Aboriginal Due Diligence Assessment: Hepher Road, Campbelltown

DRAFT REPORT

Prepared for Geolyse Pty Ltd on behalf of Campbelltown City Council

17 January 2019

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- Geolyse Pty Ltd: David Walker

Biosis staff involved in this project were:

- Amanda Atkinson (project management and quality assurance)
- Ashleigh Keevers-Eastman (archaeological survey)

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Glossary

AHIMS	Aboriginal Heritage Information Management System
ACHA	Aboriginal cultural heritage assessment
ADDA	Aboriginal due diligence assessment
Due diligence code	*Due diligence code of practice for the protection of Aboriginal objects in New South Wales*
EP&A Act	*Environmental Planning and Assessment Act 1979*
GSV	Ground Surface Visibility
ICOMOS	International Council on Monuments and Sites
LEP	Local Environment Plan
LGA	Local Government Area
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PAD	Potential Archaeological Deposit
Study area	southern portion of Lot 104, DP 1056782
The code	The *Code of practice for archaeological investigation of Aboriginal objects in NSW*

Summary

Biosis Pty Ltd (Biosis) has been commissioned by Geolyse Pty Ltd (Geolyse), on behalf of Campbelltown City Council (Council) to undertake an Aboriginal Due Diligence Assessment (ADDA) for the proposed community recycling facility (waste management facility) at Hepher Road, Campbelltown NSW (the project).

The proposed development is a designated development due to its proximity to natural waterbodies and consequently an Environmental Impact Statement (EIS) will be required to support the project. Geolyse and Council therefore require the preparation of an ADDA to support the Secretary's Environmental Assessment Requirements (SEARs) application.

An assessment in accordance with the *Due diligence code of practice for the protection of Aboriginal objects in NSW* (DECCW 2010a) (due diligence code) has been undertaken for the study area in order to inform responsibilities with regards to Aboriginal cultural heritage in the area. In addition to the basic tasks required for a due diligence assessment, an extended background review, as well as an archaeological survey in accordance with the *Code of practice for archaeological investigation of Aboriginal objects in NSW* (DECCW 2010b) (the code) was conducted, in order adequately map areas of archaeological sensitivity.

No previously recorded Aboriginal Heritage Management System (AHIMS) sites have been recorded in or within 1 kilometre of the study area. Background research conducted for this assessment found that artefact sites are the most commonly recorded site types in the Campbelltown region, and are most commonly identified within undisturbed crest, gentle slope or raised terrace landforms in close proximity to water sources. Biriwiri Creek and an unnamed tributary transect the study area, while a natural crest landform is present in the western portion of the study area indicating that Aboriginal people likely utilised the study area in the past. Historical aerial imagery obtained for the study area as part of the background research for this assessment indicated that the study area has undergone large amounts of previous ground disturbance and land modification.

An archaeological survey of the study area was conducted on 14 January 2019 by Biosis archaeologists Taryn Gooley and Ashleigh Keevers-Eastman. The purpose of the survey was to identify any previously unrecorded Aboriginal sites, objects or areas of archaeological potential; and to assess the level of previous ground disturbance within the study area. The survey consisted of a random meander transect which targeted all landforms present in the study area and areas of increased ground surface visibility (GSV) and exposure. No Aboriginal sites, objects or areas of archaeological potential were identified. The entire study area was found to have been heavily disturbed by the construction of a large causeway at the northern and south eastern edges of the study area, the modification of the creeklines which transect the study area, the construction of embankments along the northern, eastern and southern boundaries, bulk earthworks and vegetation clearance in the western portion of the site, and increased inundation events in the centre of the study area as a result of the modification of the creeklines and the installation of the embankments.

Based on the results of the desktop assessment and archaeological survey the study area has been assessed as having low Aboriginal archaeological potential. The proposed works are there unlikely to impact on any Aboriginal archaeological values.

The following management recommendations have been developed 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 (2013)
  - the code.

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

Recommendation 1: No further archaeological assessment is required

No further archaeological work is required in the study area due to the entire study area assessed as having low archaeological potential.

Recommendation 2: Discovery of Unanticipated Aboriginal Objects or Aboriginal Ancestral Remains

All Aboriginal objects and Places are protected under the *National Parks and Wildlife Act 1974* (NPW Act). It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the Office of Environment and Heritage (OEH). 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 the OEH and Aboriginal stakeholders.

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and OEH's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by OEH.

1 Introduction

1.1 Project background

Biosis has been commissioned by Geolyse, on behalf of Council to undertake an Aboriginal Due Diligence Assessment (ADDA) for the proposed community recycling facility (waste management facility) at Hepher Road, Campbelltown NSW (the project).

The proposed development is a designated development due to its proximity to natural waterbodies and consequently an EIS will be required to support the project. Geolyse and Council therefore require the preparation of an ADDA to support the SEARs application.

An assessment in accordance with the due diligence code has been undertaken for the study area in order to inform responsibilities with regards to Aboriginal cultural heritage in the area. In addition to the basic tasks required for a due diligence assessment, an extended background review, as well as an archaeological survey in accordance with the code was conducted, in order adequately map areas of high, moderate and low archaeological sensitivity.

1.2 Location of the study area

The study area is located within the Campbelltown Local Government Area (LGA), Parish of St Peter, County of Cumberland (refer to Figure 1). The study area incorporates the southern portion of Lot 104, DP 1056782 and is bounded by Hepher Road to the north and east, Johnson Road to the south and Lots 1, 37 and 38 of DP 1113810 and Lot 2 of DP 1190825 to the west (refer to Figure 2).

1.3 Planning approvals

The proposed development will be assessed against Part 5 of the *Environmental Planning and Assessment Act 1979* NSW (EP&A Act). Other relevant legislation and planning instruments that will inform the assessment include:

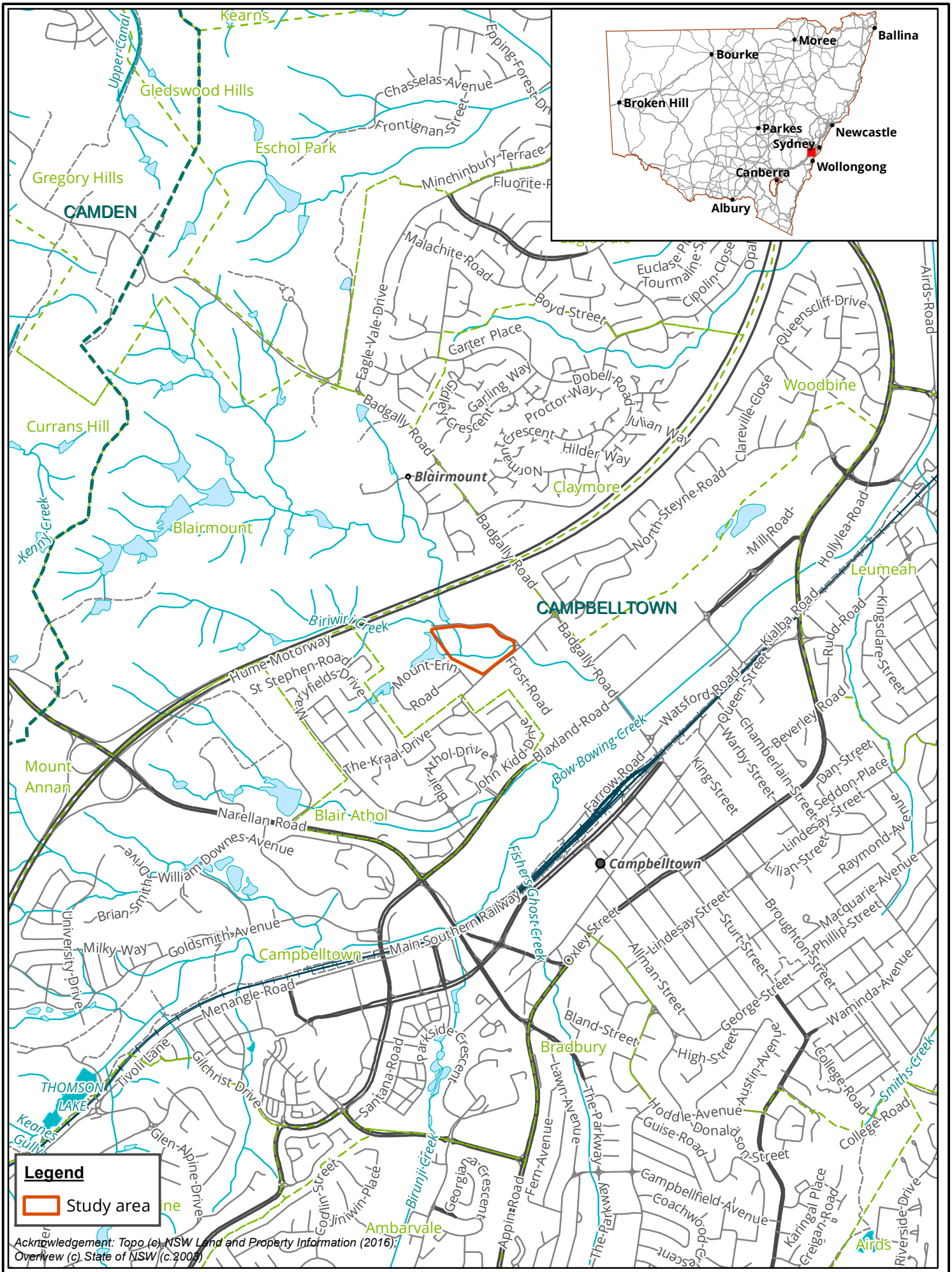
- NPW Act
- *National Parks and Wildlife Amendment Act 2010* (NSW)
- *Campbelltown Local Environmental Plan 2015* (LEP)
- *Campbelltown Development Control Plan 2015* (DCP)

1.4 Scope of the assessment

The following is a summary of the major objectives of the assessment:

- Conduct background research in order to recognise any identifiable trends in site distribution and location, including a search of the Aboriginal Heritage Information Management System (AHIMS).
- Undertake archaeological survey as per requirement 5 of the code, with particular focus on landforms with high potential for heritage places within the study area, as identified through background research.

- Record and assess sites identified during the survey in compliance with the guidelines endorsed by the OEH.
- Determine levels of archaeological and cultural significance of the study area.
- Make recommendations to mitigate and manage any cultural heritage values identified within the study area.



Acknowledgement: Topo (c) NSW Land and Property Information (2016); Overview (c) State of NSW (c.2008)

Figure 1: Location of the study area

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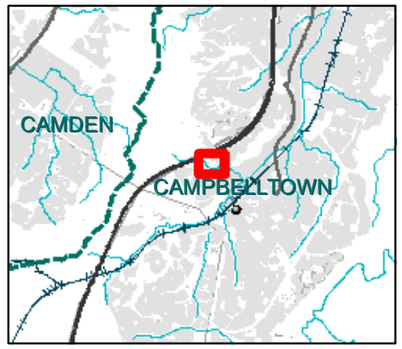

Legend

Study area

Figure 2: Study area detail

0 20 40 60 80 100

Metres

Scale: 1:2,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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2 Desktop assessment

A desktop assessment has been undertaken to review existing archaeological studies for the study area and surrounding region. This information has been synthesised to develop some Aboriginal site predictive statements for the study area and 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.

2.1 Landscape context

The study area is located in a peri urban environment in south-western Sydney on the outskirts of Campbelltown, surrounded by residential housing, light industrial estates and farmland. The study area lies within the Cumberland Plain landscape form (Mitchell 2002), which is a broad and shallow basin that stretches westwards from Parramatta to the Hawkesbury-Nepean River and southwards from Windsor to Thirlmere.

2.2 Geology, soils and landforms

The study area is largely situated on Quaternary Alluvium, with a small portion of the south-western portion contained within the Ashfield Shale formation, which itself is part of the Wianamatta Group geological formation. Quaternary Alluvium occurs along major watercourses and consists of quartz and lithic fluvial sand, silt and clay. The Ashfield Shale formation consists of laminate and dark grey siltsone (Bannerman & Hazelton 1990a, p.27). Aboriginal artefact scatter sites are common across this formation, as are Potential Archaeological Deposits (PADs). The lack of underlying sandstone geology in this area makes other varieties of sites such as rock shelters and engraving sites less common (Figure 3).

Topographically, the study area is located within an open depression running roughly south-east to north-west, along with lower slopes leading to crests surrounding the study area on its north-western, north-eastern and south-western sides. The north-eastern, and south-western crests present within the study area are man made embankments. Biriwiri Creek and an unnamed tributary run through the southern portion of the study area through the depression (Figure 4).

Stream order is recognised as a factor which helps the development of predictive modelling in Aboriginal archaeology in the Cumberland Plain. Predictive models which have been developed for the region have a tendency to favour permanent water courses as the locations of complex sites that have been continuously occupied, as they 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 (Jo McDonald Cultural Heritage Management 2000a, p.19)

The stream order system used for this assessment was originally developed by Strahler (1964). It functions by adding two streams of equal order at their confluence to form a higher order stream, as shown in Plate 1. As stream order increases, so does the likelihood that the stream would be a perennial source of water.

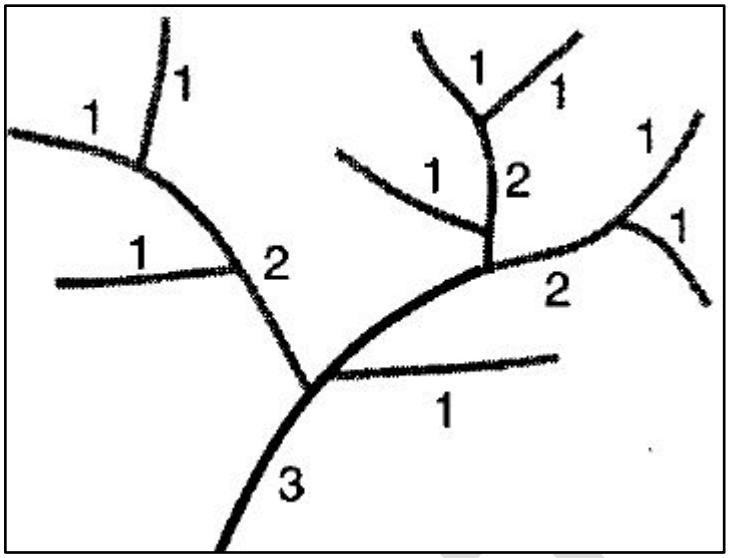


Plate 1 Diagram showing Strahler stream order (Ritter et al 1995, p. 151)

As is noted above, Biriwiri Creek is located within the study area; this non-perennial watercourse exists as a fourth order stream in the eastern part of the study area, and transitions to a third order stream at the confluence of an unnamed fourth order stream which runs roughly north-south. These hydrological features would have most likely been associated with temporary land use due to their non-perennial nature; sites are more likely to be identified within well-drained topographies such as crests and footslopes within close proximity to a water source. Historical aerial imagery of the study area shows that the two water sources present within the study area were subject to high levels of ground disturbance in the form of bulk earth works and levelling between 1963 and 1979 (Figure 5, Figure 6).

Two man-made waterbodies are located north and west of the study area, which are likely to have utilised the natural flow of Biriwiri Creek and the unnamed tributary running through the study area. Biriwiri Creek feeds into Bow Bowing Creek, a fifth order non-perennial stream, 694 metres south-east of the study area. The Georges River is located approximately 4.4 kilometres to the south-east, while the Nepean River is approximately 6.4 kilometres south-west of the study area (Figure 4).

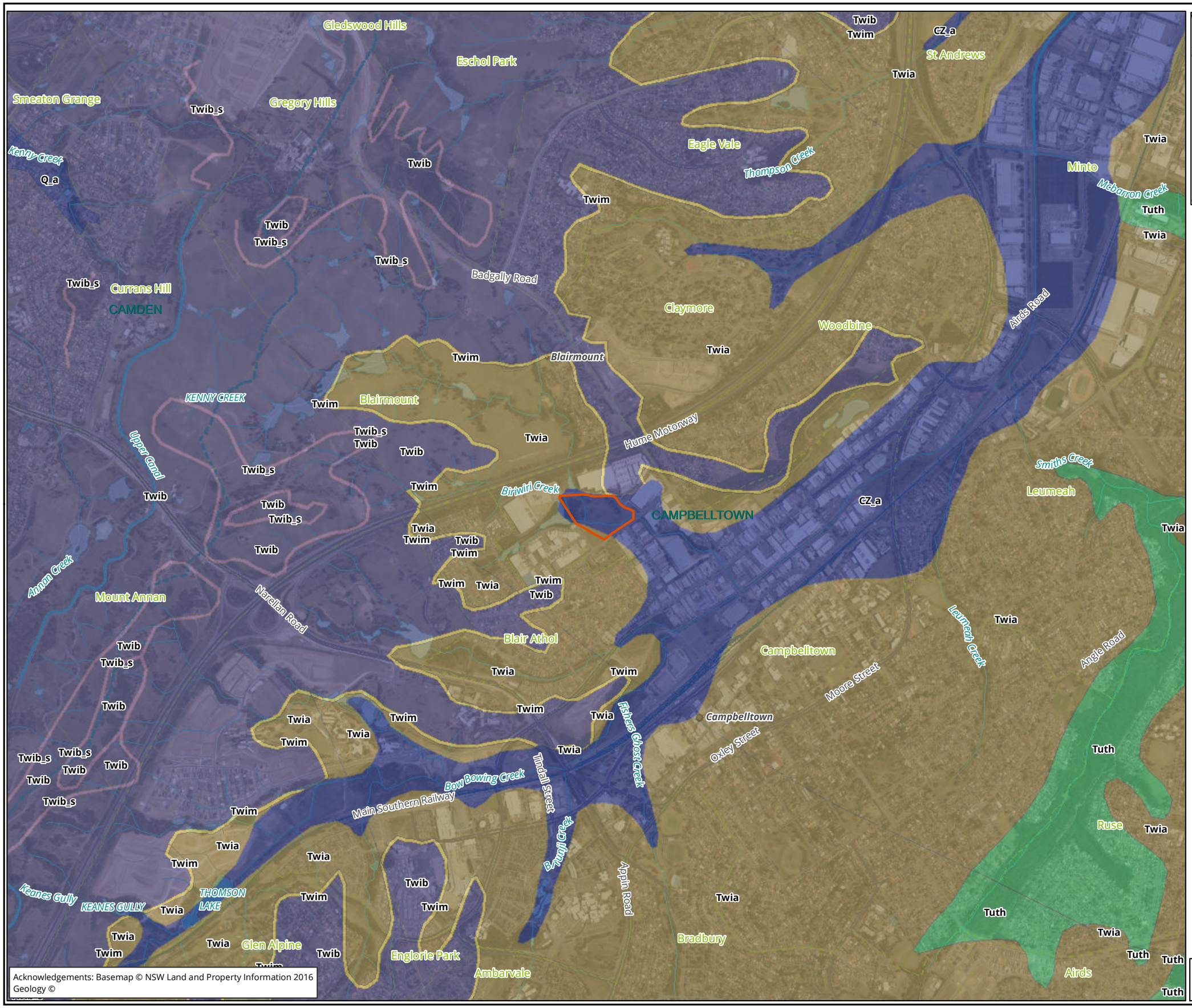
Soil landscapes have distinct morphological and topological characteristics that result in specific archaeological potential. They are defined by a combination of soils, topography, vegetation and weathering conditions. Soil landscapes are essentially terrain units that provide a useful way to summarise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

The study area is entirely located within the Blacktown Soil Landscape (Figure 7). It is a residual soil landscape characterised by its low reliefs and gentle slope, and is generally associated with a landform pattern of gently undulating rises. The local relief is around 10-30 metres, with slopes of 5%, but occasionally up to 10%. Crests and ridges are usually broad ranging from 200-600 metres, with rounded convex upper slopes transitioning into concave lower slopes, broad drainage depressions and valley flats, while rock outcrops are absent. Dominant soils consist of shallow to moderately deep (<150 centimetres) red and brown podzols on crests and in well drained topographies, and deep (150-300 centimetres) yellow podzolic soils and soloths on lower slopes and drainage lines (Bannerman & Hazelton 1990a, p.27). Due to their age and slow accumulation, residual soil landscapes have reasonable potential to contain archaeological deposits in an open context, such as stone artefacts derived from occupation sites. Other occupational evidence might include scarred trees where remnant vegetation occurs. However, the slow accumulation and high impact of extensive land clearing (usually associated with pastoral and civic development) often results in poor preservation of archaeological material. The soil characteristics of this landscape are described in Table 1.

Table 1 Blacktown soil landscape characteristics (Bannerman & Hazelton 1990a, pp.28–29)

Soil material	Description
bt1—Friable brownish black loam	This is a friable brownish black loam to clay loam with moderately pedal subangular blocky (2–20 mm) structure and rough-faced porous ped fabric. This material occurs as topsoil (A horizon). Colour is brownish black (10YR 2/2) but can range from dark reddish brown (5YR 3/2) to dark yellowish brown (10YR 3/4). Rounded iron indurated fine gravel-sized shale fragments and charcoal fragments are sometimes present. Roots are common.
bt2—Hardsetting brown clay loam	This is a brown clay loam to silty clay loam which is hardsetting on exposure or when completely dried out. It occurs as an A2 horizon. This material is water repellent when extremely dry. Colour is dark brown (7.5YR 4/3) but can range from dark reddish brown (2.5YR 3/3) to dark brown (10YR 3/3). Platy, iron indurated gravel-sized shale fragments are common. Charcoal fragments and roots are rarely present.
bt3—Strongly pedal, mottled brown light clay	This is a brown light to medium clay with strongly pedal polyhedral or sub-angular to blocky structure and smooth-faced dense ped fabric. This material usually occurs as subsoil (B horizon). Colour is brown (7.5YR 4/6) but may range from reddish brown (2.5YR 4/6) to brown (10YR 4/6). Frequent red, yellow or grey mottles occur often becoming more numerous with depth. Fine to coarse gravel-sized shale fragments are common and often occur in stratified bands. Both roots and charcoal fragments are rare.
bt4—Light grey plastic mottled clay	This is a plastic light grey silty clay to heavy clay with moderately pedal polyhedral to subangular blocky structure and smoothfaced dense ped fabric. This material usually occurs as deep subsoil above shale bedrock (B3 or C horizon). Colour is usually light grey (10YR 7/1) or, less commonly, greyish yellow (2.5YR 6/2). Red, yellow or grey mottles are common. Strongly weathered ironstone concretions and rock fragments are common. Gravel-sized shale fragments and roots are occasionally present. Charcoal fragments are rare.

Crests will contain up to 30 centimetres of friable greyish brown loam (bt1) overlying 10-20 centimetres of hardsetting brown clay loam (bt2), and up to 100 centimetres of strongly pedal brown mottled light clay (bt3), while friable greyish loam (bt1) can be absent. Soil horizons are generally clear, and total soil depth is <150 centimetres. Upper slopes and midslopes feature up to 30 centimetres of bt1 overlying 10-20 centimetres of bt2 and 20-50 centimetres of bt3, under which lies up to 100 centimetres of light grey plastic mottled clay (bt4), with a total soil depth greater than 200 centimetres. As with crests, bt1 may be absent and soil boundaries are usually clear. Lower sideslopes consist of up to 30 centimetres of bt1 overlying 10-30 centimetres of bt2, followed by 40-100 centimetres of bt3, and usually greater than 100 centimetres of bt4 underlying bt3. Total soil depth is greater than 200 centimetres and boundaries between soil materials are clear. Drainage depressions and other areas of poor drainage will contain up to 20 centimetres of a hardsetting loam topsoil (bt1) usually overlying mottled brownish yellow clay subsoil (bt3); these soils can occasionally become waterlogged and are usually saline, at depths of up to 2 metres (Bannerman & Hazelton 1990a, p.29).



Legend

- Study areas

Geological units

- Alluvium
- Ashfield Shale
- Bringelly Shale
- Bringelly Shale - sandstone
- Hawkesbury Sandstone
- Minchinbury Sandstone

Figure 3: 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 55

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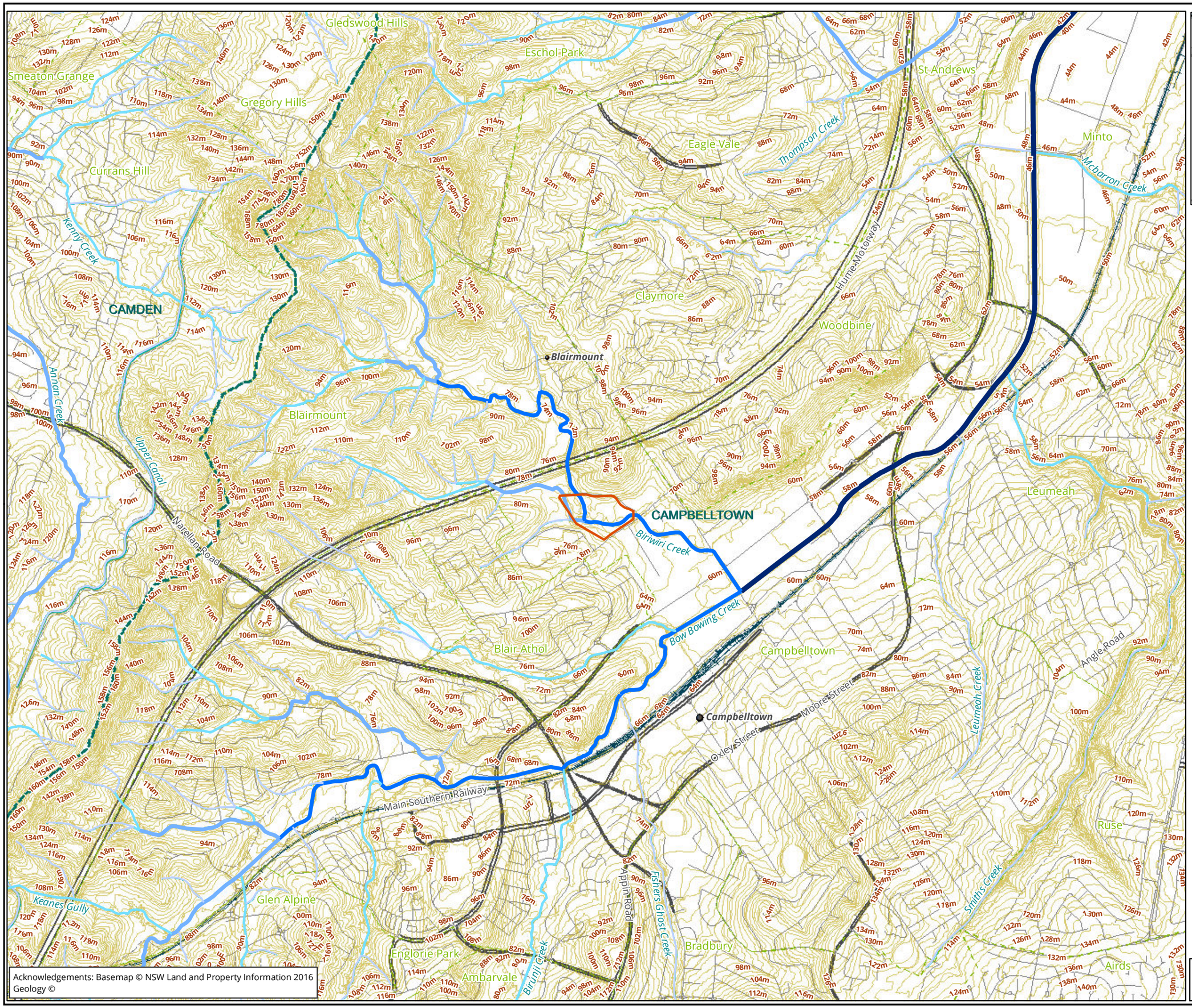

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Figure 4: Topography and hydrology

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Study area

Figure 5: Historical aerial imagery 1963

0 225 450 675 900 1,125

Metres

Scale: 1:20,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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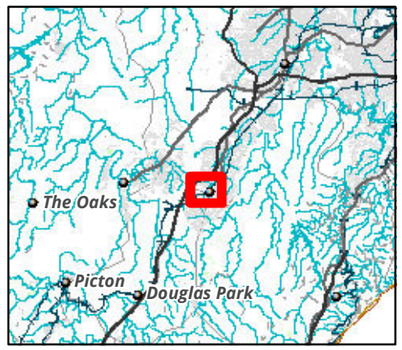

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Study area

Figure 6: Historical aerial imagery 1979

0 140 280 420 560 700

Metres

Scale: 1:12,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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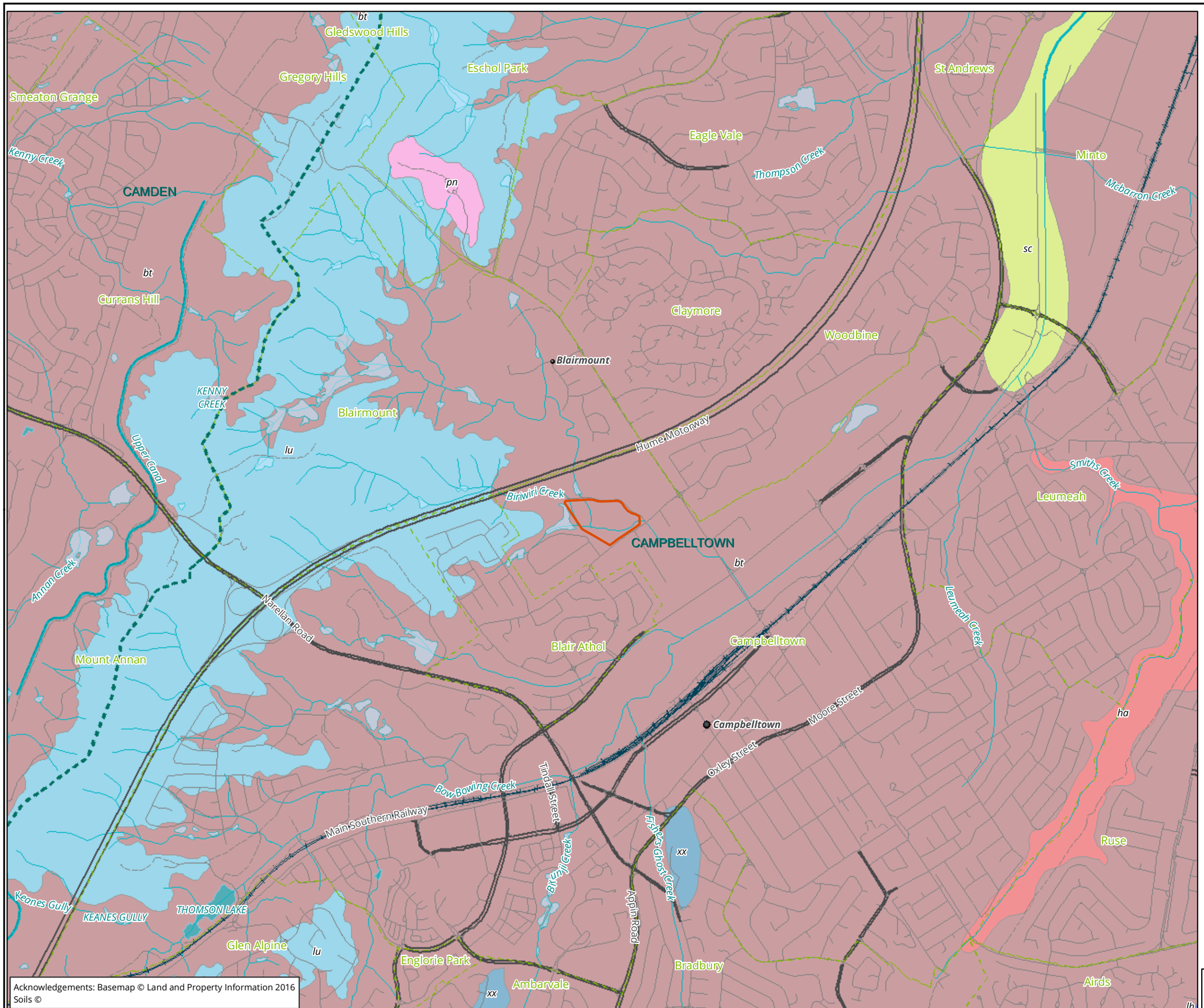

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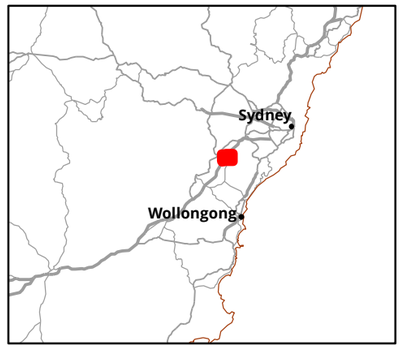
Soils ©



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Study area

Soil landscape units

- BLACKTOWN
- DISTURBED TERRAIN
- HAWKESBURY
- LUCAS HEIGHTS
- LUDDENHAM
- PICTON
- SOUTH CREEK

Figure 7: Soil landscapes near the study area

0 200 400 600 800 1,000

Metres

Scale: 1:20,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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2.3 Landscape resources

Within the Cumberland subregion of the Sydney Basin Bioregion there is a variety of vegetation types present. Grey Box, Forest Red Gum, Narrow-leaved Ironbark, and Spotted Gum are present on shale hills. Hard-leaved Scribbly Gum, Rough-barked Apple, and Old Man Banksia are identified on alluvial sands and gravels. Broad-leaved Apple, Cabbage Gum, Forest Red Gum, and Swamp Oak are present on river flats. Tall Spike-rush, and Juncus with Parramatta Red Gum is noted around lagoons and swamps (Dunn & Sahukar 2003, p.193).

The Blacktown soil landscape would have typically supported open-forest and open-woodland that has been extensively cleared since European contact. Originally the Blacktown soil landscape would have featured woodland and open-forest of Forest Red Gum, narrow-leaved Ironbark, Grey Box and Spotted Gum (Bannerman & Hazelton 1990b, p.29).

Native fauna that would have inhabited the area in the vicinity of the study area may have included the Eastern Grey Kangaroo, Feathertail Glider, Australian Brushtail Possum, Eastern Bent-wing Bat and Koala. Bird species which may have been present include the Australian Magpie, Eastern Rosella, Galah and White-faced Herron, while reptiles could have included the Eastern Water-kink, Eastern Brown Snake, Water Dragon and Eastern Blue-tongue (Atlas of Living Australia n.d.).

Plant resources were used in a variety of ways. Fibres were twisted into string which was used for many purposes including the weaving of nets, baskets and fishing lines. String was also used for personal adornment. Bark from eucalypts was used in the provision of shelter; a large sheet of bark being propped against a stick to form a gunyah (Attenbrow 2002, p.105). Swamp Oak bark could be used for the making of canoes, and Smooth-barked Apple for the making of baskets and bowls.

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, p.107).

3 Aboriginal context

3.1 Ethnohistory and contact history

It is generally accepted that people have inhabited the Australian landmass for at least 50,000 years (Allen & O'Connell 2003). The date of 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 an archaeological deposit at Parramatta, which was dated to 30,735 ± 407 before present (BP) (Jo McDonald Cultural Heritage Management Pty Ltd 2005a, Jo McDonald Cultural Heritage Management Pty Ltd 2005b).

Archaeological evidence of Aboriginal occupation of the Cumberland Plains 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 subsurface archaeological investigations, rather than actual evidence of the Aboriginal people prior to this time. East of Campbelltown, a sandstone rock shelter site (known as Bull Cave) was excavated and yielded a basal date of 1820 ± 90 BP (Koettig 1985). In general, the majority of both open and rock shelter sites in the Sydney region date to within the last 3,000 to 5,000 years. Dibden (2003) attributes the increase in apparent occupation intensity to sea level stabilisation after the last ice age at around 5,000 years ago:

> *"Following the stabilisation of seal levels, the development of coastal estuaries, mangrove flats and sand barriers would have increased the resource diversity, predictability, and the potential productivity of coastal environments for Aborigines" (Dibden 2003, p.27).*

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 a 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.

Despite a proliferation of Aboriginal heritage sites there is considerable ongoing debate about the nature, territory and range of pre-contact Aboriginal language groups in the greater Sydney region. These debates have arisen largely because, by the time colonial diarists, missionaries and proto-anthropologists began making detailed records of Aboriginal people in the late 19th century; pre-European Aboriginal groups had been broken up and reconfigured by European settlement activity. The following information relating to Aboriginal people on the Cumberland Plains is based on such early records.

There is some confusion relating to group names, which can be explained by the use of differing terminologies in early historical references. Language groups were not the main political or social units in Aboriginal life. Instead, land custodianship and ownership centred on the smaller named groups that comprised the broader language grouping. There is some variation in the terminology used to categorise these smaller groups; the terms used by Attenbrow (2002) will be used here.

The project area is in the vicinity of three language groups, Dharawal, Gundungurra and the hinterland Darug. Attenbrow (2002, p.34) suggests:

- The Gundungurra covered "the southern rim of the Cumberland Plain west of the Georges River, as well as the southern Blue Mountains".

- The Dharawal covered "the south side of Botany Bay, extending as far as the Shoalhaven River; from the coast to the Georges River and Appin, possibly as far west as Camden".
- The hinterland Darug covered the area "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".

These areas are considered to be indicative only and would have changed through time.

It has been estimated that may have been 3,000-5,000 Aboriginal people living in the Sydney region at the time of the British First Fleet's arrival in 1788. The movement of Aboriginal hunter-gatherers began to be increasingly restricted from this time. European expansion along the Cumberland Plain was swift and soon there had been considerable loss of land to agriculture. This led to violence and conflict between Europeans and Aboriginal people as both groups sought to compete for the same resources. In the Camden region, it began following the murder of an Aboriginal woman and her children, resulting in violent clashes between several Aboriginal men and European settlers between 1814 and 1816. The violence had escalated in 1816 following the outlaw proclamation by Macquarie, and concluded with the massacre of 14 Aboriginal people at Appin. This event is known as the 'Appin Massacre' and is historically regarded as the destruction of the Aboriginal people of the Campbelltown and Camden region. At the same time diseases such as small pox were having a devastating effect on the Aboriginal population. Death, starvation and disease were some of the disrupting factors that led to a reorganisation of the social practices of Aboriginal communities after European contact. The formation of new social groups and alliances were made as Aboriginal people sought to retain some semblance of their previous lifestyle (Attenbrow 2002, pp.16, 158–159, Liston 1988, p.50,54).

3.2 Regional context

Jo McDonald Cultural Heritage Management (1996, 2000b) has developed a predictive model for Aboriginal site distribution on the Cumberland Plain that is applicable to the study area. This has been developed using the Aboriginal occupation models proposed for the Camden area by Haglund (1989) and data collected from other areas of the Cumberland Plain where trends in the distribution of archaeological sites have been apparent. The following predictive model for the Cumberland Plain has been taken from Jo McDonald Cultural Heritage Management (2000b).

- The size (density and complexity) of archaeological features will vary according to permanence of water, landscape unit and proximity to stone resources in the following way:
  - At the headwaters of upper tributaries (first order creeks) archaeological evidence will be sparse and will comprise little more than background scatters of stone artefacts.
  - At the middle reaches of minor tributaries (second order creeks) archaeological evidence will be sparse but indicate focussed activity.
  - At the lower reaches of tributary creeks (third order creeks) archaeological evidence will indicate more frequent occupation and evidence of repeated, more concentrated activities.
  - On major creek lines and rivers (fourth order creeks) archaeological evidence will indicate more permanent occupation, which is of greater complexity.
  - Creek junctions and swamps may provide foci for site activity.
  - Ridgetop locations between drainage lines will usually contain limited archaeological evidence.
- Where sandstone features occur (overhangs or platforms), these may have provided a focus for a number of activities including camping or art production or the sharpening of axes. Sandstone

platforms may also have been used for the production of art (engravings), although these are very rare on the margins of the Cumberland Plain.

Australian Museum Business Services (1997) undertook a large scale regional Aboriginal heritage study of part of the Cumberland Plain. The assessment focused on the representativeness of Aboriginal sites on the Cumberland Plain, assessing the effectiveness of the planning framework to achieve the aims of heritage management, and producing guidelines on the recognition of silcrete artefacts. The study examined all previously recorded archaeological sites and studies completed across the region, including field survey and subsurface investigation work. The Plumpton Ridge silcrete source work completed by McDonald in 1985 was used as a case study in determining accurate identification of silcrete artefacts from naturally spalled silcrete. The report concluded:

- Previous archaeological investigation on the Cumberland Plain has not contributed significantly to a developed understanding of Aboriginal occupation and settlement patterns of the region. This was attributed to the isolated, small scale nature of the archaeological investigations dispersed throughout the region, and the use of intuitive and simple pattern recognition models and research designs. Further, where large scale research projects and models have been developed, they have not been adequately tested by ensuing investigations (Australian Museum Business Services 1997, p.i).
- Excavation projects have been limited and techniques have been restrictive and not interpreted the spatial structure of open sites adequately, as the focus of analysis has been on technology of the assemblages, limiting the interpretive potential of many archaeological investigations.
- The correct identification of silcrete artefacts is problematic, and the analysis of material excavated by McDonald (1985) at the Plumpton Ridge silcrete source revealed that a number of the artefacts did not exhibit attributes of cultural modification, but were naturally fractured or broken from farm machinery.
- Regional planning approaches are inadequate for the assessment and conservation of Aboriginal heritage throughout the region. This was attributed to development pressures, minor reserve coverage and limited opportunities for establishing new protected areas.

More recent archaeological work (AECOM 2010) has indicated that while the most recognised Cumberland Plain predictive modelling is most relevant, it is not always typical. Archaeological material tends to occur anywhere on the Cumberland Plain and that while the size and frequency of sites can be linked with stream order, the complexity of sites cannot.

Archaeological and Heritage Management Solutions Pty Ltd (AHMS) (2015) was commissioned by the Department of Planning and Environment (DPE) to undertake an Aboriginal and historic heritage gap analysis of the Greater Macarthur Investigation Area (GMIA). The purpose of the gap analysis was to identify the cultural heritage values of the area and to recommend any further investigations required. The assessment consisted of a review of existing Aboriginal and historical heritage assessments for the region, determination of areas which have been subject to minimal or no previous assessment, and the identification of areas of known Aboriginal and historical heritage significance. The assessment found that the GMIA contained a number of areas which may contain evidence of Aboriginal and European contact archaeology, particularly near Menangle and Menangle Park. A total of 323 AHIMS sites have been recorded within the GMIA, with the vast majority being recorded in areas which have been subject to previous assessment as a result of development activities. The assessment found that artefact sites are found commonly throughout the Cumberland Plain region which makes up the vast majority of the GMIA. Artefact sites are found generally within 200 metres of the larger river systems within the region, however some artefact sites were recorded up to 500 metres from a larger river system. The eastern portions of the GMIA located within the Sydney Cataract region, contained higher instances of rockshelters and other closed sites. These are frequently found along creek-lines where the sandstone geology allows for the formation of such natural features. Predictive

modelling conducted as part of the assessment found that there is high potential for Aboriginal sites and objects to be identified in close proximity to the Nepean, Cataract and Georges Rivers, and Allens, Elladale, Clemens, Cascade, and Wallandoola, creeks. The Georges River, Allens Creek, Elladale Creek and headwaters of the Cataract River (including Wallandoola creek) were assessed as having the highest potential for scientifically significant deposits due to lower levels of development in these areas along with these areas having higher elevations suggesting they have not been heavily disturbed by inundation events.

3.3 Local context

A number of Aboriginal cultural heritage investigations have been conducted within an approximately 10 kilometre buffer of the study area. These investigations are briefly summarised below. Most of these investigations were development driven and include surface and sub-surface investigations.

Crew Archaeological Consultant (1998) conducted an archaeological survey of a proposed subdivision of Lot 204 at Mount Annan located to the west of the current study area. The proposed development was situated around a small gully that was associated with Narellan Creek. This survey focused on a number of exposures that were located within the study area however no new aboriginal or heritage sites were relocated during this survey.

New South Wales Archaeology (2003) undertook a cultural heritage assessment for Sydney Gas Operations Pty Ltd (Sydney Gas) at Glenlee, Menangle Park and Menangle (south-west of the study area) as part of Camden Gas Project. The predictive model developed for the site was based on earlier local and regional archaeological assessments, and proposed that areas of low to moderate archaeological potential, particularly open stone artefact scatter sites including isolated finds but also low to moderate/high density sites and potential archaeological deposits (PAD) on low graded, elevated land in close proximity to water, were likely to be located across the site, and impacted by development works. The possibility of locating extant scar trees was also noted, with the caveat that much of the land had been previously cleared. The survey covered areas where which would have some element of ground surface impact, and identified 20 previously unrecorded Aboriginal sites, including surface artefact scatters featuring chert, silcrete, quartz, tuff, a possible scarred tree.

AECOM (2010) completed an archaeological survey as part of the Camden Gas Project Northern Expansion project in rural areas of Currans Hill, Varroville, Raby and Denham Court in the Camden and Campbelltown LGAs. The general predictive model used for the Cumberland Plain was utilised, in that the most likely Aboriginal archaeological sites to be encountered would be stone artefact scatters or isolated finds. The results of the survey generally reflected the predictive modelling, with the majority of the 28 newly identified sites (11 isolated artefact finds, 12 open campsites, 3 scarred trees) were located close to first and second order drainage lines, or on ridge and hill crests, but also in a disturbed context.

White and McDonald (2010) authored an article on lithic artefact distribution on the Cumberland Plain, centring on the north-west Rouse Hill development area. The sample of artefacts used for the study consisted of assemblages from JMCHM sites in the Camden region conducted between 1999 and 2008, with a total of 4,429 artefacts. The study took into account distance from water, landforms, geology, and distances from silcrete sources, the most common raw material for stone artefacts on the Cumberland Plain. 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. The study 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.

Australian Museum Business Services (2012) conducted an assessment of the Austral and Leppington North Precincts, north-west of the study area, prior to their development. An AHIMS search of the area identified 86

previously recorded sites, including 39 artefact scatters, 37 isolated finds, eight PADs, and two scarred trees. The predictive model stated that stone artefact sites were most likely to be identified during archaeological survey of the area. The survey recorded six newly identified sites, including five isolated artefacts, and one artefact scatter and PAD. The majority of the artefacts found were made of silcrete, although chert was also present. Four of the artefacts were present on creek flats, and two were located on slopes.

Biosis (2012) undertook an Aboriginal cultural heritage assessment and archaeological survey for a large area in the Campbelltown and Camden areas as part of the Camden Gas Project. The predictive model prepared for the archaeological survey was based on site distribution in relation to landscape descriptions, consideration of site type, raw material types and site densities likely to be present within the site, findings of ethnohistorical research on the potential for material traces to be present, potential use of natural resources available or previously available within the project area, and consideration of the temporal and spatial relationships of sites within the site and surrounding region. The model proposed there was high potential for flakes stone artefact scatters and isolate artefacts and PADs, but low potential for other Aboriginal site types, such as grinding grooves, scarred trees and Aboriginal places. The survey consisted of 69 transects, which resulted in the identification of 39 Aboriginal sites and two PADs, of which there were five newly identified sites. The majority of sites were open lithic scatters and isolated artefact finds, with several scarred trees also identified. Almost all of the sites were considered to be situated within a disturbed context.

Niche Environment and Heritage (Niche) (2013) conducted an ADDA for a proposed residential and business zone development at Maryfields Estate, Campbelltown, NSW located approximately 950 metres to the south west of the current study area. The study area was found to have been subject to high levels of previous disturbance, however one area of PAD (Maryfields PAD1) was recorded along an undisturbed creekline, while one isolated artefact consisting of a broken ground edged axe fragment (Maryfields AS1) was identified in association with the area of PAD. The area of PAD measures 50 by 100 metres on the northern side of a creek terrace. The northern side of the creek was considered less likely to have been impacted on by inundation events and contained areas of remnant native vegetation. The area of PAD is located within the Blacktown soil landscape, a residual soil landscape. Residual soil landscapes have reasonable potential to contain archaeological deposits in an open context, such as stone artefacts derived from occupation sites. The potion of the study area within the Luddenham soil landscape was found to be highly disturbed and assessed as having a low potential for intact soil deposits due to the high erosion potential of the soils present. Niche recommended that further works in the form of an ACHA and AHIP would be required if the proposed works could not avoid Maryfields AS1 and Maryfields PAD1.

Biosis (2017) was commissioned by Mott MacDonald on behalf of Crownland Leppington Pty Ltd to undertake an ADDA for a proposed subdivision and residential development at 1432 Camden Valley Way, Leppington NSW located approximately 10 kilometres to the north of the current study area. A review of previous assessments in the local area identified a high potential for subsurface deposits to be present in close proximity to higher order creeklines locally, and further identified flats and alluvial terraces as landforms with the potential to contain subsurface deposits of artefacts. An archaeological survey of the study area was completed however dense grass coverage limited the surveyors potential to identify surface artefacts which may have been present within the study area. Further desktop assessment including a review of historical aerial imagery identified that the entire study area had been subject to previous ground disturbances. The archaeological assessment therefore did not identify and Aboriginal sites or areas of archaeological potential.

Biosis (2018a) was commissioned by Nettcorp to undertake an archaeological investigation in advance of proposed geotechnical works for the Macarthur Memorial Park, Varroville, NSW located approximately 5 kilometres to the north of the current study area. A total of 28 AHIMS sites were recorded within the study area. Archaeological test excavations were therefore required prior to geotechnical testing being undertaken in order to determine if the proposed works would require an AHIP to proceed. A total of 10 Aboriginal artefacts were identified across 88 test pits which were excavated across all landforms present within the

study area. Previous archaeological test excavations conducted by Artefact Heritage (2018) in the study area found 184 stone artefacts across 155 test pits situated on level plains, wide crests, raised terraces, mid-slopes and spur crests. Spur crests, raised terrace and mid slope landforms produced the majority of artefacts identified at similar numbers (64, 53, and 54 respectively), with the majority of artefacts identified at a depth of 100-200 millimetres across the entire study area. Artefacts were not recovered from test areas located on upper slopes with steep gradients. The results of the Biosis (2018a) and Artefact Heritage (2018) test excavations indicate that the entire study area was utilized to some degree by Aboriginal people with activities concentrated on Spur crests, raised terraces and gently inclined slopes.

Biosis (2018b) was commissioned by Root Partnerships to undertake an Aboriginal cultural heritage assessment for the proposed Stage 2 of the Campbelltown Hospital Redevelopment, Campbelltown, NSW located approximately 3 Kilometres to the south east of the current study area. No Aboriginal sites registered on the AHIMS database were identifies in or within 1 kilometre of the study area. An archaeological survey was conducted with no Aboriginal sites or objects identified. The background research and field survey identified that the significant disturbances that have occurred within the study area over a long period of time have impacted upon the preservation and integrity of any cultural materials that may have been present. This is consistent with two previous Aboriginal heritage assessments undertaken of the study area by GML (2011) and Austral Archaeology (2012) who both concluded that there was low archaeological potential for Aboriginal sites to be located within an intact subsurface context and the likelihood of impacting any sites during works would be low.

Biosis (2018c) was commissioned by TSA Management to undertake an Aboriginal cultural heritage assessment, including a field investigation, for the proposed Leppington Public School development at Lot 9001 DP 1206596, Commissioners Drive, Denham Court, NSW located approximately 8 kilometres to the north west of the study area. Two previously recorded AHIMS sites were located within the study area while a further 102 AHIMS sites were identified within a 5 kilometre radius of the study area. A review of available background information and previous reports for the area found that isolated artefacts and artefact scatter sites were the most likely site time to be identified within the study area. Alluvial terraces within close proximity to permanent water sources were identified as having the highest likelihood of containing large Aboriginal archaeological site complexes, while ridge lines and slopes, and lower order creek lines were generally found to have been utilised by Aboriginal people only intermittently. A previous AHIP had been obtained for the study area and a site inspection conducted by Biosis confirmed that the AHIMS sites present had been destroyed by the development activities permitted by the AHIP.

Biosis (2018) was commissioned by Mott MacDonald to undertake an Aboriginal cultural heritage assessment for a proposed residential subdivision at 49 – 57 Kelly Street, Austral, located approximately 11 kilometres to the north of the current study area. The assessment determined that the western portion of the study area was considered to be of high archaeological potential due to its location on a broad gentle slope and close association to Kemps Creek. The remainder of the study area was determined to have been highly disturbed therefore possessed low potential for Aboriginal sites to be located within the study area. A total of 40 test pits were excavated, resulting in the identification of five stone artefacts, including one complete flake and five angular fragments.

3.3.1 Identified Aboriginal archaeological sites

An extensive search of the AHIMS database was conducted on 9 January 2019 (Client service ID: 391417). The search identified 113 Aboriginal archaeological sites within a 7.8 kilometre search area, centred on the proposed study area (Table 2 and Appendix 1). None of these registered sites are located *within* the study area (Figure 8). The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available. These descriptions and maps were relied where notable discrepancies occurred.

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.

Table 2 AHIMS sites within the study area

Site type	Occurrences	Frequency (%)
Artefact(s)	82	70
PAD	27	23
Modified tree (carved or scarred)	6	5
Shelter with art – art (pigment or engraved)	1	1
Art (pigment or engraved)	1	1
Total	117	100

A simple analysis of the Aboriginal cultural heritage sites registered within a 5 kilometre radius of the study area indicates that artefact sites (both artefact scatters and isolated artefacts area the dominant site type within the Campbelltown region representing 70% (n=82), followed by PAD sites at 23% (n=27). Modified trees (5% n=6), shelters with art (1%, n=1), and art sites (1%, n=1), have also been recorded in the Campbelltown area, however at much lower frequencies.

All the sites were located within close proximity to the reliable sources of water, were either exposed by the land clearing works (artefact scatters), in the areas with remnant native vegetation (scarred trees) or within areas of sandstone outcrops for overhang development (shelters with art/deposit).

Legend

- Study area
- AHIMS Record

Figure 8: AHIMS records near the Project Area

NOT TO BE MADE PUBLIC

0 330 660 990 1,320 1,650

Metres

Scale: 1:33,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

biosis

Biosis Pty Ltd

Ballarat, Brisbane, Canberra, Melbourne, Sydney,Wangaratta & Wollongong

Matter:
Date: 10 January 2019,
Checked by: amurray, Generated by: amurray
Location:\\bio-data-01\matters$\28900s\28930\Mapping\28930_F8_AHIMS.mxd

3.4 Predictive statements

A series of 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:

- Local and regional site distribution in relation to landform features identified 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.

Table 3 below outlines the site types most likely to be encountered during the survey across the present study area The definition of each site type is described firstly, followed by the predicted likelihood of this site type occurring within the study area.

Table 3 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.	Moderate: Stone artefact sites have been previously recorded in the region on level, well-drained topographies in close proximity to reliable sources of fresh water. Biriwiri Creek and an unnamed tributary transect the study area indicating that the study area was likely used by Aboriginal people in the past. However, the level of previous ground disturbance which has occurred within the study area indicates that any Aboriginal sites present within the study are likely to have been heavily disturbed or destroyed. The potential for artefacts to be present within the study area is therefore assessed as moderate.
Potential Archaeological Deposits (PADs)	Potential sub surface deposits of cultural material.	Low: 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. The level of previous ground disturbance and frequent inundation events which have occurred in the study area indicate that the likelihood PAD occurring in the study area is low.

Site type	Site description	Potential
Modified trees	Trees with cultural modifications	Low: Historical aerial imagery indicates that the entire study area, with the exception of a small cluster of trees in the western portion of the study area has been subject to vegetation clearance. There is therefore low potential for scarred trees to occur in the study area.
Grinding grooves	Grooves created in stone platforms through ground stone tool manufacture.	Low: Grinding groove sites are unlikely to occur in the study area due to the absence of suitable rock outcrops.
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.
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: Shelter sites are unlikely to occur in the study area due to the absence of suitable sandstone exposures or overhangs.
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.
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.

Site type	Site description	Potential
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.

4 Archaeological investigation

An archaeological investigation of the study area was undertaken on 14 January 2019. The survey sampling strategy, methodology and a discussion of results are provided below.

4.1 Archaeological survey aims

The principle aims 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 Aboriginal archaeological and cultural sensitivity.

4.2 Survey methods

The survey was conducted on foot and followed the random meander technique. 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 elements, distinguishable areas of land approximately 40m across or with a 20m radius (CSIRO 2009)
- Photographs of the site indicating landform
- Ground surface visibility (GSV) and areas of exposure
- Observable past or present disturbances to the landscape from human or animal activities
- Aboriginal artefacts, culturally modified trees or any other Aboriginal sites.

Where possible, the 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, 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 and the Map Grid of Australia (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 factor that contributed most to the effectiveness of the survey within the study area was low ground surface visibility (GSV).

4.4 Visibility

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 2010b). GSV across the study area was generally low (5%). The entire study area is heavily vegetated with thick grasses and weeds which limited the surveyors ability to see the ground surface (Plate 2). Large concentrations of blackberry thickets were also present along the drainage lines and in the western portion of the study area (Plate 3). Household rubbish located along the northern edge of the study area and in the western portion of the study area also impacted on the level of GSV. Areas of higher visibility (20%) were observed in the centre of the site along the modified creekline which transects the study area (Plate 4), and in areas of erosion in the western portion of the study area.

Plate 2 Study area facing west showing low levels of GSV

Plate 3 Study area facing south west showing blackberry thickets and dumped rubbish pile

Plate 4 GSV across the centre of the study area showing small area of moderate GSV

4.5 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 2010b). Overall, the study area displayed low levels of exposure (5%). These were concentrated in the centre of the study area along the modified creekline and in areas of erosion observed on the rise located in the western portion of the study area (Plate 5, Plate 6).

Plate 5 Area of exposure in western portion of the study area

Plate 6 Area of exposure in centre of the study area

4.6 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 cover large sections of the land surface. The agents include residential development such as landscaping and construction of residential buildings; farming practices, such as initial vegetation clearance for creation of paddocks, fencing and stock grazing; agricultural practices

such as fruit orchards; light industrial practices such as nursery and creation of artificial dams throughout the entire study area.

The archaeological survey found that the entire study area has been subject to high levels of previous ground disturbance (Figure 9). Historical aerial imagery indicates that levelling and bulk earthwork activities occurred in the western and southern portions of the study area between 1963 and 1979 (Figure 5, Figure 6). The field investigation also observed that the creek lines present within the study area had been heavily modified by the installation of large causeways at the north western, and south eastern edges of the study area, and a cement drainage channel which transects the study area (Plate 7, Plate 8). The southern, eastern, and northern portions of the study area have been heavily disturbed by the installation of large artificial slopes or embankments which form an artificial basin type depression in the centre of the study area (Plate 8, Plate 9). The depression at the centre of the study area is likely impacted on by frequent inundation events as a result of the modification of the drainage channels and installation of artificial embankments. The western portion of the study area consisted of a crest landform, this area contained moderately dense regrowth vegetation and a large portion of the landform is currently utilised by squatters (Plate 2, Plate 3). A large amount of household rubbish was also observed in this area. The crest landform displayed evidence of sheet erosion. The observations made in the field supported the evidence from the background research that this area had been stripped of vegetation and top soils historically. The level of disturbance observed during the survey and found during the background research indicates that any Aboriginal sites which may have existed in the study area have been destroyed.

Plate 7 Modified drainage line facing south east

Plate 8 **Causeway and modifiifed drainge line facing north**

Plate 9 **Study area facing south east, note manmade embankemtn in foreground and background creating an artifical basin in the centre of the study area**

Plate 10 **Study area facing south east, note manmade embankment in foreground and background creating an artifical basin in the centre of the study area**

Legend

Study area

Type

- Heavily disturbed from historical earth works
- Heavily disturbed from land modification works and frequent inundation
- Heavily disturbed - man made embankments, drainage channels and causeways

Figure 9: Areas of disturbance

0 20 40 60 80 100

Metres

Scale: 1:2,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

N

Biosis Pty Ltd

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

Matter: 28930,
Date: 16 January 2019,
Checked by: CA, Drawn by: DK, Last edited by: amurray
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4.7 Investigation results

The archaeological investigation was conducted on 14 January 2019 by Biosis archaeologists Taryn Gooley and Ashleigh Keevers-Eastman. The survey sampled all landforms present within the study area and targeted areas of higher GVS and exposure. No Aboriginal sites, objects or areas of archaeological potential were identified during the archaeological survey. As noted above, the study area was found to have been subject to high levels of previous ground disturbance as a result of the installation of manmade embankments along the northern, eastern and southern boundaries of the site, along with historical tree clearing activities and bulk earth works in the western portion of the study area. The creation of an artificial basin like depression in the centre of the study area along with the modification of the creek lines within the study area has also resulted in high levels of ground disturbances. The disturbances noted throughout the study area have likely resulted in the destruction of any Aboriginal sites or objects that may once have been present in the study area.

5 Discussion and recommendations

5.1 Discussion and conclusions

The background research conducted as part of this assessment has identified that artefact sites (both open sites and isolated finds) are the most commonly recorded site type both within the wider Cumberland Plain region and the local Campbelltown area. Aboriginal sites are frequently located within close proximity to a water source both perennial and non perennial, however larger artefact sites are commonly located within close proximity to higher order creek lines (third order and above) (AECOM 2010, Jo McDonald Cultural Heritage Management 2000a, AMBS 1997, Jo McDonald Cultural Heritage Management Pty Ltd 1996). Artefact sites located within close proximity to lower order water ways (first and second order creek lines) generally consist of isolated artefacts or low density scatters indicative of intermittent or transitory land use by Aboriginal people. Modified trees can occur throughout the Cumberland plain region however due to wide spread tree clearing activities, they are restricted to areas of remnant native vegetation. Previous archaeological assessments in the local area indicate that Aboriginal occupation was concentrated on upper or raised creek terraces, spur crests, and gently inclined slopes in close proximity to water (Biosis 2018a, Artefact Heritage 2018, Niche 2013).

The study area consists of a crest landform, and mid and lower slope in the western portion of the study area, a man made basin like depression in the centre of the study area, and a man made embankment which runs along the northern, eastern and southern boundary of the study area. Biriwiri Creek (fourth order) and an unnamed tributary (third order) transect the study area. However based on a review of historical aerial imagery and observations made in the field, both creeklines have been heavily modified by historical land clearing, bulk earth works, and the installation of cause ways and dams from 1963 to the present day. These activities have modified the course of the creeklines, and have likely stripped away soil deposits within the study area. The installation of embankments along the northern, eastern and southern boundaries of the site have resulted in heavy disturbance to the study area both from the initial construction of the features and the increased flooding events which have occurred in the study area as a result of their installation.

The vegetation clearing activities, levelling and dam construction activities which have occurred in the western portion of the study area have resulted in heavy impacts to the crest and associated slope landforms present in the study area. Any Aboriginal sites, object or deposits which may have once existed in this landform have likely been destroyed as a result.

While the study area is located within the Blacktown Soil Landscape, a residual soil landscape known to contain the potential to preserve Aboriginal archaeological deposits, the high levels of previous disturbance within the study area have destroyed the natural soil profiles within the study area.

Based on the results of the desktop assessment and archaeological survey the study area has been assessed as having low Aboriginal archaeological potential (Figure 10). The proposed works are there unlikely to impact on any Aboriginal archaeological values.

Legend

- Study area
- Low archaeological potential

Figure 10: Survey results

0 20 40 60 80 100

Metres
Scale: 1:2,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

N

biosis
Biosis Pty Ltd

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

Matter: 28930,
Date: 16 January 2019,
Checked by: CA, Drawn by: DK, Last edited by: amurray
Location:\\bio-data-01\matters$\28900s\28930\Mapping\28930_F10_Results.mxd

5.2 Recommendations

The following management recommendations have been developed 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 (2013)
  - the code.

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

Recommendation 1: No further archaeological assessment is required

No further archaeological work is required in the study area due to the entire study area assessed as having low archaeological potential.

Recommendation 2: Discovery of Unanticipated Aboriginal Objects or Aboriginal Ancestral Remains

All Aboriginal objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the OEH. 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 the OEH and Aboriginal stakeholders.

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and OEH's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by OEH.

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Appendix 1 AHIMS search results

This Appendix is not to be made public.

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 28930 - CLA

Client Service ID : 391417

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-0032	Campbelltown;	AGD	56	300269	6227777	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1976
Contact	Recorders	Sydney Prehistory Group						Permits		
52-2-1725	IF 2;	AGD	56	294780	6228640	Open site	Valid	Artefact : -	Isolated Find	
Contact	Recorders	Anthony English						Permits	743	
52-2-0910	Curran's Hill;	AGD	56	293293	6229012	Open site	Valid	Artefact : -	Open Camp Site	393,1194
Contact	Recorders	Jenny Hanrahan						Permits		
52-2-0911	Glenlee 1;Mount Annan;	AGD	56	293505	6227553	Open site	Valid	Artefact : -	Open Camp Site	393,1193,1677
Contact	Recorders	Jenny Hanrahan						Permits	2	
52-2-0912	Glenlee 2;Mount Annan;Cluthas;	AGD	56	293490	6228285	Open site	Valid	Artefact : -	Open Camp Site	393,401,1193,1677,3687,9826,7,102726
Contact	Recorders	Huw Barton,Jenny Hanrahan						Permits	934,985,1993	
52-2-2115	TLC3	AGD	56	295694	6230793	Open site	Valid	Artefact : 1	Isolated Find	
Contact	Recorders	Annie Nicholson						Permits		
52-2-2150	AIRDS-01	GDA	56	299449	6226643	Open site	Valid	Modified Tree (Carved or Scarred) : -		102726
Contact	Recorders	Huw Barton,GML Heritage Pty Ltd + Context - Surry Hills,Doctor.Tim Owen						Permits		
52-2-2657	H377	AGD	56	300360	6225400	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
Contact	Recorders							Permits		
52-2-2784	Site H901	AGD	56	301410	6226000	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
Contact	Recorders	Bobbie Oakley						Permits		
52-2-2785	Site H902	AGD	56	301410	6225810	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
Contact	Recorders	Bobbie Oakley						Permits		
52-2-2348	H338	AGD	56	301475	6225900	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
Contact	Recorders	Navin Officer Heritage Consultants Pty Ltd						Permits		
52-2-2349	H339	AGD	56	301460	6225830	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
Contact	Recorders	Navin Officer Heritage Consultants Pty Ltd						Permits		

Report generated by AHIMS Web Service on 09/01/2019 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 293358 - 301610, Northings : 6225288 - 6233323 with a Buffer of 0 meters. Additional Info : Due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 113

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-2632	H402	AGD	56	300980	6231700	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Ms.Louise Gay					**Permits**		
52-2-2702	Site H761	AGD	56	300620	6225530	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**		
52-2-2703	Site H762	AGD	56	300690	6225440	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**		
52-2-2704	Site H763	AGD	56	300820	6225400	Open site	Valid	Artefact : 5		
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**		
52-2-2705	Site H764	AGD	56	300940	6225350	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**		
52-2-2706	Site H765	AGD	56	300240	6225140	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**		
52-2-2708	Site H767	AGD	56	301480	6225520	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**		
52-2-2709	Site H768	AGD	56	301460	6225550	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**		
52-2-2710	Site H769	AGD	56	301330	6225710	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**		
52-2-2711	Site H770	AGD	56	301250	6225990	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 28930 - CLA

Client Service ID : 391417

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-2658	H376	AGD	56	300700	6225900	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders						Permits		
52-2-2712	Site H771	AGD	56	301270	6226120	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Mr.Kelvin Officer					Permits		
52-2-2713	Site H772	AGD	56	301190	6226440	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Mr.Kelvin Officer					Permits		
52-2-2659	H375	AGD	56	300860	6226090	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders						Permits		
52-2-2660	H374	AGD	56	301340	6226170	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders						Permits		
52-2-2661	H372	AGD	56	301401	6225600	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders						Permits		
52-2-2715	Site H774	AGD	56	300100	6225180	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Mr.Kelvin Officer					Permits		
52-2-2717	Site H775	AGD	56	300060	6225230	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Mr.Kelvin Officer					Permits		
52-2-2718	Site H776	AGD	56	300140	6225130	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Mr.Kelvin Officer					Permits		
52-2-2978	Pembroke Road IF1	AGD	56	300200	6230580	Open site	Valid	Artefact : -		
	Contact	Recorders	Paul Irish Consultant Archaeologist					Permits	1899,1948	

Report generated by AHIMS Web Service on 09/01/2019 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 293358 - 301610, Northings : 6225288 - 6233323 with a Buffer of 0 meters. Additional Info : Due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 113

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-2662	H373	AGD	56	301320	6225920	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**						**Permits**		
52-2-3561	TR-5	AGD	56	295536	6232477	Open site	Valid	Artefact : 3		102190
	Contact T Russell	**Recorders** Jo McDonald Cultural Heritage Management see GML						**Permits**	2792,3112	
52-2-3562	TR-6	AGD	56	295497	6232129	Open site	Valid	Artefact : 5		102190
	Contact T Russell	**Recorders** Jo McDonald Cultural Heritage Management see GML						**Permits**	3112	
52-2-3563	TR-7	AGD	56	295109	6232857	Open site	Valid	Artefact : 257		102190
	Contact T Russell	**Recorders** Jo McDonald Cultural Heritage Management see GML						**Permits**	3112	
52-2-3564	TR-8	AGD	56	294955	6232941	Open site	Valid	Modified Tree (Carved or Scarred) : 1		102190
	Contact T Russell	**Recorders** Jo McDonald Cultural Heritage Management see GML						**Permits**		
52-2-3566	TR-10	AGD	56	293913	6233068	Open site	Destroyed	Artefact : 18		102190
	Contact T Russell	**Recorders** Jo McDonald Cultural Heritage Management see GML						**Permits**	3111	
52-2-3557	TR-1	AGD	56	293294	6232162	Open site	Valid	Artefact : 12		102190
	Contact T Russell	**Recorders** Jo McDonald Cultural Heritage Management see GML						**Permits**		
52-2-3558	TR-2	AGD	56	294960	6231794	Open site	Valid	Artefact : 17		102190
	Contact T Russell	**Recorders** Jo McDonald Cultural Heritage Management see GML						**Permits**	3112	
52-2-3559	TR-3	AGD	56	294201	6232610	Open site	Valid	Modified Tree (Carved or Scarred) : 1		102190
	Contact T Russell	**Recorders** Jo McDonald Cultural Heritage Management see GML						**Permits**	3112	
52-2-3560	TR-4	AGD	56	295368	6231755	Open site	Valid	Artefact : 1		102190
	Contact T Russell	**Recorders** Jo McDonald Cultural Heritage Management see GML						**Permits**	3112	
52-2-2223	MV4 -MANOOKA VALLEY 4	AGD	56	294680	6230480	Open site	Valid	Artefact : -		97349
	Contact	**Recorders** Stephanie Garling,Mr.Mark Rawson						**Permits**	2576,2838	
52-2-2220	BRINGELLY SHALE (RWB)	AGD	56	294660	6231110	Open site	Valid	Artefact : -		102190
	Contact	**Recorders** J Garling,Mr.Mark Rawson						**Permits**	2576,2838	
52-2-3873	GHSN	GDA	56	293445	6232313	Open site	Valid	Artefact : 16		102351
	Contact	**Recorders** Mr.Neville Baker,EMGAMM-St Leonards (previously EMGA)						**Permits**	3426	
52-2-3874	GHSS	GDA	56	293360	6231986	Open site	Valid	Artefact : 3		102351
	Contact	**Recorders** Mr.Neville Baker,EMGAMM-St Leonards (previously EMGA)						**Permits**	3426	
52-2-4242	Kenny Ck Artefact Scatter 1	AGD	56	295128	6231239	Open site	Valid	Artefact : -		
	Contact	**Recorders** Doctor.Darran Jordan						**Permits**		

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SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-2116	TLC4	AGD	56	294802	6227005	Open site	Not a Site	Artefact : 6	Open Camp Site	
	Contact	**Recorders**	Annie Nicholson,Mr.David Marcus					**Permits**		
52-2-1219	MT.Annan Tunnel.	AGD	56	293920	6227320	Open site	Valid	Artefact : -	Open Camp Site	32
	Contact	**Recorders**	Ms.Laila Haglund					**Permits**		
52-2-2151	AIRDS-02	GDA	56	299473	6226456	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Huw Barton,GML Heritage Pty Ltd + Context - Surry Hills,Doctor.Tim Owen					**Permits**		
52-2-3066	H10/K036	AGD	56	300470	6225620	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact T Russell	**Recorders**	Mr.Kelvin Officer					**Permits**		
52-2-3045	Macarthur Square Campsite 1	AGD	56	296050	6227100	Open site	Destroyed	Artefact : 2		
	Contact S Scanlon	**Recorders**	Dominic Steele Archaeological Consulting,Mr.Paul Irish					**Permits**	2245	
52-2-3636	MA 1 & PAD MA1 (Campbelltown)	GDA	56	295187	6228881	Open site	Valid	Potential Archaeological Deposit (PAD) : 4, Artefact : 4		101160
	Contact	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
52-2-3637	MA2 (Campbelltown)	GDA	56	295150	6226387	Open site	Valid	Artefact : 5		101160
	Contact	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
52-2-3677	Rose Park	GDA	56	301120	6231800	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Michael Guider					**Permits**		
52-2-3966	UWS TP40 IF	GDA	56	295619	6227461	Open site	Deleted	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Marcus Leslie					**Permits**		
52-2-3967	UWS TP20 IF	GDA	56	295320	6227442	Open site	Deleted	Artefact : -		
	Contact	**Recorders**	Mr.Marcus Leslie					**Permits**		
52-2-3945	AB12 ARTEFACT SCATTER	GDA	56	299681	6226984	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Doctor.Alan Williams					**Permits**	3689,3794	
52-2-3956	UWS_TP19_AS	GDA	56	295298	6227500	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Austral Archaeology Pty Ltd,Mr.David Marcus					**Permits**	3611	
52-2-3957	UWS_TP20_IF	GDA	56	295320	6227442	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Austral Archaeology Pty Ltd,Mr.David Marcus					**Permits**	3611	
52-2-3958	UWS_TP25_IF	GDA	56	295369	6227426	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Austral Archaeology Pty Ltd,Mr.David Marcus					**Permits**	3611	
52-2-3959	UWS_TP40_IF	GDA	56	295619	6227461	Open site	Valid	Artefact : 1		

Report generated by AHIMS Web Service on 09/01/2019 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 293358 - 301610, Northings : 6225288 - 6233323 with a Buffer of 0 meters. Additional Info : Due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 113

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	**Recorders**	Austral Archaeology Pty Ltd,Mr.David Marcus					**Permits**		
52-2-3919	MPRP 12 Menangle Park Rezoning Project 12	GDA	56	293700	6225988	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,AECOM Australia Pty Ltd (previously HLA-					**Permits**		
52-2-4162	Claymore 1	GDA	56	297512	6230819	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Ms.Fenella Atkinson					**Permits**	4126	
52-2-4163	Claymore Park IF 3	GDA	56	297425	6230161	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Ms.Fenella Atkinson					**Permits**	3832	
52-2-4164	Claymore Park IF1	GDA	56	297468	6230075	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Ms.Fenella Atkinson					**Permits**	3832	
52-2-4165	Brady Park IF 8	GDA	56	297581	6230999	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Ms.Fenella Atkinson					**Permits**		
52-2-4166	Badgally Reserve IF 4	GDA	56	297488	6230394	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Ms.Fenella Atkinson					**Permits**	3832	
52-2-4196	Dimeny Park	GDA	56	297850	6230296	Closed site	Valid	Art (Pigment or Engraved) : -		
	Contact	**Recorders**	Mr.Alan Williams					**Permits**		
52-2-4437	Macarthur AS1	GDA	56	296320	6227640	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Austral Archaeology Pty Ltd,Mr.James McGuinness					**Permits**		
52-2-4438	Macarthur IF1	GDA	56	296160	6227680	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Austral Archaeology Pty Ltd,Mr.James McGuinness					**Permits**		
52-2-4439	Macarthur IF2	GDA	56	296500	6227680	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Austral Archaeology Pty Ltd,Mr.James McGuinness					**Permits**		
52-2-2221	MV1 - "MANOOKA VALLEY 1"	AGD	56	294510	6231100	Open site	Valid	Artefact : -		97349
	Contact	**Recorders**	Stephanie Garling,Mr.Mark Rawson					**Permits**	2576,2838	
52-2-2222	MV3 - MANOOKA VALLEY 3	AGD	56	294880	6230420	Open site	Valid	Artefact : -		97349
	Contact	**Recorders**	Stephanie Garling,Mr.Mark Rawson					**Permits**		
52-2-2122	MV5 - " Manooka Valley 5"	AGD	56	294470	6231530	Open site	Valid	Artefact : -		97826,102190
	Contact	**Recorders**	Stephanie Garling,Doctor.Jodie Benton					**Permits**	2576,2838	
52-2-2281	GL16	AGD	56	293956	6225876	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Doctor.Julie Dibden,Heritage Concepts					**Permits**		
52-2-2269	GL14	GDA	56	293591	6226111	Open site	Valid	Artefact : 2		
	Contact	**Recorders**	Doctor.Julie Dibden,Kelleher Nightingale Consulting Pty Ltd,Miss.Kristen Taylor					**Permits**		
52-2-2271	GL 16-14	AGD	56	293803	6226072	Open site	Valid	Artefact : 1		

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SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	**Recorders**	Doctor.Julie Dibden					**Permits**		
52-2-2274	GL15	AGD	56	293932	6225688	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Doctor.Julie Dibden					**Permits**		
52-2-2277	GL18	AGD	56	294961	6226573	Open site	Valid	Artefact : 4		
	Contact	**Recorders**	Doctor.Julie Dibden					**Permits**	4322	
52-2-2312	H299	AGD	56	300530	6225530	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
52-2-3222	Macarthur Square IF3	AGD	56	296250	6226950	Open site	Valid	Potential Archaeological Deposit (PAD) : -, Artefact : 1		
	Contact T Russell	**Recorders**	Mr.Paul Irish					**Permits**	2416	
52-2-3057	IF 6	AGD	56	295014	6227116	Open site	Valid	Artefact : 5		
	Contact Searle	**Recorders**	Matthew Kelleher					**Permits**		
52-2-3058	IF 7	AGD	56	294893	6227450	Open site	Valid	Artefact : 1		
	Contact Searle	**Recorders**	Australian Museum Consulting (AM Consulting)					**Permits**		
52-2-3059	UWS 2	AGD	56	295089	6227211	Open site	Valid	Artefact : 3		
	Contact Searle	**Recorders**	Matthew Kelleher					**Permits**		
52-2-3060	UWS 3	AGD	56	294944	6227145	Open site	Valid	Artefact : 2		
	Contact Searle	**Recorders**	Australian Museum Consulting (AM Consulting)					**Permits**		
52-2-3061	UWS 4	AGD	56	295636	6228123	Open site	Valid	Artefact : 2		
	Contact Searle	**Recorders**	Matthew Kelleher					**Permits**		
52-2-3062	UWS 5	AGD	56	295383	6228081	Open site	Not a Site	Artefact : 5		
	Contact Searle	**Recorders**	Matthew Kelleher,Mr.David Marcus					**Permits**		
52-2-3314	MV2 - Manooka Valley 2	AGD	56	294660	6231110	Open site	Valid	Artefact : -		97349,102190
	Contact	**Recorders**	Doctor.Jo McDonald					**Permits**		
52-2-3316	Mt Annan, Macarthur Sub Station Site - 1	GDA	56	294062	6226305	Open site	Valid	Artefact : 1		
	Contact Searle	**Recorders**	Heritage Concepts					**Permits**	4303	
52-2-3317	Mt Annan, Macarthur Sub Station Site - 2	GDA	56	293998	6226286	Open site	Valid	Artefact : 1		
	Contact Searle	**Recorders**	Heritage Concepts					**Permits**		
52-2-3318	Mt Annan Macarthur Sub Station Site 3	GDA	56	293907	6226252	Open site	Valid	Artefact : 1		
	Contact Searle	**Recorders**	Niche Environment and Heritage,Heritage Concepts,Ms.Clare Anderson					**Permits**		
52-2-3319	Mt Annan Macarthur Sub Station 4	GDA	56	293676	6226185	Open site	Valid	Artefact : 1		
	Contact Searle	**Recorders**	Niche Environment and Heritage,Heritage Concepts,Ms.Clare Anderson					**Permits**		
52-2-3320	Mt Annan Macarthur Sub Station 5	GDA	56	293616	6226137	Open site	Valid	Artefact : 1		

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SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact Searle	**Recorders**	Niche Environment and Heritage,Heritage Concepts,Ms.Clare Anderson					**Permits**		
52-2-3321	Mt Annan Macarthur Sub Station Site 6	GDA	56	294020	6225949	Open site	Valid	Artefact : 1		
	Contact Searle	**Recorders**	Niche Environment and Heritage,Heritage Concepts,Ms.Clare Anderson					**Permits**		
52-2-3322	Mt Annan, Macarthur Sub Station - 7	GDA	56	293946	6225904	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact Searle	**Recorders**	Heritage Concepts					**Permits**		
52-2-3723	CG-IA-16	GDA	56	294120	6226374	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Ms.Renee Regal					**Permits**		
52-2-3724	TR1 (Campbelltown)	GDA	56	295440	6232910	Open site	Valid	Artefact : 171		
	Contact	**Recorders**	AECOM Australia Pty Ltd (previously HLA-Envirosciences)					**Permits**		
52-2-3727	TR Transect G	GDA	56	294630	6233120	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	AECOM Australia Pty Ltd (previously HLA-Envirosciences)					**Permits**		
52-2-3728	TR Transect H	GDA	56	295370	6232950	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	AECOM Australia Pty Ltd (previously HLA-Envirosciences)					**Permits**		
52-2-3737	CG-IA-04	GDA	56	295280	6231233	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**		
52-2-3738	CG-IA-05	GDA	56	295268	6230653	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**		
52-2-3739	CG-IA-06	GDA	56	295132	6228982	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**		
52-2-3740	CG-IA-07	GDA	56	295170	6228923	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**		
52-2-3741	CG-IA-08	GDA	56	295094	6228196	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**		
52-2-3742	CG-IA-09	GDA	56	294892	6227751	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**		
52-2-3743	CG-IA-10	GDA	56	294858	6227665	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**		
52-2-3744	CG-IA-11	GDA	56	294790	6227496	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**		
52-2-3745	CG-IA-12	GDA	56	294656	6227263	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**		
52-2-3747	CG-OCS-08	GDA	56	295719	6232719	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**	4303	

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 28930 - CLA

Client Service ID : 391417

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-3748	CG-OCS-10	GDA	56	295189	6228881	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**		
52-2-3749	CG-OCS-11	GDA	56	294871	6227709	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**		
52-2-3751	CG-TRE-O4	GDA	56	296811	6230987	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Miss.Melanie (Duplicate of #6086) Thomson					**Permits**		

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