil landscape includes extensively cleared open dry sclerophyll forest (Bannerman & Hazelton 1990, p.64). The dominant tree species include Spotted Gum *Eucalyptus maculata* and Grey Box *E. moluccana.* Broad-leaved Iron Bark *E. fibrosa,* Narrow Leaved Ironbark *E. crebra*, Forest Red Gum *E. lereticornis* and Woolybutt *E. longifolia* are also present. The understory shrub species include Blackthorn *Bursaria spinose*, Coffee Bush *Breynia oblongifolia*, Forest Oak *Alocasuarina torulosa*, Hickory *Acacia implexa* and *Clerodendrum tomenlosum*. While common grasses include Speargrass *Aristida vagans*, Bordered Panic Grass *Entolasia marginate* and Paddock Lovegrass *Theineda australis* (Bannerman & Hazelton 1990, p.64).

A variety of plant species were useful for manufacturing tools. Wood from trees was used to manufacture canoe poles, weapons, woomeras, boomerangs and for use in fire. Resins from trees and grasses were used as a fixative in tool making. Bark and fibres were used for carrying vessels, canoes and decorations. Fibres were used to make ropes and nets for trapping fish and birds. In addition, many plants provided sources of both food and medicine. Food, tools, shelter and ceremonial items were derived from floral resources, with the locations of many campsites predicated on the seasonal availability of resources.

The native fauna that could have been present in the area include, but is not limited to: Common Ringtail Possum *Pseudocheirus pereginus*, Common Brushtail possum *Trichosurus vulpecula*, Grey Headed Flying Fox *Pteropus Alecto*, Sugar Glider *Petaurus breviceps*, Eastern Grey Kangaroo *Macropus giganteus*, and Swamp Wallaby *Wallabia bicolor* (*Atlas of Living Australia* 2019). As well as being important food sources, animal products were also used for tool making and fashioning a myriad of utilitarian and ceremonial items. For example, tail sinews are known to have been used to make fastening cord, while 'bone points', which would have functioned as awls or piercers, are often an abundant part of the archaeological record. Animals such as Brush-tailed Possums were highly prized for their fur, with possum skin cloaks worn fastened over one shoulder and under the other (Attenbrow 2002).

3.1.4 Ethnohistory

Our knowledge of Aboriginal people and their land-use patterns and lifestyles prior to European contact is mainly reliant on documents written by non-Aboriginal people. These documents are affected by the inherent bias of the class and cultures of their authors, who were also often describing culture that they did not fully understand - a culture that was in a heightened state of disruption given the arrival of settlers and disease. Early written records can however be used in conjunction with archaeological information and surviving oral histories from members of the Aboriginal community in order to gain a picture of Aboriginal life in the region.

Early interactions between local Aboriginal groups in the Sydney region and European settlers varied in nature between peaceful and hostile. It was not long before the effects of colonisation proved detrimental to local groups, with farming practices employed by the settlers removing land that had until that point been used for subsistence (Attenbrow 2002).

Early observers made no note of the language of the local groups, and it was not until the latter part of the 19th century that the name Darug was used. Mathews (1901, p.155) stated that "*The Dharuk speaking people adjoined the Thurrawal on the north, extending along the coast to the Hawkesbury River, and inland to what are now Windsor, Penrith, Campbelltown, and intervening towns*". Subsistence activities varied based on the local landscapes, with Darug groups closer to the coast employing different food sources and means of hunting in order to survive, compared to those further inland (Kelleher Nightingale Consulting 2010, p.10).

Attenbrow (2002, p.34) suggests that a total of four dialects were spoken in the Sydney region:

- *Darug coastal dialect/s - the Sydney Peninsula (north of Botany Bay, south of Port Jackson, west to Parramatta), as well as the country to the north of Port Jackson, possibly as far as Broken Bay.*
- *Darug hinterland dialect - on the Cumberland Plain from Appin in the south to the Hawkesbury River in the north; west of the Georges River, Parramatta, the Lane Cove River and Berowra Creek.*
- *Dharawal - from south side of Botany Bay, extending south as far as the Shoalhaven River; from the coast to the Georges River and Appin, and possibly as far west as Camden.*
- *Gundungurra - southern rim of the Cumberland Plain west of the Georges River, as well as the southern Blue Mountains.*

McDonald (2008, p.16) notes that early observers of Aboriginal culture who came with the First Fleet studied Aboriginal society around Port Jackson extensively; however, ethnographies for other areas are not as reliable, and that many leaps of faith are involved when studying Aboriginal culture in Sydney more broadly. Systematic anthropological studies of these communities were not carried out until the late 19th century, well after colonisation and its impacts were felt (including an epidemic of smallpox in the 1830s).

McDonald made a number of broad statements about the nature of Aboriginal society in the Sydney region, creating a number of parameters for her analysis, including:

- Distinct bands would have been identifiable (speaking separate language or dialects), and would identify specific tracts of land.
- These bands would have been part of a larger clan group (assumed to be the language group), which would occupy a larger estate.
- Interaction between clan groups would occur on the periphery of these estates.
- Interaction between clan groups for the purpose of holding ceremonies indicates larger group cohesion between clans (McDonald 2008, pp.18–19).

From 1792 to 1809, much of the colonisation west of Sydney was focused on Parramatta, as it provided fertile soils for crop production and pastoral practices. By 1794, early settlers looked to expand upon their territory, with exploration efforts moving settlers to more fertile soils surrounding the Hawkesbury River. The land throughout this area was already occupied by the Darug people, who used the banks of the river primarily as a hunting ground ('Incidents between Aboriginal people in NSW and the British colonisers 1792–1809.' n.d). Despite this, European settlers established settlements along the river, leading to a proliferation and disruption of resources for Aboriginal people. This included land clearing efforts for agricultural practices, with large quantities of maize planted to feed the livestock and residents of the settlements. Martin (1988, p.42) states that 'the natives of the Hawkesbury lived on the wild yams on the banks. Cultivation has rooted out these, and poverty compelled them to steal Indian corn to support nature. The unfeeling settlers resented this by unparalleled severities'.

This theft of resources started a string of violent attacks, raids and warfare from both parties. Between the months of May and June of 1795, these isolated offences culminated in the Battle of Richmond Hill, which took place between the Darug people and the NSW Corps due to conflicts over the farming of the land by European settlers (Battle of Richmond Hill 2020). This battle was considered to be one of the first recorded battles between Aboriginal people and European settlers. In 2010, a memorial garden was erected within the grounds of St John of God Hospital to commemorate this event.

A meeting with a representative for the Richmond Hill memorial garden was attended on 2 July 2020, with the following information obtained:

Prior to European settlement in the Parramatta and Hawkesbury regions, the Darug people lived along the extent of the Hawkesbury River, with the land along the embankment used for hunting and cultivation purposes. A treaty between Governor Arthur Phillip and Yarramundi (an Aboriginal elder and leader of the Richmond Boorooberongal clan) was reached sometime between 1788 and 1794, whereby the land located along the Hawkesbury River was not to be settled upon by European inhabitants, as it was already occupied by the Darug people. It was reported that Phillip strived to maintain a good relationship with the Darug people, which was reciprocated in turn due to Phillip's missing front tooth, which possessed the symbolic value of power and leadership in Darug culture. To ensure the continued harmony between the Aboriginal and European communities, Phillip decided the next European settlement would be located in Parramatta, with colonisation occurring in 1788.

The Darug people primarily used the land along the Hawkesbury River to harvest the wild yams that grew along the embankment, as they were a traditional crop utilised in food production. Once Phillip returned to England in 1792, Europeans settlers decided they needed to expand their settlement and colonised the banks of the Hawkesbury River from 1794, subsequently breaking Phillip's treaty with the Darug people. When colonisation occurred in 1794, European settlers removed all of the yam crops and replaced them with corn.

Cultural differences played a large part in the escalation of tensions and skirmishes between the Aboriginal and European inhabitants. In Darug culture, the 'mother' is the earth and the 'father' is the sky. The mother and father provide the conditions for crops to be produced, with the crops considered a gift from the mother that was to be shared equally by the people who lived throughout the area. Conversely, the European settlers erected fences around a parcel of land they were granted by the Crown, with that land becoming solely theirs, meaning any crops planted in that land grant were not shared. The Darug people, who saw that the yams they ate had been replaced by corn crops, determined that the corn was still to be shared between both groups. Alternatively, the Europeans saw this act as theft. As a result, a number of small skirmishes occurred between May and June of 1795, which lead to the NSW Corps being enlisted by the European settlers to intervene in June of 1795.

The Battle of Richmond Hill saw the loss of both Aboriginal and European lives, however the presence of the NSW Corps decimated much of the Aboriginal community. It is one of the earliest recorded battles on Australian soil between European settlers and the Aboriginal people. In order to commemorate this event, a memorial garden was erected in 2010. This spot was chosen by the Darug community, in liaison with the St John of God brotherhood, as it contained a great sense of healing and had a beautiful vantage point, overlooking the Hawkesbury River. Over the last 10 years, the garden has been used to continue to educate people about the history of the region and the battle itself, with a yearly commemoration event held at the memorial grounds to ensure this event is memorialised. (M Stubbings 2020, pers. comm.)

3.1.5 Land use history

The colonial history of the Hawkesbury River and the land surrounding it played a significant role in the survival and expansion of early settlement. Initial colonisation around the Hawkesbury River commenced in 1794 and by the early 1800s major homesteads were developed within the Richmond area, with the land primarily used for farming (Photo 2).

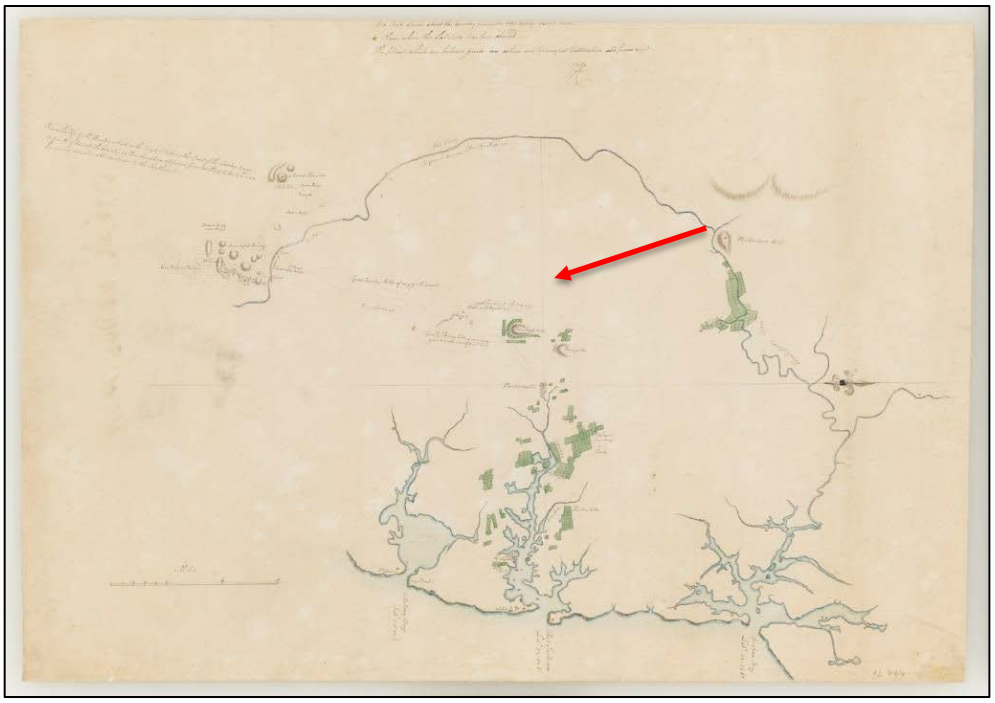


Photo 2 NSW sketch of the settlements, 20th of August 1796 by Govenor John Hunter, with the approximate location of Richmond marked with the red arrow (Source: State Library of NSW)

Between 1810 and 1849, Archibald Bell was provided with a land grant for the property known as 'Belmont' where he built the first house in the study area. Currently only the foundations of that house remain (DPIE 2019). Ownership of the land was then transferred to Philip Charley who built Belmont House in 1892 (Kurrajong-Comleroy Historical Society 2019). Belmont House still stands within the study area. Freehold for properties were available for purchase in 1898 within the North Richmond area to the north-east of the study area. The advertisement of land for sale is displayed in Photo 3. This lead to major residential development within the area.

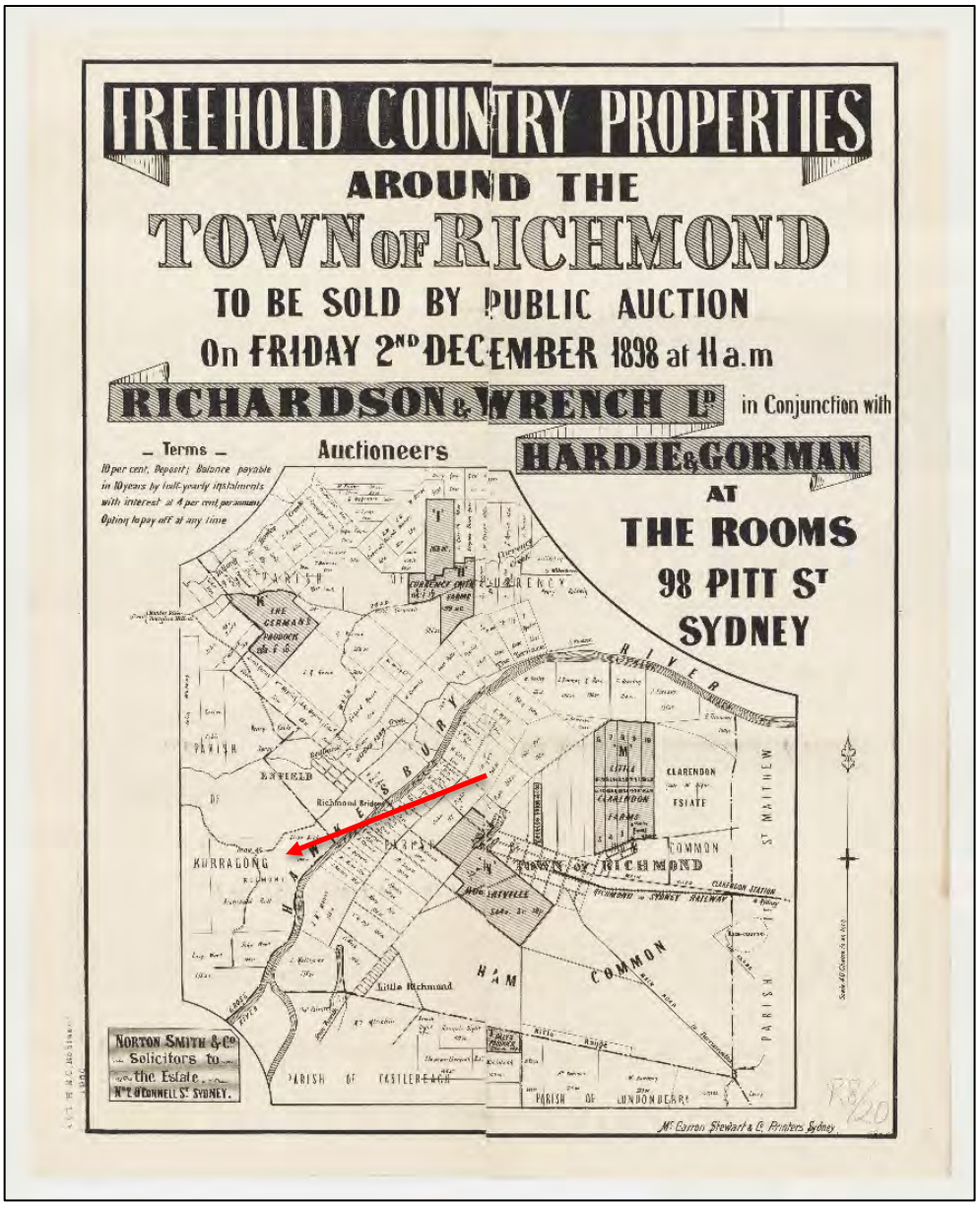


Photo 3 1898 auction poster for properties surrounding Richmond. Estimated location of study area indicated by red arrow (Source: NSW Land Registry Services).

Further development within the study area occurred in 1907 with the addition of the Gate House or The Lodge (Kurrajong-Comleroy Historical Society 2019). This sandstone structure was built at the end of the half mile long avenue of Canary Island palms leading to the elaborate gardens surround Belmont House (Photo 4). Belmont House fell into disrepair before the purchase of the property in 1951 by the Brothers of St John of God who sought to restore it themselves ('Crowd Sees Cardinal Open St John of God Hospital' 1952, p.1). The following year, Belmont House was converted into a mental health hospital, with a 50 bed capacity (St John of God Richmond Hospital n.d, DPIE 2019, Kurrajong-Comleroy Historical Society 2019, 'Crowd Sees Cardinal Open St John of God Hospital' 1952).

Photo 4 **The Grand Mansion at Belmont, North Richmond, circa 1900 (Source: Kurrajong-Comleroy Historical Society)**

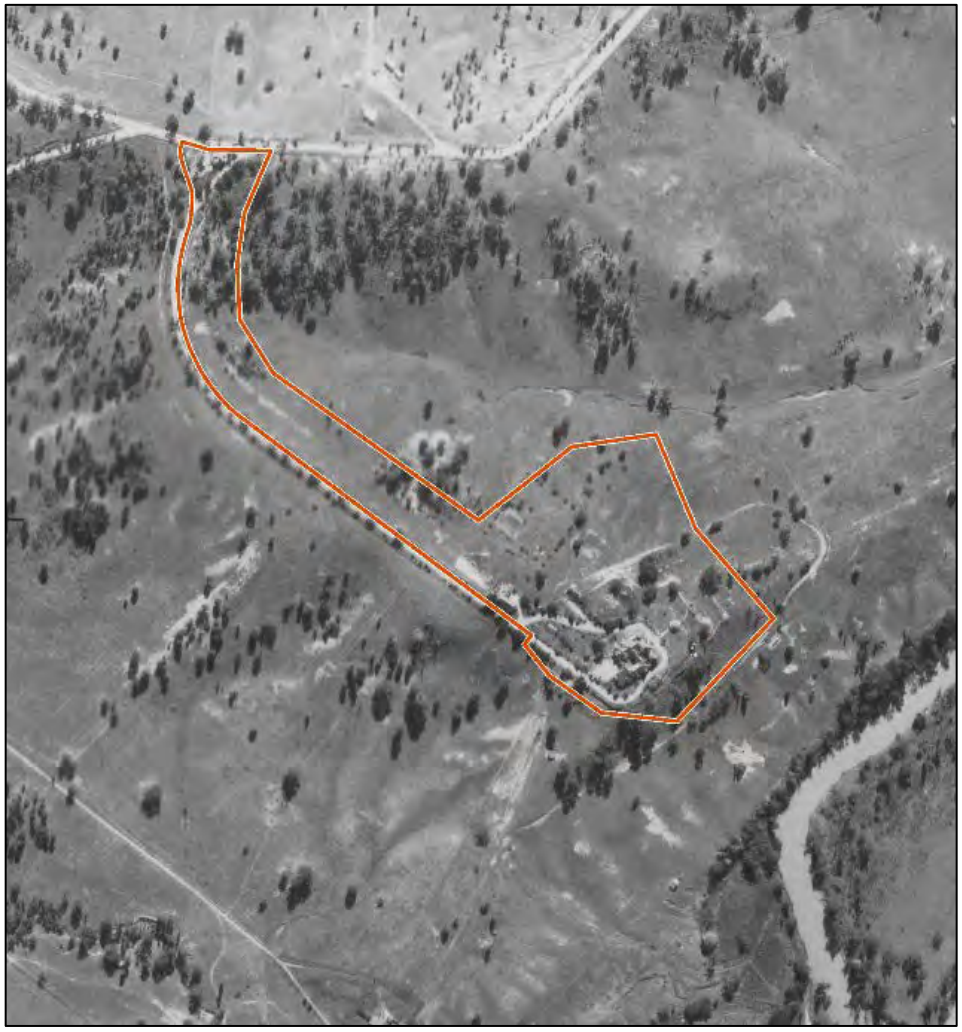


Photo 5 **1947 aerial photograph containing the study area outlined in red (Source: NSW Spatial Services)**

In 1957, a new treatment block worth £50,000 was opened at the hospital, providing a further 30 beds for patients with private rooms and views of the river ('New 50,000 Pound Block In Hospital Opened' 1957, p.1, St John of God Richmond Hospital n.d) (Photo 6). In 1970, the hospital also functioned as a training school for nursing aides ('New South Wales Nurses Registration Board' 1970). November 1975 saw the construction of two new wings, with the hospital expanding its services in psychiatric care and the treatment of alcohol and drug addictions (St John of God Richmond Hospital n.d). Aerial imagery dating to the same year show the circular drive that was once located at the front of the house replaced by the new buildings (Photo 6). The new structures can be seen within the south-west portion of the study area (Photo 6). Landscaping of a stepped terrace to the north-east of these structures also appeared to have occurred, however current aerials do not show this, suggesting that the area was further landscaped at a later date. Additional buildings to the north-east of the 1975 wings, towards the centre of the study area were constructed and opened in 1991 (St John of God Richmond Hospital n.d). Between 1991 and 2010, various additions to the hospital included a gazebo, swimming pool and tennis court. In 2010, a memorial garden was erected towards the north-east side of the study area to commemorate the Battle of Richmond Hill. No further significant development has occurred since then. Overall, alterations have been concentrated to the southern portion of the study area.

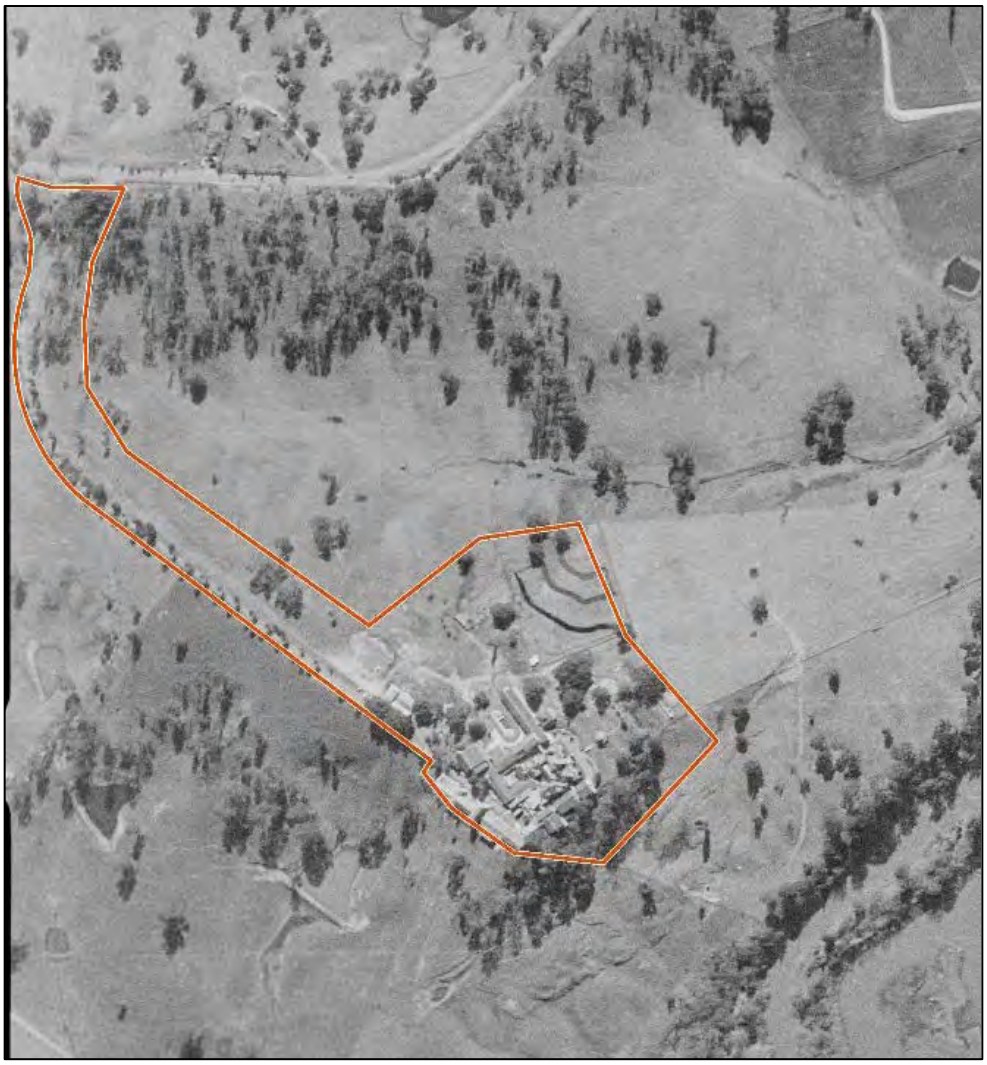


Photo 6 1975 aerial containing the study area outlined in red (Source: NSW Land Services)

3.2 Previous archaeological work

A large number of cultural heritage surface (surveys) and sub-surface (excavations) investigations have been conducted throughout the region of NSW in the past 30 years. There has been an increasing focus on cultural heritage assessments in NSW due to ever increasing development, along with the legislative requirements for this work and greater cultural awareness of Aboriginal cultural heritage.

It is generally accepted that people have inhabited the Australian landmass for the last 50,000 years (Clarkson et al. 2015). Dates of the earliest occupation of the continent by Aboriginal people are subject to continued revision as more research is undertaken. The timing for the human occupation of the Sydney Basin is still uncertain. While there is some possible evidence for occupation of the region around 40,000 years ago, the earliest known radiocarbon date for the Aboriginal occupation of the Sydney Basin is associated with a cultural / archaeological deposit at Parramatta, which was dated to 30,735 ± 407 before present (BP) (JMCHM 2005a).

Archaeological evidence of Aboriginal occupation of the Cumberland Plain indicates that the area was intensively occupied from approximately 4000 years BP (Dallas 1982). Such 'young' dates are probably more a reflection of the conditions associated with the preservation of this evidence and the areas that have been subject to surface and sub-surface archaeological investigations, rather than actual evidence of the Aboriginal prior to this time.

3.2.1 Regional overview

A number of Aboriginal cultural heritage investigations have been conducted for the Sydney region. Models for predicting the location and type of Aboriginal sites with a general applicability to the Cumberland plain have been formulated. These models have been developed from cultural heritage investigations for relatively large developments.

Dallas (1982) completed a survey within the areas of Riverstone, Schofields, and Quakers Hill, located approximately 14 to 17 kilometres south-east of the study area. Background research completed by Dallas indicated that it was likely that artefact sites and culturally modified trees would occur within the study area, and that based on previous work completed by Haglund, artefact sites were most likely to occur on high points adjacent to or between creek lines (Dallas 1982, pp.7–8).

The study considered a number of factors. Dallas used Haglund's (1980) study of Blacktown to provide a predictive model of site location and thus areas of greatest archaeological potential. As a result of the assessment, the following statements were made:

- Sites were known to be on high ground above or between creeks and along creek banks.
- The site type predominant in the region is artefact scatters on the surface or in shallow deposits.
- Other site types known in the region were: scarred trees and, where suitable sandstone was available, axe-grinding groove sites.

Due to the archaeological information available and the type of terrain of the study area it was expected that the site types that were likely to be located were that of open campsites and scarred trees.

Dallas' survey identified seven sites and four isolated finds. One of the seven sites was an open site (QH 3 Quakers Hill). The site was a surface scatter of artefacts located on exposed clay and gravels on a volley ball court at Riverstone High School. The artefacts were three fine grained red silcrete secondary flakes, all of which show use wear and secondary working; and one quartz chip. Dallas concluded by stating:

> *'All the sites have some degree of disturbance. In the case of sites QH 2, 3, 4 and 6 the disturbance is severe and there is little or no likelihood of undisturbed sub-surface material remaining. Campsites QH2, 3 and 6 have been fully recorded and their associations with other sites have been noted. Due to their highly disturbed condition they have little or no further archaeological potential and further archaeological work is not required'* (Dallas 1982).

McDonald (1986) conducted a preliminary archaeological reconnaissance between Townson Road, Eastern Creek and Plumpton Ridge, located approximately 14 kilometres south-east of the study area. Previous research within the area identified that Plumpton ridge is a major silcrete outcrop for the Cumberland Plain, which had been extensively exploited by past Aboriginal people for the stone tool production. Field investigations identified surface scatters of artefacts made up of red and yellow silcrete. Test excavations identified that the type and density of artefacts varied across the area primarily due to disturbance. These scatters were however concentrated towards creek lines and low ridges above or between watercourses. Many of the sites, particularly along Plumpton ridge, were also quarrying activities.

White & McDonald (2010) undertook a review of previous work in the Rouse Hill development area, located approximately 20 kilometres south-east of the study area, discussing lithic artefact distribution in previous excavations carried out by JMCHM in 2008. The study considered a number of factors including stream order, distance from water, landform, aspect, and distance to silcrete sources. As a result of the assessment, the following statements were made:

- Stream order: water supply was a significant factor influencing Aboriginal land use and habitation in the area. There was a correlation between increasing stream order and larger numbers and higher densities of artefacts (from a comparison of first, second, and fourth order streams).
- Distance from water: first order stream landscapes illustrated no significant correlation between artefact distribution and distance to water. In second order stream landscapes, artefact density was highest within 50 metres of water, and then declined with increasing distance. In fourth order landscapes, density was highest between 51-100 metres from water.
- Landform: Artefact density was considered to be lowest on upper slopes and ridgetops, with density increasing on mid and lower slopes. Density was highest in terrace landforms, and lower on creek flats, likely due to repeated flooding events and associated erosion.
- Distance to silcrete sources: the results of the study showed no significant difference between sites located closer to or further away from silcrete sources. However, 6 kilometres was the maximum tested distance from silcrete sources, so the sample is only representative of a limited area.
- Aspect: only appeared to have an influence on sites in the lower parts of valleys, these may have been sited to take advantage of steady factors such as the rising/setting sun and wind direction. Sites in higher parts of valleys may have been influenced by weather and other factors.

The study concluded that landform and distance from water had an impact on site distribution, with artefacts becoming more numerous closer to creeks, and along higher order creeks. It also found that although artefacts are found on all landforms, landform type influences artefact distribution, with the preference being for slightly elevated, well-drained areas in the lower parts of valleys.

Williams (2012) undertook salvage excavations near Pitt Town located approximately 14 kilometres east of the study area. The site (PT12) is located on a levee adjacent to the Hawkesbury River. Salvage excavations identified 1.5 metre deep sandy deposits containing three artefact assemblages. These deposits were optically stimulated luminescence dated providing six ages that gave a chronology for the site. The sand body within the levy began to form > 50,000 years, with the greatest concentration of artefacts identified at 15,000 years and 11,000 years. The earliest assemblage included tools from local river cobbles, which match similar assemblages within the area. While the most recently dated tools found at the site were primarily silcrete, other materials identified at the site included quartzite, quartz and tuff. Tool types included backed blades, cores, and thumbnail scrapers. These dates and tool types suggested sporadic occupation of the Hawkesbury during the late Pleistocene followed by a hiatus and increased period of occupation during the early Holocene.

AHMS (2015) conducted an ACHA for the proposed earthworks on part of the former Schofields aerodrome, located approximately 18 kilometres south-east of the study area. A number of previous assessments and investigations resulted in the identification of several Aboriginal archaeological sites and areas of sensitivity within the study area. Further background research and the results of the previous AHMS survey indicated that there were two sites with PADs located within the study area. This prompted the need to conduct test excavations throughout these areas of PAD. A total of 46 pits were excavated and 507 artefacts were recovered. The excavations allowed a revision of earlier interpretations of the previously identified sites. It was concluded that these sites were significantly disturbed and the surface artefacts were likely to have been introduced in gravel. Artefacts were present in high densities in the deeper soils in close proximity to the watercourse.

Biosis Pty Ltd (2016) completed an ACHA in advance of the proposed Rouse Road upgrade, approximately 20 kilometres south-east of the study area. The assessment included background research, archaeological survey, test excavation, and consultation with the Aboriginal community. Predictive modelling carried out by Biosis identified a high potential for artefact sites and PADs to be located within the study area.

The results of Biosis' predictive modelling suggested that sites were most likely to be identified in association with first and third order creek lines, with sites occurring in relatively large numbers up to 400 metres from both permanent and ephemeral water courses.

The survey did not identify any new Aboriginal sites, with the lack of stone artefacts mostly attributed to the grass cover over the study area, as well as large areas of disturbance associated with Rouse Road. Based on the results of the assessment, the study area was divided into areas of high, moderate, and low archaeological potential, and further investigation undertaken in the form of test excavations. Areas of low potential were associated with areas of disturbances, typically those which had already been developed, areas of moderate potential with lesser disturbed areas considered to have the potential to contain intact subsurface deposits, and areas of high potential typically associated with the margins of Second Ponds Creek. Test excavations identified stone artefacts at two previously recorded sites (RH/SP 17 and RH/A20P 11), and identified three new archaeological deposits.

Biosis Pty Ltd (2017) undertook an Aboriginal Due Diligence Assessment (ADDA)and historical heritage advice for a proposed small scale concrete and sandstone crushing plant at Edward Street, Riverstone, approximately 16 kilometres south-east of the study area. The assessment included background research and an archaeological survey. The study area had been impacted by the construction of various structures and vegetation clearance. The archaeological survey of the study area did not identify any new archaeological sites or any areas of PAD.

Extent (2017) were commissioned by Design Cubicle to complete an ADDA at 166 Guntawong Road, Riverstone, located approximately 18 kilometres south-east of the study area. A desktop assessment and site visit determined it is unlikely that Aboriginal materials would be present across most of the southern portion of the property due to previous land use and disturbance that had truncated the soil profile, specifically the A1 horizon where Aboriginal objects are commonly found. However, a small area in the northern part of the property, located within proximity to the dam, was considered to be relatively undisturbed and therefore considered to have potential to contain Aboriginal objects.

Extent (2017b) were commissioned by Guntawaong Estate Pty Ltd to undertaken an ADDA of 172 Guntawong Road, Riverstone, 18 kilometres south-east of the study area. The assessment was undertaken for a proposed residential redevelopment of the site. The site inspection revealed that majority of the subject area had been previously disturbed and/or cleared. It was noted that a first order drainage line was once present but had been subject to modification by heavy machinery to construct a dam. No Aboriginal objects were observed around the watercourse or within the study area.

Biosis Pty Ltd (2018) conducted an ADDA at Riverstone High School. Predictive modelling for the study area indicated a high potential for stone artefacts and moderate potential for PADs. During the site survey, areas of previous disturbance were noted and recorded. Areas of ground surface exposure were targeted in order to identify any Aboriginal objects within the study area. No previously unrecorded sites or objects were located during the site survey. One previously identified site, QH 3 Quakers Hills (AHIMS #45-5-0359) could not be relocated.

Biosis (2019) conducted an ADDA at Penrith Regatta Centre located approximately 14 kilometres south of the study area. The local area had been subject to repeated assessment as a part of the Penrith Lakes Scheme and associated quarrying works. Previous assessments found that although archaeological deposits were present within the area along Cranebrook Creek, these were of low density and not considered to be of high significance. Subsequent to this, the study area was subject to disturbance as a part of quarrying activities, followed by landscaping works as a part of the construction of the Penrith Regatta Centre.

3.2.2 Local overview

There has not been a significant amount of local studies into Aboriginal cultural heritage surrounding the Richmond and North Richmond area. This section instead focuses on Aboriginal investigations along the Hawkesbury River, to assist in formulating concise predictive modelling and provide a comparative analysis for the study area. Most of these investigations were undertaken as part of development applications and included surface and sub-surface investigations. These investigations are summarised below.

Extent Heritage (2006) (previously AHMS) undertook extensive archaeological investigations in advance of a residential development at Pitt Town, approximately 15 kilometres east of the current study area, with subsequent excavations taking place in 2011 and 2012. The study area was located on the edge of an elevated ridge, approximately 200 metres from the Hawkesbury River. Test excavations revealed a deep Kandosol soil profile, characterised as a 1-2 metre deep fine to medium loamy sand, situated above the Pitt Town Sands. It was discovered that the sand body was deposited through fluvial processes approximately 120,000 years ago, with the upper 1-1.3 metres of sand body exhibiting re-working. This means it was most likely formed within the last 40,000 years. Approximately 10,000 stone artefacts were recovered at depths of up to 1.3 metres, demonstrating continued occupation along the river, making this one of the earliest assemblages in the Sydney Basin region.

Comber (2008) conducted an ACHA along Grose Vale Road approximately 1 kilometre north-west of the study area. Predictive modelling based on the limited studies that have been conducted in the area. They identified that stone arrangements and open campsites were located on crests and ridges nearby the Grose River, and grinding grooves and artefacts were located on the banks of or nearby Redbank creek. The survey identified no sites due to lack of ground visibility. Soil monitoring was recommended.

Austral Archaeology (2011) undertook extensive archaeological investigations approximately 11 kilometres east of the current study area, focusing on excavations of a sand deposit within the Windsor township. The sand deposit was located on a moderately steep ridge, approximately 100 metres away from the Hawkesbury River. The investigation revealed a deep soil profile, characterised as around 1.5 metres in depth. The excavations recovered approximately 12,000 Aboriginal objects, which were found to be concentrated between depths of 0.5-0.8 metres, but occurred as deep as 1.5 metres, illustrating very deep soil profiles.

Kelleher-Nightingale Consulting (2012) (KNC) undertook test excavations for the Windsor Bridge Replacement Program, located approximately 11 kilometres east of the study area. Results of the test excavations illustrated a variable subsurface stratigraphy, with some areas extending up to 1 metre in depth, while others were visibly disturbed with most of the subsurface deposit removed or truncated. A total of 185 artefacts were recovered, considerably less than Austral Archaeology's excavations (Austral Archaeology Pty Ltd 2011). The dominant material type was tuff, which is highly indicative of Pleistocene era occupation in this region,

based on previous investigations by Archaeological & Heritage Management Solutions (AHMS) and Jo McDonald Cultural Heritage Management (JMCHM), where stratified deposits found in rockshelter sites and sand sheets also illustrated dates >10,000 years old. The northern side of the river illustrated a reduced artefact distribution, with only a handful of artefacts found. KNC postulated that this is due to the proximity to the river and location within the flood zone, potentially discouraging Aboriginal occupation.

Kayandel Archaeological Services (2014) conducted test excavations at 108 Grose Vale Road, North Richmond, located approximately 1 kilometre east of the study area. The site NR10 (AHIMS #45-4-4100) that included nine artefacts was excavated. This site is located on an elevated rise within a lower slope within 600 metres of Redbank Creek and 1 kilometre of the Hawkesbury River. An additional 149 artefacts were recovered and analysed. Material primarily consisted of silcrete and silicified tuff, in addition to heat scatters, quartz and one silicified wood artefact. Although rare in the Western Sydney landscape, it was suggested that this deposit was intact.

Austral Archaeology and Extent Joint Venture (2017) undertook test excavations ahead of the Windsor Bridge Replacement Program, approximately 10 kilometres east of the current study area. Testing recovered approximately 1434 stone artefacts, with 23 from the northern project, and the remainder from the southern project area. Depths of the artefacts were variable, but often deep, ranging between 120-240 centimetres in depth in the northern project area, and 70-210 centimetres deep in the southern project area. From these results, the following landscapes were developed:

- *Ridgeline – This landscape reveals a disparate shallow soil profile, often beneath historical overburden. Much of this landscape has been heavily affected by modern and historical activities, with only pockets of soil profile (and any associated stone artefacts) being present across the landscape. The deposit contained discrete concentrations of Aboriginal stone artefacts, which compositionally appeared to represent a mixture of several different phases of use over the last 30,000 years.*
- *Source-Bordering Dune – This landscape was composed of two different layers of sand, formed by both river and wind processes over the last 82,000 years. The majority of the Aboriginal stone artefacts (995) from the southern project area were recovered from these layers. Compositionally, the artefacts could be divided into three different periods of visitation and/or occupation of the project area. The majority of the Aboriginal stone artefacts dates to between 27-17,000 years ago, and provides some of the earliest evidence of populations in the Sydney basin, and the Last Glacial Maximum. A number of glass artefacts (n=3) were also found in the upper parts of the deposit and demonstrate post-contact interactions between Aboriginal people and early European settlers.*
- *River's Edge Alluvium – This landscape consists of thick dark brown sand and clay, and was likely formed through low-energy deposition by the Hawkesbury River, probably in the last 6,500 years. Aboriginal stone artefacts are found throughout the deposit in low numbers, with many of them potentially re-worked either naturally or via human processes from other nearby archaeological landscapes.*
- *River's Edge – Reclaimed/Introduced Fill – disparate pockets of introduced and/or modified natural deposits used to in-fill and landscape areas primarily along the southern bank of the Hawkesbury River. Aboriginal stone artefacts are found throughout the deposit in low numbers, with many of them potentially re-worked either naturally or via human processes from other nearby archaeological landscapes* (AAJV (Austral and Extent Joint Venture) 2017, pp.i–ii).

The majority of the artefacts recovered were located within the second landscape type, with much of the proposed works for the bridge replacement occurring throughout this landform. Therefore, salvage excavations were recommended prior to any works commencing.

3.2.3 AHIMS site analysis

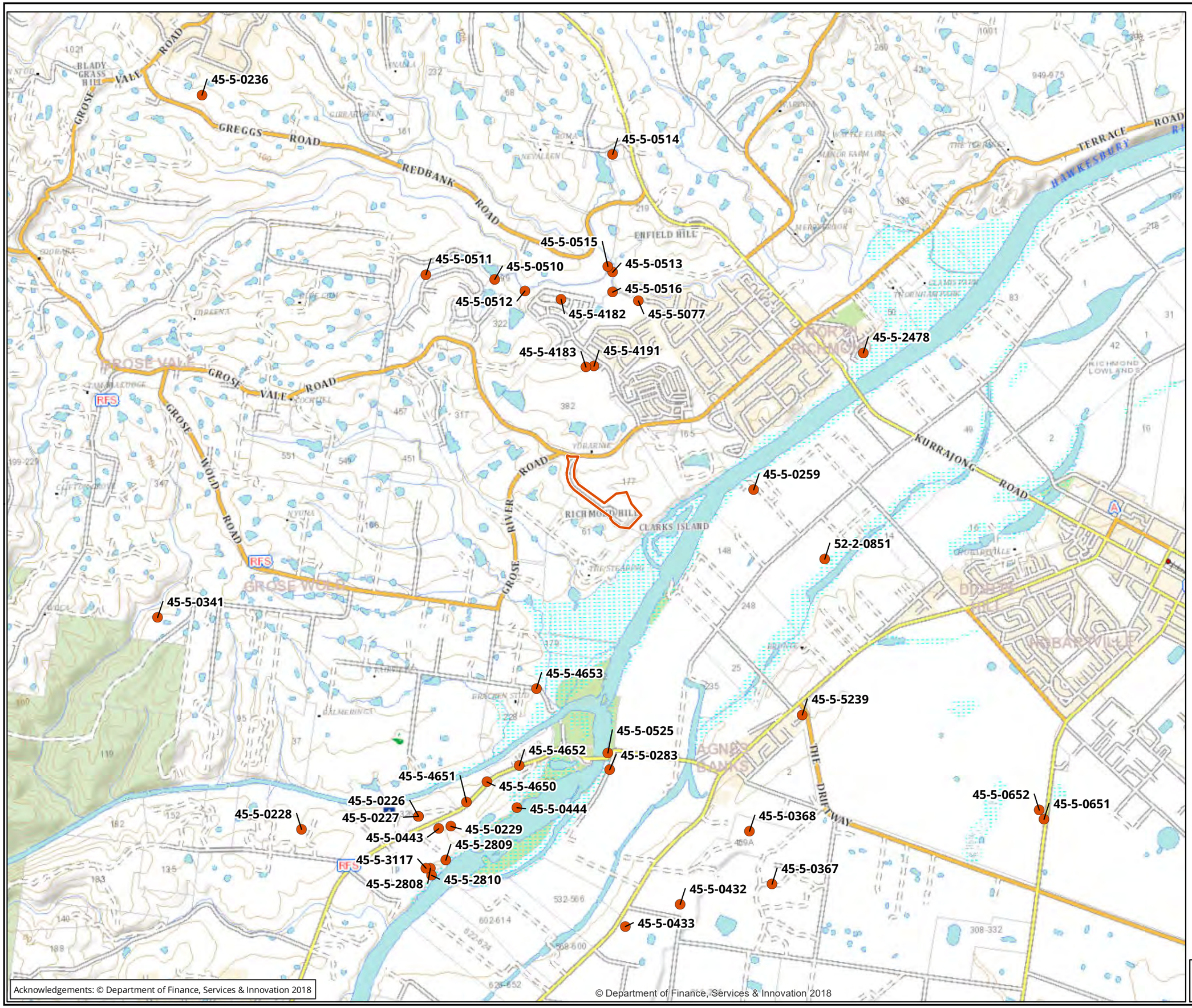
A search of the AHIMS database (Client Service ID: 473733) identified 40 Aboriginal archaeological sites within a 5 by 5 kilometre search area, centred on the study area (Table 3). None of these registered sites are located within the study area (Figure 7). AHIMS search results are provided in Appendix 1. Table 3 provides the frequencies of Aboriginal site types in the vicinity of the study area. The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available.

It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence, AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area. Some recorded sites consist of more than one element, for example artefacts and a modified tree, however for the purposes of this breakdown and the predictive modelling, all individual site types will be studied and compared. This explains why there are 43 results presented here, compared to the 40 sites identified in AHIMS.

Table 3 AHIMS site type frequency

Site type	Number of occurrences	Frequency (%)
Artefact	29	67
Grinding groove	9	21
Shelter with art	2	5
Shelter with deposit	2	5
Rock engraving	1	2
Total	43	100

A simple analysis of the Aboriginal cultural heritage sites registered within the 5 by 5 kilometre buffer of the study area indicates that the most common site type is artefact at 67% (n=29) followed by grinding groove at 21% (n=9). Shelter with art and shelter with deposit both have a frequency of 5% (n=2 each). Lastly rock engraving had the lowest frequency of 2% (n=1).



Legend

- Study area
- AHIMS record

Figure 7 AHIMS sites in the vicinity of the study area

NOT TO BE MADE PUBLIC

0 500 1,000 1,500

Metres

Scale: 1:30,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

biosis

Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Sydney, Newcastle, Wangaratta & Wollongong

Matter: 31057,
Date: 20 January 2020,
Checked by: ML, Drawn by: SSK, Last edited by: amurray
Location:P:\31000s\31057\Mapping
31057_F7_AHIMS.mxd

3.3 Discussion

3.3.1 Predictive statements

A series of predictive statements have been formulated to broadly predict the type and character of Aboriginal cultural heritage sites likely to exist throughout the study area and where they are more likely to be located.

These statements are based on:

- Site distribution in relation to landscape descriptions within the study area.
- Consideration of site type, raw material types and site densities likely to be present within the study area.
- Findings of the ethnohistorical research on the potential for material traces to present within the study area.
- Potential Aboriginal use of natural resources present or once present within the study area.
- Consideration of the temporal and spatial relationships of sites within the study area and surrounding region.

Based on this information, a series of predictive statements have been developed, indicating the site types most likely to be encountered during the survey and subsequent sub-surface investigations across the present study area (Table 4). The definition of each site type is described firstly, followed by the predicted likelihood of this site type occurring within the study area.

Table 4 Aboriginal site prediction statements

Site type	Site description	Potential
Flaked stone artefact scatters and isolated artefacts	Artefact scatter sites can range from high-density concentrations of flaked stone and ground stone artefacts to sparse, low-density 'background' scatters and isolated finds.	**High**: Stone artefact sites have been previously recorded in the region across a wide range of landforms including alluvial flats, and also within the vicinity of the study area; therefore, they have the high potential to be present in undisturbed areas within the study area.
Potential archaeological deposits (PADs)	Potential sub surface deposits of cultural material.	**Moderate**: PADs have been previously recorded in the region across a wide range of landforms. PADs are likely to be present within areas adjacent to water courses or on high points in undisturbed landforms. Although the study area has been subject to high levels of previous ground disturbance from extensive development, the terrace landform it is within suggests good potential for sub surface deposits. PAD sites are therefore likely to be present within the study area.
Axe grinding grooves	Grooves created in stone platforms through ground stone tool manufacture.	**Moderate**: The AHIMS search identified nine previously recorded sites with axe grinding grooves present. As the geology of the study area lacks suitable horizontal sandstone rock outcrops for axe-grinding grooves, the potential for axe

Site type	Site description	Potential
		grinding grooves to occur in the study area has been assessed as moderate.
Quarries	Raw stone material procurement sites.	**Low**: There is no record of any quarries being within or surrounding the study area.
Post-contact sites	These are sites relating to the shared history of Aboriginal and non-Aboriginal people of an area and may include places such as missions, massacre sites, post-contact camp sites and buildings associated with post-contact Aboriginal use.	**Low**: There are no post-contact sites previously recorded in the study area and historical sources do not identify one.
Aboriginal ceremony and Dreaming Sites	Such sites are often intangible places and features and are identified through oral histories, ethnohistoric data, or Aboriginal informants.	**Low**: There are currently no recorded mythological stories for the study area.
Aboriginal places	Aboriginal places may not contain any 'archaeological' indicators of a site, but are nonetheless important to Aboriginal people. They may be places of cultural, spiritual or historic significance. Often they are places tied to community history and may include natural features (such as swimming and fishing holes), places where Aboriginal political events commenced or particular buildings.	**Low**: There are currently no recorded Aboriginal historical associations for the study area.
Rock shelters with art and / or deposit	Rock shelter sites include rock overhangs, shelters or caves, and generally occur on, or next to, moderate to steeply sloping ground characterised by cliff lines and escarpments. These naturally formed features may contain rock art, stone artefacts or midden deposits and may also be associated with grinding grooves.	**Low**: The AHIMS search identified two previously recorded sites with axe grinding grooves present within a 5 kilometre radius of the study area. Rock shelter sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space, which are not present in the study area.
Shell middens	Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time.	**Low**: Shell midden sites have not been recorded within the study area. There is some potential for shell middens to be located in vicinity of permanent water sources located to the south of the study area. However, no shell middens have been recorded within the vicinity of the study area.

Site type	Site description	Potential
Burials	Aboriginal burial sites.	**Low**: Aboriginal burial sites are generally situated within deep, soft sediments, caves or hollow trees. Areas of deep sandy deposits will have the potential for Aboriginal burials. The soil profiles associated with the study area are not commonly associated with burials.
Modified trees	Trees with cultural modifications.	**Low**: A small number of mature native trees have survived within the study area, due to extensive vegetation clearing from the 1800s onwards. No modified trees have been recorded within the vicinity of the study area.

4 Archaeological survey

A field survey of the study area was undertaken on 16 January 2020, attended by Ashley Bridge (Biosis, Archaeologist) and St John of God Hospital representative Deborah Shaw. An Aboriginal representative for the Richmond Hill Memorial site was scheduled to attend the survey; however, was unable to attend on the day due to illness. The field survey sampling strategy, methodology and a discussion of results are provided below.

4.1 Archaeological survey objectives

The objectives of the survey were to:

- Undertake a systematic survey of the study area targeting areas with the potential for Aboriginal heritage.
- Identify and record Aboriginal archaeological sites visible on the ground surface.
- Identify and record areas of PADs.

4.2 Archaeological survey methodology

The survey methods were intended to assess and understand the landforms and to determine whether any archaeological material from Aboriginal occupation or land use exists within the study area.

4.2.1 Sampling strategy

As the study area contains extents that are not part of the development area, the survey effort targeted all areas and buildings within the proposed development impact area, which would be directly affected by the proposed works. The purpose of this strategy was to gain further insight into the landforms and disturbances present within the study area, the memorial site and its relationship to the wider landscape, as well as allow for the Aboriginal representative to view these locations and provide any additional cultural information which may contribute to the assessment of the study area.

4.2.2 Survey methods

The archaeological survey was conducted on foot with one team member. Recording during the survey followed the archaeological survey requirements of the Code and industry best practice methodology. Information that recorded during the survey included:

- Aboriginal objects or sites present in the study area during the survey.
- Survey coverage.
- Any resources that may have potentially have been exploited by Aboriginal people.
- Landform.
- Photographs of the site indicating landform.
- Evidence of disturbance.
- Aboriginal artefacts, culturally modified trees or any other Aboriginal sites.

Where possible, identification of natural soil deposits within the study area was undertaken. Photographs and recording techniques were incorporated into the survey including representative photographs of survey

units, landform, vegetation coverage, ground surface visibility (GSV) and the recording of soil information for each survey unit were possible. Any potential Aboriginal objects observed during the survey were documented and photographed. The location of Aboriginal cultural heritage and points marking the boundary of the landform elements were recorded using a hand-held Global Positioning System (GPS) and the Map Grid of Australia (MGA) (94) coordinate system.

4.3 Constraints to the survey

With any archaeological survey there are several factors that influence the effectiveness (the likelihood of finding sites) of the survey. The factors that contributed most to the effectiveness of the survey within the study area were limited GSV, exposure and disturbance. Low GSV and exposure limited the effectiveness of the survey, as it was difficult to ascertain whether any surface Aboriginal artefacts were present within the study area, while the existing development reduced surface visibility and access.

4.4 Visibility

Due to the current levels of disturbance present throughout the majority of the impact area, a single meandering transect was walked across the extent of the impact area. The survey was conducted throughout the interior and exterior of the existing buildings, in addition to any areas that did not contain any previous disturbance.

In most archaeological reports and guidelines visibility refers to GSV, and is usually a percentage estimate of the ground surface that is visible and allowing for the detection of (usually stone) artefacts that may be present on the ground surface (DECCW 2010a). GSV across the study area was typically poor (20%), due to the extensive levels of development, landscaping and grass coverage present throughout the impact area (Photo 7 and Photo 8).

Photo 7 **North-west facing view of study area showing high levels of grass coverage present**

Photo 8 **East facing view of study area showing landscaping techniques and development**

4.4.1 Exposure

Exposure refers to the geomorphic conditions of the local landform being surveyed, and attempts to describe the relationship between those conditions and the likelihood the prevailing conditions provide for the exposure of (buried) archaeological materials. Whilst also usually expressed as a percentage estimate, exposure is different to visibility in that it is in part a summation of geomorphic processes, rather than a simple observation of the ground surface (Burke & Smith 2004, p.79, DECCW 2010a). Overall, the study area displayed areas of exposure (10%) in areas containing minimal disturbance, and were typically found alongside or underneath trees and fence lines (Photo 9 and Photo 10). Due to the extensive level of disturbance seen throughout most of the impact area, exposure was typically poor due to roads, driveways and landscaping features impacting the remaining ground surface.

Photo 9 **Detailed photograph of exposure levels present underneath trees within the study area**

Photo 10 **Landscape photograph illustrating the levels of exposure underneath trees in the northern portion of the study area, facing north**

4.4.2 Disturbances

Disturbance in the study area is associated with natural and human agents. Natural agents generally affect small areas and include the burrowing and scratching in soil by animals, such as wombats, foxes, rabbits and wallabies, and sometimes exposure from slumping or scouring. Disturbances associated with recent human action are prevalent in the study area and are associated with the extensive development in the southern portion of the study area. The hospital and its associated structures are located on a terrace platform area, which has been modified through construction and the creation of gardens, driveways, roads and fencing (Photo 11, Photo 12 and Photo 13). The areas north of the study area contained small areas of disturbance associated within vegetation clearance and fencing (Photo 14).

Photo 11 **North-west facing view of study area showing high levels of grass coverage present**

Photo 12 **Disturbance from landscaping, pathways, and buildings within the southern portion of the study area, adjacent to the reception building**

Photo 13 **Disturbance from landscaping, pathways, driveway/road and buildings within the southern portion of the study area, with reception building visible**

Photo 14 **Small areas of disturbance associated within vegetation clearance and fencing on northern side of study area**

4.5 Archaeological survey results

The field investigation consisted of a pedestrian survey of a single meandering transect throughout the extent of the study area, focusing on the development impact area and sampling the accessible landforms (Figure 8). The majority of the study area is located on a terrace platform landform, with the south-east portion of the area within a slope landform. As the study area is in close proximity (approximately 200 metres north-west) to a permanent water source, areas with minimal disturbances are typically indicative of where surface and subsurface artefact scatters are located within this type of landscape formation. Survey coverage and landform results can be found in Table 5 and Table 6.

Overall the field investigation was hindered by grass and vegetation coverage, as well as extensive development, which limited its potential to identify any surface artefacts present within the study area. Whilst GSV was limited, it was still possible to assess sections of the study area and note any areas of disturbance. Disturbance was more prevalent in the south-west parts of the study area where development had taken place, limiting its potential to contain archaeological deposits. The northern parts of the study area remained largely undeveloped, with a road present throughout the north-west portion of the area, outside of the impact area.

Areas of low, moderate, and high archaeological potential were identified by the field investigation, including the Richmond Hill Memorial Gardens. The Memorial Garden displays historic, aesthetic and cultural values due to its strong association with the Battle of Richmond Hill and its ties to early colonisation efforts along the Hawkesbury River.

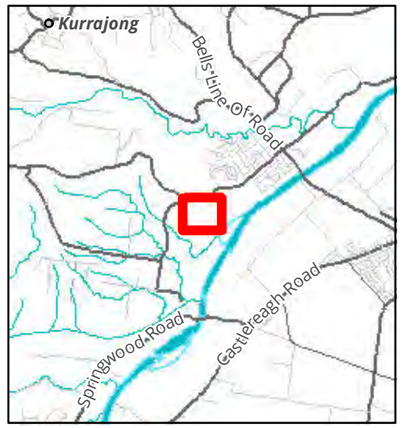
Within the impact area, sections that remained largely undeveloped have the ability to contain untouched terrain and topography which could hold Aboriginal sites, objects and deposits. Exposure throughout the study area was limited, with small areas visible throughout the northern, north-western and southern portions of the study area, with larger patches of exposure visible underneath trees and along fence lines. As the study area has been subjected to extensive clearing, landscaping and development, minimal mature trees were identified within the area of proposed works, limiting the potential for scarred trees to be located within the study area.

Table 5 Survey coverage

Survey unit	Landform	Survey unit area (m²)	Visibility (%)	Exposure (%)	Effective coverage area (m²)	Effective coverage (%)
1	Terrace	54527.52	10	10	8524.31	15.63%
2	Slope	9089.69	20	10	502.99	5.53%
3	Flat	34869.44	15	10	4220.75	12.10%

Table 6 Landform summary

Landform	Landform area (m²)	Area effectively surveyed (m²)	Landform effectively surveyed (%)	No. of Aboriginal sites	No. of artefacts or features
Terrace	54527.52	8524.31	15.63%	0	0
Slope	9089.69	502.99	5.53%	0	0
Flat	34869.44	4220.75	12.10%	0	0



Legend

Study area

Survey tracks

Figure 8 Survey coverage

0 25 50 75 100

Metres

Scale: 1:2,500 @ A3

Coordinate System: GDA 1994 MGA Zone 56

N

Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Sydney, Newcastle, Wangaratta & Wollongong

Matter: 31057,
Date: 20 January 2020,
Checked by: ALB, Drawn by: SSK, Last edited by: amurray
Location:P:\31000s\31057\Mapping
31057_F8_SurveyCoverage.mxd

5 Analysis and discussion

The background research conducted for this project demonstrated that the study area has been subject to significant residential development since 1810, with the construction of 'Belmont' occurring between 1810 and 1849. Further development associated with the study area occurred in 1892, with the construction of Belmont House, which still remains standing today. From 1951, the land has been occupied by the St John of God Hospital, where an additional eight – ten buildings were erected, in addition to a number of amenities including a tennis court, swimming pool and carpark.

Predictive modelling in the Cumberland Plain region (Jo McDonald Cultural Heritage Management Pty Ltd 2006, Jo McDonald Cultural Heritage Management Pty Ltd 2008, JMCHM 2005b, JMCHM 2005c) suggests that Aboriginal people have a tendency to occupy areas in close proximity to higher order streams, as these types of streams would have been more likely to provide a stable source of water and by extension, other resources which would have been used by Aboriginal groups. These areas of occupation tend to be found on elevated ridges or slopes within close proximity to the associated creek line, as raised landforms have a lower likelihood of being inundated during flooding events. Aboriginal artefact scatter sites are common across this formation, as are PADs, grinding grooves, rock shelters and water holes, making it the most archaeologically rich formation in the area. The proximity to a perennial source of water, in addition to the location of the study area on a terrace platform, is a positive indicator for Aboriginal artefacts to exist within the study area.

Soil landscapes show that areas on the terraced landform within the study area have total depths of approximately 400 millimetres, suggesting that the likelihood for containing archaeological deposits within areas of disturbance and development is low. Areas along the upper slopes and those areas that have minimal disturbance within the terrace and flat landforms are more likely to contain intact archaeological deposits as the total depths extend as far as one metre.

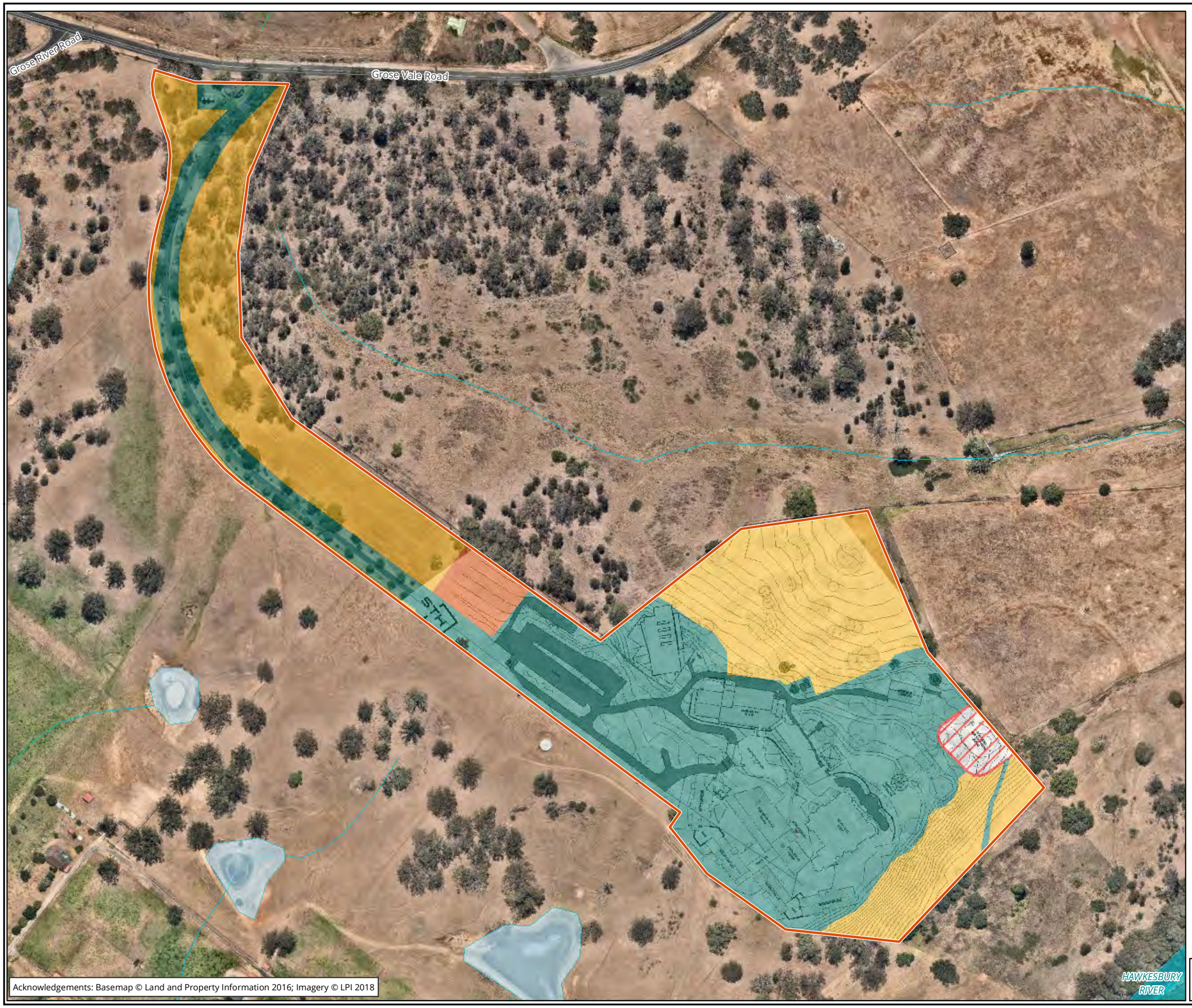
Previous excavations along the banks of the Hawkesbury River suggest that soil profiles can extend as deep as 1.5 metres within 200 metres of the Hawkesbury River, with the majority of the recovered artefacts occurring within depths between 500 and 800 millimetres. Austral Archaeology (2011) and the Austral Archaeology and Extent Joint Venture (2017) recovered most artefacts along a ridge platform landform, approximately 100 metres away from the River, along the southern side of the River on ridgelines or terraces. KNC (2012) recovered significantly fewer artefacts than previous excavations along the Hawkesbury River, which can be largely attributed to the landform type and overall location along the River. Test excavations took place within a sloped landform on the northern side of the river, which is prone to flooding events, suggesting surface and subsurface deposits would be periodically washed away.

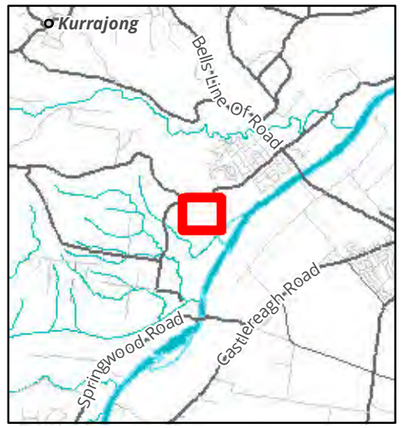
In addition to the predictive statements and previous excavations, historical records indicate that Aboriginal people were residing along the embankments of the Hawkesbury River prior to colonial settlement. This is confirmed by accounts of the Battle of Richmond Hill and the subsequent memorial site that was constructed in 2010 to commemorate the lives lost in the battle.

Therefore, as the majority of the study area is located on a terrace platform within 200 metres of the river, it is likely to contain a high potential for evidence of Aboriginal occupation. Areas contained within the slope landform has a lower likelihood of containing artefacts, as the study area is located on the northern side of the river; however, as the slope contains minimal disturbance, the archaeological potential is considered to be moderate.

The field investigation did not identify any Aboriginal stone artefacts; however this is most likely due to the limited visibility, exposure and extensive levels of disturbance during the survey, rather than an absence of Aboriginal occupation of the area. Based on the results of the field investigation, the proposed developments'

footprint has been revised to ensure the impacts are contained to existing areas of disturbance, which will minimise the overall impacts to the study area (Figure 3). Due to the existing disturbance throughout a large portion of the study area, majority of the impact area is unlikely to contain any intact Aboriginal sites and has therefore been assessed as holding low archaeological potential (Figure 9).





Legend

Study area

Archaeological potential

High

Moderate

Low

No-go zone

Figure 9 Survey effort and results

0 25 50 75 100

Metres

Scale: 1:2,500 @ A3

Coordinate System: GDA 1994 MGA Zone 56

Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Sydney, Newcastle, Wangaratta & Wollongong

Matter: 31057,
Date: 20 July 2020,
Checked by: ML, Drawn by: SSK, Last edited by: amurray
Location:P:\31000s\31057\Mapping
31057_F9_SurveyEffortResults.mxd

6 Scientific values and significance assessment

The two main values addressed when assessing the significance of Aboriginal sites are cultural values to the Aboriginal community and archaeological (scientific) values. This report will assess scientific values while the ACHA report will detail the cultural values of Aboriginal sites in the study area.

6.1 Introduction to the assessment process

Heritage assessment criteria in NSW fall broadly within the significance values outlined in the Australia International Council on Monuments and Sites (ICOMOS) Burra Charter (Australia ICOMOS 2013). This approach to heritage has been adopted by cultural heritage managers and government agencies as the set of guidelines for best practice heritage management in Australia. These values are provided as background and include:

- **Historical significance** (evolution and association) refers to historic values and encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out in this section. A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.
- **Aesthetic significance** (Scenic/architectural qualities, creative accomplishment) refers to the sensory, scenic, architectural and creative aspects of the place. It is often closely linked with social values and may include consideration of form, scale, colour, texture, and material of the fabric or landscape, and the smell and sounds associated with the place and its use.
- **Social significance** (contemporary community esteem) refers to the spiritual, traditional, historical or contemporary associations and attachment that the place or area has for the present-day community. Places of social significance have associations with contemporary community identity. These places can have associations with tragic or warmly remembered experiences, periods or events. Communities can experience a sense of loss should a place of social significance be damaged or destroyed. These aspects of heritage significance can only be determined through consultative processes with local communities.
- **Scientific significance** (Archaeological, industrial, educational, research potential and scientific significance values) refers to the importance of a landscape, area, place or object because of its archaeological and/or other technical aspects. Assessment of scientific value is often based on the likely research potential of the area, place or object and will consider the importance of the data involved, its rarity, quality or representativeness, and the degree to which it may contribute further substantial information.

The cultural and archaeological significance of Aboriginal and historic sites and places is assessed on the basis of the significance values outlined above. As well as the ICOMOS Burra Charter significance values guidelines, various government agencies have developed formal criteria and guidelines that have application when assessing the significance of heritage places within NSW. Of primary interest are guidelines prepared by the Commonwealth Department of the Environment and Energy, Heritage NSW, NSW Department of Planning, Industry and Environment. The relevant sections of these guidelines are presented below.

These guidelines state that an area may contain evidence and associations which demonstrate one or any combination of the ICOMOS Burra Charter significance values outlined above in reference to Aboriginal heritage. Reference to each of the values should be made when evaluating archaeological and cultural significance for Aboriginal sites and places.

In addition to the previously outlined heritage values, the Heritage NSW Guidelines (OEH 2011) also specify the importance of considering cultural landscapes when determining and assessing Aboriginal heritage values. The principle behind a cultural landscape is that 'the significance of individual features is derived from their inter-relatedness within the cultural landscape'. This means that sites or places cannot be 'assessed in isolation' but must be considered as parts of the wider cultural landscape. Hence the site or place will possibly have values derived from its association with other sites and places. By investigating the associations between sites, places, and (for example) natural resources in the cultural landscape the stories behind the features can be told. The context of the cultural landscape can unlock 'better understanding of the cultural meaning and importance' of sites and places.

Although other values may be considered – such as educational or tourism values – the two principal values that are likely to be addressed in a consideration of Aboriginal sites and places are the cultural/social significance to Aboriginal people and their archaeological or scientific significance to archaeologists. The determinations of archaeological and cultural significance for sites and places should then be expressed as statements of significance that preface a concise discussion of the contributing factors to Aboriginal cultural heritage significance.

6.2 Archaeological (scientific significance) values

Archaeological significance (also called scientific significance, as per the ICOMOS Burra Charter) refers to the value of archaeological objects or sites as they relate to research questions that are of importance to the archaeological community, including indigenous communities, heritage managers and academic archaeologists. Generally the value of this type of significance is determined on the basis of the potential for sites and objects to provide information regarding the past life-ways of people (Burke & Smith 2004, pp. 249, NPWS 1997), For this reason, the NPWS summarises the situation as 'while various criteria for archaeological significance assessment have been advanced over the years, most of them fall under the heading of archaeological research potential' (NPWS 1997, pp. 26). The NPWS criteria for archaeological significance assessment are based largely on the ICOMOS Burra Charter.

Research potential

Research potential is assessed by examining site content and site condition. Site content refers to all cultural materials and organic remains associated with human activity at a site. Site content also refers to the site structure – the size of the site, the patterning of cultural materials within the site, the presence of any stratified deposits and the rarity of particular artefact types. As the site contents criterion is not applicable to scarred trees, the assessment of scarred trees is outlined separately below. Site condition refers to the degree of disturbance to the contents of a site at the time it was recorded.

The site contents ratings used for archaeological sites are:

Table 7 Site contents ratings used for archaeological sites

Rating	Description
0	No cultural material remaining.
1	Site contains a small number (e.g. 0–10 artefacts) or limited range of cultural materials with no evident stratification.
2	Site contains a larger number, but limited range of cultural materials; and/or some intact stratified deposit remains; and/or are or unusual example(s) of a particular artefact type.
3	Site contains a large number and diverse range of cultural materials; and/or largely intact stratified deposit; and/or surface spatial patterning of cultural materials that still reflect the way in which the cultural materials were deposited.

Table 8 Site condition ratings used for archaeological sites

Rating	Description
0	Site destroyed.
1	Site in a deteriorated condition with a high degree of disturbance; lack of stratified deposits; some cultural materials remaining.
2	Site in a fair to good condition, but with some disturbance.
3	Site in an excellent condition with little or no disturbance. For surface artefact scatters this may mean that the spatial patterning of cultural materials still reflects the way in which the cultural materials were laid down.

Pearson and Sullivan (1995, pp. 149) note that Aboriginal archaeological sites are generally of high research potential because 'they are the major source of information about Aboriginal prehistory'. Indeed, the often great time depth of Aboriginal archaeological sites gives them research value from a global perspective, as they are an important record of humanity's history. Research potential can also refer to specific local circumstances in space and time – a site may have particular characteristics (well preserved samples for absolute dating, or a series of refitting artefacts, for example) that mean it can provide information about certain aspects of Aboriginal life in the past that other less or alternatively valuable sites may not (Burke & Smith 2004, pp. 247–8). When determining research potential value particular emphasis has been placed on the potential for absolute dating of sites.

The following sections provide statements of significance for the Aboriginal archaeological sites recorded during the sub-surface testing for the assessment. The significance of each site follows the assessment process outlined above. This includes a statement of significance based on the categories defined in the Burra Charter. These categories include social, historic, scientific, aesthetic and cultural (in this case archaeological) landscape values. Nomination of the level of value—high, moderate, low or not applicable—for each relevant category is also proposed. Where suitable the determination of cultural (archaeological) landscape value is applied to both individual sites and places (to explore their associations) and also, to the study area as a whole. The nomination levels for the archaeological significance of each site are summarised below.

Representativeness

Representativeness refers to the regional distribution of a particular site type. Representativeness is assessed by whether the site is common, occasional, or rare in a given region. Assessments of representativeness are subjectively biased by current knowledge of the distribution and number of archaeological sites in a region. This varies from place to place depending on the extent of archaeological research. Consequently, a site that is assigned low significance values for contents and condition, but a high significance value for representativeness, can only be regarded as significant in terms of knowledge of the regional archaeology. Any such site should be subject to re-assessment as more archaeological research is undertaken.

Assessment of representativeness also takes into account the contents and condition of a site. For example, in any region there may only be a limited number of sites of any type that have suffered minimal disturbance. Such sites would therefore be given a high significance rating for representativeness, although they may occur commonly within the region.

The representativeness ratings used for archaeological sites are:

Table 9 Site representativeness ratings used for archaeological sites

Rating	Description
1	Common occurrence
2	Occasional occurrence
3	Rare occurrence

Overall scientific significance ratings for sites, based on a cumulative score for site contents, site integrity and representativeness are provided in Table 10.

Table 10 Scientific significance ratings used for archaeological sites

Rating	Description
1-3	Low scientific significance
4-6	Moderate scientific significance
7-9	High scientific significance

Each site is given a score on the basis of these criteria – the overall scientific significance is determined by the cumulative score.

6.2.1 Statements of archaeological significance

The following archaeological significance assessment is based on Requirement 11 of the Code. Using the assessment criteria detailed in Scientific Values and Significance Assessment, an assessment of significance was determined and a rating for each site was determined. The results of the archaeological significance assessment are given in Table 11 and Table 12 below and refer to the potential assessments illustrated in Figure 9.

Table 11 Scientific significance assessment for the study area (see Figure 9 for more details)

Location within the study area	Site content	Site condition	Representativeness	Scientific significance
Low archaeological potential	0	0	0	Nil – no Aboriginal sites were identified.
Moderate archaeological potential	2	2	2	Moderate
High archaeological potential	3	3	3	High
Richmond Hill Memorial Garden	3	3	3	High

Table 12 Statements of scientific significance for the study area

Statement of significance
The majority of the study area is located on a terrace platform within 200 metres of the river, and is likely to contain a high potential for evidence of Aboriginal occupation. Areas contained within the slope landform have a lower likelihood of containing artefacts, however, as the slope contains minimal disturbance, the archaeological potential is considered to be moderate. A field investigation of the study area did not identify any Aboriginal objects. The Richmond Hill Memorial Garden displays historic, aesthetic and cultural values due to its strong association with the Battle of Richmond Hill and its ties to early colonisation efforts along the Hawkesbury River. The footprint for the proposed development has been revised to ensure the impacts are contained to existing areas of disturbance, which will minimise the overall impacts to the study area. Due to this existing disturbance, the entire impact area is unlikely to contain any intact Aboriginal sites and has therefore been assessed as holding low archaeological potential. All other areas outside of the impact area have minimal disturbances and therefore have been assessed as containing moderate to high archaeological potential.

7 Impact assessment

As previously outlined, the proposed development includes the construction of a building complex comprising of four residential and two amenity buildings (Figure 3). This will involve:

- Demolition of eight existing buildings in the southern portion of the study area.
- Construction of four residential buildings [1] on top of the existing footings of the demolished buildings.
- Construction of a clinical support building [2] and a wellness centre [3], skewed to the existing footings of the demolished buildings and tennis court.
- Installation of services throughout areas of new build, including, but not limited to, gas, electrical and water services.
- Installation of lights and electrical services throughout carpark area.
- Creation of stockpiling and set down areas throughout the designated areas of low potential.

7.1 Predicted physical impacts

Harm can be avoided to all Aboriginal sites within the study area as a part of the proposed works. Original schematic designs provided by Johnstaff identified two areas of moderate and high potential which were to be impacted for the implementation of a carpark extension and a new wellness centre. As these areas of potential remain largely untouched by previous development, they contain the potential to retain Aboriginal objects or artefacts. Johnstaff has since revised their schematic designs to ensure all impacts are contained within areas of existing development, therefore minimising the overall harm of Aboriginal sites throughout the study area. This will ensure all impacts are contained within areas of low potential.

A summary of impacts is provided below in Table 13.

Table 13 Summary of potential archaeological impacts

Site name	Site type	Significance	Type of harm before mitigated	Consequence of unmitigated harm	Consequence of mitigated harm	Site specific recommendations
Richmond Hill Memorial Gardens	Commemorative gardens	High	Indirect	Partial loss of value	Impact can be avoided with No-Go Zone implemented.	Should be avoided.
-	Moderate potential areas	Moderate	Direct	Total loss of value	Excavations will reduce destruction of Aboriginal sites, salvage any Aboriginal artefacts present throughout the	Test excavations to be conducted prior to any development.

Site name	Site type	Significance	Type of harm before mitigated	Consequence of unmitigated harm	Consequence of mitigated harm	Site specific recommendations
					area and provide recommendations for remainder of project.	
-	High potential areas	High	Direct	Total loss of value	Excavations will reduce destruction of Aboriginal sites, salvage any Aboriginal artefacts present throughout the area and provide recommendations for remainder of project.	Test excavations to be conducted prior to any development.

7.2 Management and mitigation measures

Ideally, heritage management involves conservation of sites through the preservation and conservation of fabric and context within a framework of 'doing as much as necessary, as little as possible' (Marquis-Kyle & Walker 1994, pp. 13). In cases where conservation is not practical, several options for management are available. For sites, management often involves the salvage of features or artefacts, retrieval of information through excavation or collection (especially where impact cannot be avoided) and interpretation.

As part of the management and mitigation measures for the proposed works, an ACHA including background research, a field investigation and consultation with the Aboriginal community was undertaken. This was done to determine the presence and nature of any potential Aboriginal sites so that appropriate management could be undertaken. The field investigation identified areas of low, moderate, and high archaeological potential, however, no Aboriginal objects were identified. A 10 metre exclusion zone has been erected surrounding the Richmond Hill Memorial Gardens to ensure that no impacts are made, with the memorial located outside of the proposed impact area. Avoidance of impacts to archaeological and cultural heritage sites through the design of the development is the primary mitigation and management strategy, and should be implemented where practicable. The final schematic designs illustrate that all areas of ground disturbance and impact will be contained to areas of low potential in order to adhere to the mitigation strategy in this report. It should be noted that if unexpected Aboriginal objects are identified during works, or if the scope of works should change to include impacts within an area that has not been previously surveyed, further assessment would be required.

8 Recommendations

Strategies have been developed based on the archaeological (significance) of cultural heritage relevant to the study area and influenced by:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.
- Current best conservation practise, widely considered to include:
  - Ethos of the Australia ICOMOS Burra Charter.
  - The Code.

Prior to any impacts occurring within the study area, the following is recommended:

Recommendation 1: No further assessment required in areas identified as having low archaeological potential

No further investigations are required for areas assessed as having low archaeological potential. The conditions set forth in the SEARs (SSD 10394) must be adhered to. This recommendation is conditional upon Recommendations 5 and 6.

Recommendation 2: Further assessment required in the form of test excavations prior to development within areas of moderate or high archaeological potential

The assessment has identified areas of moderate and high archaeological potential within the study area. At the time of this report, Johnstaff has confined the proposed development to areas that have been assessed as having low potential. If impacts to areas of moderate and high archaeological potential cannot be avoided, subsurface investigations (test excavations) will be required prior to the commencement of works.

If the schematic designs (inclusive of these items) change, any impact areas identified as having high or moderate archaeological potential should be avoided wherever possible (Figure 9).

Impacts which would require further assessment in the form of test excavations within areas of moderate or high archaeological potential includes, but is not limited to, any stockpiling areas, set down areas, installation of services, bulk earthworks, vehicle tracks/vehicle movement, landscaping or areas of revegetation, or any other activities that will result in disturbances to the ground surface.

Recommendation 3: Richmond Hill Memorial Gardens listed as a heritage item

The Richmond Hill Memorial Gardens should be listed on the *Hawkesbury Local Environmental Plan* 2009 (LEP) as a local heritage item.

Recommendation 4: Continued consultation with the registered Aboriginal stakeholders

As per the consultation requirements, the proponent should continue to inform Aboriginal stakeholders about the management of Aboriginal cultural heritage sites within the study area throughout the life of the project. This recommendation is in keeping with the consultation requirements.

Recommendation 5: Discovery of Unanticipated Aboriginal Objects

All Aboriginal objects and Places are protected under the *NSW National Parks and Wildlife Act 1974* (NPW Act). It is an offence to disturb an Aboriginal site without a consent permit issued by Heritage NSW, Department of Premier and Cabinet (Heritage NSW). Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders.

Recommendation 6: Discovery of human remains

If any suspected human remains are discovered during any activity works, all activity in the vicinity must cease immediately. The remains must be left in place and protected from harm or damage. The following contingency plan describes the immediate actions that must be taken in instances where human remains or suspected human remains are discovered. Any such discovery at the study area must follow these steps:

1. Discovery: If suspected human remains are discovered all activity in the vicinity must stop to ensure minimal damage is caused to the remains; and the remains must be left in place, and protected from harm or damage.
2. Notification: Once suspected human skeletal remains have been found, the Coroner's Office and the NSW Police must be notified immediately. Following this, and if the human remains are likely to be Aboriginal in origin, the find will be reported to the Aboriginal parties and Heritage NSW. If the find is likely to be non-Aboriginal in origin and more than 100 years in age, the Heritage Council of NSW will be notified of the find under Section 146 of the *Heritage Act 1977* (Heritage Act).

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Appendices

Appendix 1 AHIMS results

THE FOLLOWING APPENDIX IS NOT TO BE MADE PUBLIC

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 31057 MEL

Client Service ID : 473733

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-0851	Wilton Allens Creek Bridge Site 8	AGD	56	288420	6279900	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	384,1738
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists (MDCA)					**Permits**		
45-5-2808	Yarramundi 4	AGD	56	285040	6277250	Open site	Valid	Artefact : -		98202
	Contact	**Recorders**	Doctor.Jo McDonald					**Permits**		
45-5-2809	Yarramundi 5	AGD	56	285170	6277320	Open site	Valid	Artefact : -		98202
	Contact	**Recorders**	Doctor.Jo McDonald					**Permits**		
45-5-2810	Yarramundi 3	AGD	56	285050	6277190	Open site	Valid	Artefact : -		98202
	Contact	**Recorders**	Doctor.Jo McDonald					**Permits**		
45-5-0651	HB13	AGD	56	290300	6277670	Open site	Valid	Artefact : -	Open Camp Site	1380
	Contact	**Recorders**	Laura-Jane Smith					**Permits**		
45-5-4100	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Destroyed			103008
	Contact	**Recorders**	Matthew Kelleher,Kelleher Nightingale Consulting Pty Ltd,Mr.Josh Symons					**Permits**	3542	
45-5-4650	Yarramundi 7	GDA	56	285628	6278181	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd					**Permits**		
45-5-4651	Yarramundi 8	GDA	56	285453	6278006	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd					**Permits**		
45-5-4652	Yarramundi 9	GDA	56	285905	6278320	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd					**Permits**		
45-5-4653	Yarramundi 10	GDA	56	286053	6278981	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd					**Permits**		
45-5-5239	Markwell Place AFT 1	GDA	56	288331	6278754	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Ms.Cristany Milicich					**Permits**		
45-5-0368	Yarramundi;Yarramundi 2;	AGD	56	287776	6277568	Open site	Valid	Artefact : -	Open Camp Site	1018
	Contact	**Recorders**	Jim Kohen					**Permits**	418	
45-5-0341	Grose Wold Grose Wold 1	AGD	56	282700	6279400	Open site	Valid	Artefact : -, Stone Arrangement : -	Open Camp Site,Stone Arrangement	260,658,1018
	Contact	**Recorders**	Rex Silcox					**Permits**		
45-5-0432	Agnes Banks 3 Brooks Lane	AGD	56	287180	6276940	Open site	Valid	Artefact : -	Open Camp Site	407,528,1018
	Contact	**Recorders**	Jim Kohen					**Permits**		
45-5-0433	Agnes Banks 5	AGD	56	286710	6276750	Open site	Valid	Artefact : -	Open Camp Site	407,528,1018
	Contact	**Recorders**	Jim Kohen					**Permits**		
45-5-0443	Yarramundi 2 Richmond	AGD	56	285110	6277590	Open site	Valid	Artefact : -	Open Camp Site	1018
	Contact	**Recorders**	G Happ					**Permits**		

Report generated by AHIMS Web Service on 18/12/2019 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 282764 - 290740, Northings : 6276538 - 6285104 with a Buffer of 0 meters. Additional Info : ACHA and AR. Number of Aboriginal sites and Aboriginal objects found is 40

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-0444	Yarramundi 1 Richmond	AGD	56	285780	6277770	Open site	Valid	Artefact : -	Open Camp Site	1018
	Contact	**Recorders**	G Happ					**Permits**		
45-5-0283	Agnes Banks;Yarramundi;	AGD	56	286576	6278094	Open site	Valid	Artefact : -	Open Camp Site	260,1018
	Contact	**Recorders**	Jim Kohen					**Permits**		
45-5-0652	HB14	AGD	56	290260	6277750	Open site	Valid	Artefact : -	Open Camp Site	1380
	Contact	**Recorders**	Laura-Jane Smith					**Permits**		
45-5-0227	Grose Wold Agnes Banks Two Flakes Cave	AGD	56	284938	6277696	Closed site	Valid	Artefact : 2, Art (Pigment or Engraved) : -	Rock Engraving,Shelter with Deposit	
	Contact	**Recorders**	Mr.R Taplin					**Permits**	28	
45-5-0228	Grose Wold	AGD	56	283934	6277585	Open site	Valid	Grinding Groove : 2	Axe Grinding Groove	
	Contact	**Recorders**	Mr.R Taplin					**Permits**		
45-5-0229	Grose Wold Agnes Banks	AGD	56	285214	6277610	Open site	Valid	Grinding Groove : 9	Axe Grinding Groove	
	Contact	**Recorders**	Mr.R Taplin					**Permits**		
45-5-0236	Kurrajong North Richmond	AGD	56	283080	6283880	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	639,681
	Contact	**Recorders**	B Ross					**Permits**		
45-5-0510	NR 6 Axe Grinding Grooves North Richmond/ Grose Wold	AGD	56	285590	6282300	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	1018
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists (MDCA)					**Permits**		
45-5-0511	NR 7 Axe Grinding Grooves North Richmond/ Grose Wold	AGD	56	285000	6282340	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	1018
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists (MDCA)					**Permits**		
45-5-0512	NR 5 Open Camp Site North Richmond/ Grose Wold	GDA	56	285954	6282389	Open site	Partially Destroyed	Artefact : -	Open Camp Site	1018
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists (MDCA),Kelleher Nightingale Consulting Pty					**Permits**	4024	
45-5-0513	NR 1 Axe Grinding Grooves North Richmond/ Grose Wold	AGD	56	286600	6282360	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	1018
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists (MDCA)					**Permits**		
45-5-0514	NR 2 Axe Grinding Grooves North Richmond/ Grose Wold	AGD	56	286600	6283370	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	1018
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists (MDCA)					**Permits**		
45-5-0515	NR 3 Axe Grinding Grooves	AGD	56	286560	6282410	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	1018
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists (MDCA)					**Permits**		
45-5-0516	NR 4 Open Camp Site North Richmond/ Grose Wold	GDA	56	286705	6282380	Open site	Partially Destroyed	Artefact : -	Open Camp Site	1018

Report generated by AHIMS Web Service on 18/12/2019 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 282764 - 290740, Northings : 6276538 - 6285104 with a Buffer of 0 meters. Additional Info : ACHA and AR. Number of Aboriginal sites and Aboriginal objects found is 40

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 31057 MEL

Client Service ID : 473733

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists (MDCA),Kelleher Nightingale Consulting Pty					**Permits**	4024	
45-5-0525	Yarramundi YM/1 Kurrajong	AGD	56	286560	6278240	Open site	Valid	Artefact : -	Open Camp Site	1018
	Contact	**Recorders**	Jim Kohen					**Permits**		
45-5-0226	Grose Wold Agnes Banks Abrasions Cave	AGD	56	284938	6277696	Closed site	Valid	Artefact : -, Art (Pigment or Engraved) : -	Shelter with Art,Shelter with Deposit	
	Contact	**Recorders**	Mr.R Taplin					**Permits**		
45-5-0259	North Richmond	AGD	56	287811	6280496	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	260,1018
	Contact	**Recorders**	Charles.D Power					**Permits**		
45-5-4191	NR11	GDA	56	286546	6281745	Open site	Destroyed	Artefact : 1		
	Contact	**Recorders**	Kayandel Archaeological Services					**Permits**	3542	
45-5-4182	NR 8	GDA	56	286265	6282318	Open site	Destroyed	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Kelleher Nightingale Consulting Pty Ltd,Mi					**Permits**	4024	
45-5-4183	NR 9	GDA	56	286477	6281736	Open site	Destroyed	Artefact : 2		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Kelleher Nightingale Consulting Pty Ltd,Mi					**Permits**	4024	
45-5-5077	NR-IA1-18	GDA	56	286926	6282304	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Geordie Oakes,AECOM Australia Pty Ltd - Sydney					**Permits**		
45-5-2478	Beaumont Ave (BA-OS-1)	AGD	56	288750	6281670	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Mr.Phil Hunt					**Permits**		
45-5-3117	Yarramundi 6	AGD	56	285000	6277250	Open site	Valid	Artefact : 1, Grinding Groove : 4		
	Contact T Russell	**Recorders**	Colin Gale					**Permits**		
45-5-0367	Agnes Banks Agnes Banks 1	AGD	56	287967	6277114	Open site	Valid	Artefact : -	Open Camp Site	1018
	Contact	**Recorders**	Jim Kohen					**Permits**	418	

Report generated by AHIMS Web Service on 18/12/2019 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 282764 - 290740, Northings : 6276538 - 6285104 with a Buffer of 0 meters. Additional Info : ACHA and AR. Number of Aboriginal sites and Aboriginal objects found is 40