



CAMPBELLTOWN HOSPITAL CAMPBELLTOWN, NSW

Stage 1 Redevelopment

Aboriginal Archaeological and
Cultural Heritage Assessment

FINAL REPORT



Prepared by
David Marcus and Justin McCarthy of
Austral Archaeology Pty Ltd
Archaeological & Cultural Heritage Consultants
For
NSW Health Infrastructure

Campbelltown City Council Local Government Area

July 2012

Project No: 1201

EXECUTIVE SUMMARY

Preamble

This report details the Aboriginal archaeological and cultural heritage assessment of one parcel of land, Lot 6 DP1058047 (the study area), situated at 100 Parkside Crescent, Campbelltown NSW, and bounded by Appin Road on the east, Central Road and Parkside Crescent on the west, Therry Road on the south and the IRT Macarthur retirement village on the north. The study area is located within the Campbelltown City Council LGA. The study area is approximately 1.25 kilometres south-west of Campbelltown and 44 kilometres south-west of Sydney (Figure 1.1, Figure 1.2 and Figure 1.3). The nearest population centre is Macarthur, which is a regional hub consisting of a train station, shops and housing situated on the Cumberland Plain. The study area is situated just west of the Georges River.

Austral Archaeology Pty Ltd (Austral Archaeology) has been commissioned by NSW Health Infrastructure (the Proponent) to undertake consultation with the Aboriginal community following the completion of a desktop heritage assessment conducted by Godden Mackay and Logan (GML 2011). The consultation undertaken by Austral Archaeology will meet the standards of the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005) and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a).

The Proponent proposes to redevelop the site of Campbelltown hospital. The proposal includes construction of new facilities, link bridge and forecourt.

All construction work has the potential to impact upon any Aboriginal cultural heritage that may be present within the study area, although to differing degrees dependant on the scale of the required construction work. Therefore, the construction of new buildings, and associated excavation work, will significantly impact upon any archaeological material present.

The GML report determined that there was minimal potential for Aboriginal cultural heritage to be present within the study area, based on the high levels of disturbance that are known to have occurred. This report will serve to summarise the results of the GML report and provide the opportunity for the Aboriginal community to comment on the original findings.

This report in conjunction with the previous assessment (GML 2011) has established that there is a low likelihood of Aboriginal cultural material or deposits being impacted upon by the proposed works at Campbelltown Hospital. As there are no registered Aboriginal Objects or Places within the area and the proposed work will take place on disturbed land, it is concluded that the Proponent will not need to conduct any further archaeological or cultural assessment and may proceed with caution.

Recommendations

The following recommendations are derived from consideration of the legislative requirements of the *Environmental Planning and Assessment Act 1979*, *National Parks and Wildlife Act 1974*, the *National Parks and Wildlife Regulations 2009* and the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH 2010).

1. Due to the lack of identified Aboriginal cultural heritage within the study area, the proposed work can proceed without undue risk of damaging Aboriginal cultural heritage objects.
2. It is recommended that an Aboriginal heritage management plan should be developed for the site prior to earthworks occurring.
3. In the event that Aboriginal archaeological material or deposits are encountered during earthworks, all work within 50 metres radius of the find must cease immediately to allow an archaeologist to assess the find. The archaeologist may also need to consult with the Regional Archaeologist in the Office of Environment and Heritage and the relevant Aboriginal stakeholders. Section 89A of the *NPW Act 1974* requires that the OEH must be notified of any Aboriginal objects discovered “within a reasonable time”.

4. All contractors undertaking earthworks on site should be briefed on the protection of Aboriginal heritage objects under the *National Parks and Wildlife Act 1974* and the penalties for damage to these items.
5. A copy of this report should be forwarded to OEH and all local Aboriginal Community Groups who have registered an interest in the project.

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1 INTRODUCTION

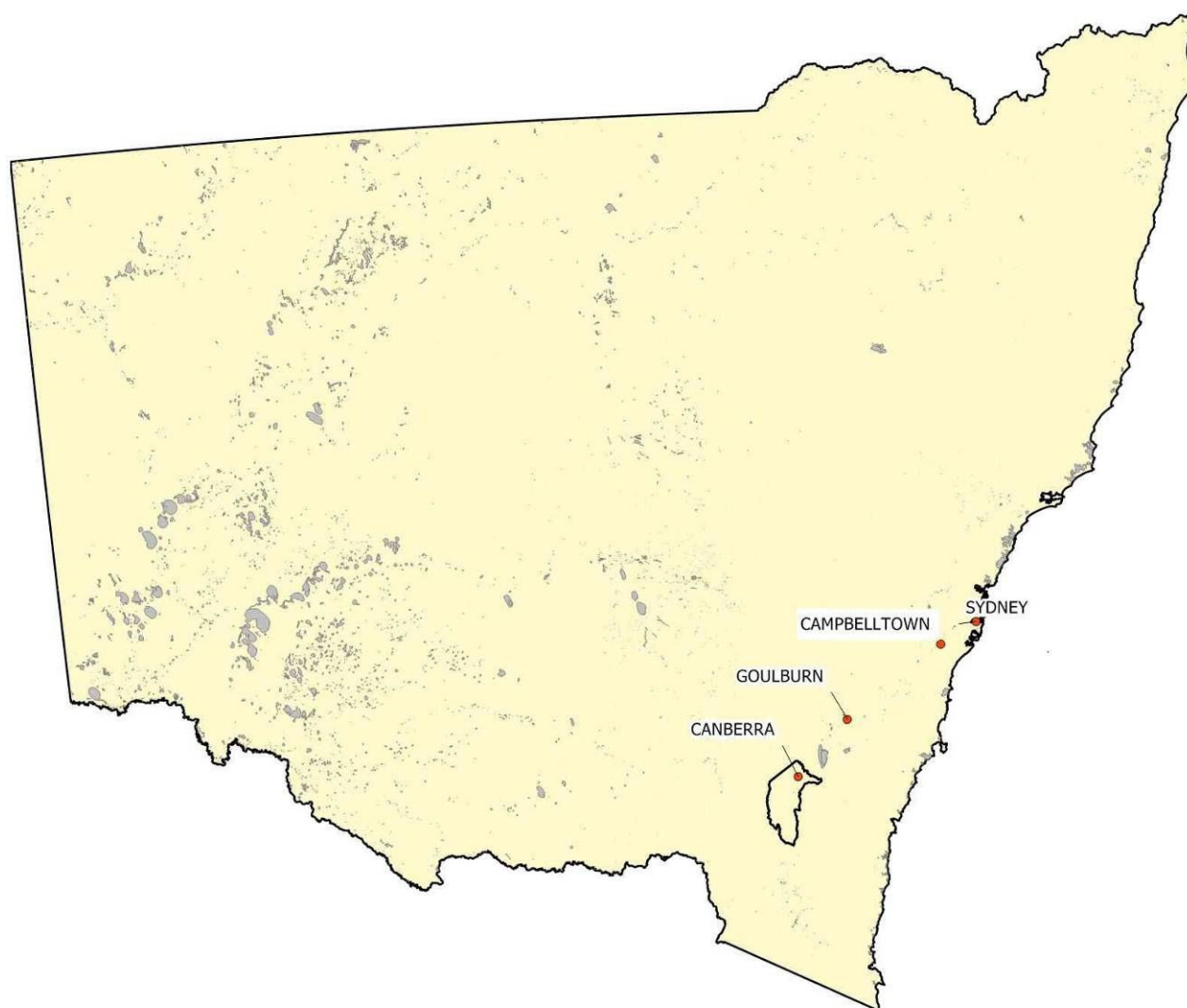
1.1 Introduction

This report details the Aboriginal archaeological and cultural heritage assessment of Lot 6 DP1058047 (the study area), which is situated at 100 Parkside Crescent, Campbelltown NSW and located within the Campbelltown City Council LGA. The study area is bounded by Appin Road on the east, Central Road and Parkside Crescent on the west, Therry Road on the south and the IRT Macarthur retirement village on the north. The study area is approximately 1.25 kilometres south-west of Campbelltown and 44 kilometres south-west of Sydney (Figure 1.1, Figure 1.2 and Figure 1.3). The nearest population centre is Macarthur, which is a regional hub consisting of a train station, shops and housing situated on the Cumberland Plain. The study area is situated just west of the Georges River.

Austral Archaeology Pty Ltd (Austral Archaeology) has been commissioned by NSW Health Infrastructure (the Proponent) to undertake consultation with the Aboriginal community following the completion of a desktop heritage assessment conducted by Godden Mackay and Logan (GML 2011). The consultation undertaken by Austral Archaeology will meet the standards of the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005) and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a).

The GML report determined that there was minimal potential for Aboriginal cultural heritage to be present within the study area, based on the high levels of disturbance that are known to have occurred. This report will serve to summarise the results of the GML report and provide the opportunity for the Aboriginal community to comment on the original findings.

The finalised Aboriginal cultural heritage assessment will accompany a Development Application (DA) for redevelopment of Stage 1 of the site and may result in an Aboriginal Heritage Impact Permit (AHIP) application. On the basis of the predicted low archaeological potential of the study area however, the development could be undertaken without an AHIP but in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010b).



Project Name: Campbelltown Hospital
Client: Capital Insight Pty Ltd
Project Number: 1201
Drawn By: David Marcus

Datum (Zone): Australia MGA94 (56)
Scale: N.A.
Source map: Geoscience Australia
Date: 11 January 2012



Figure 1.1 Map of NSW showing the study area and major population centres

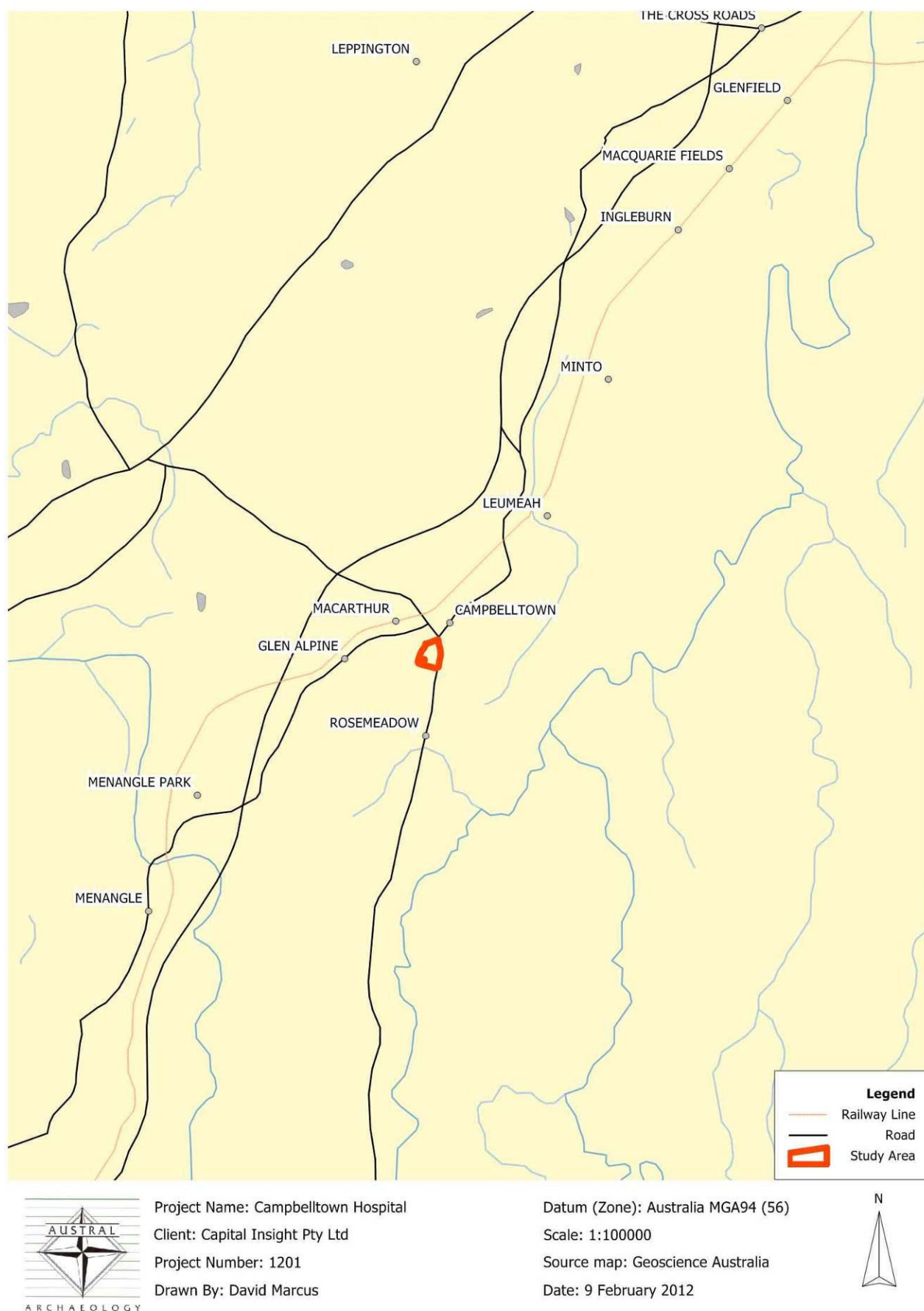


Figure 1.2 Location of the study area in relation to the local region.

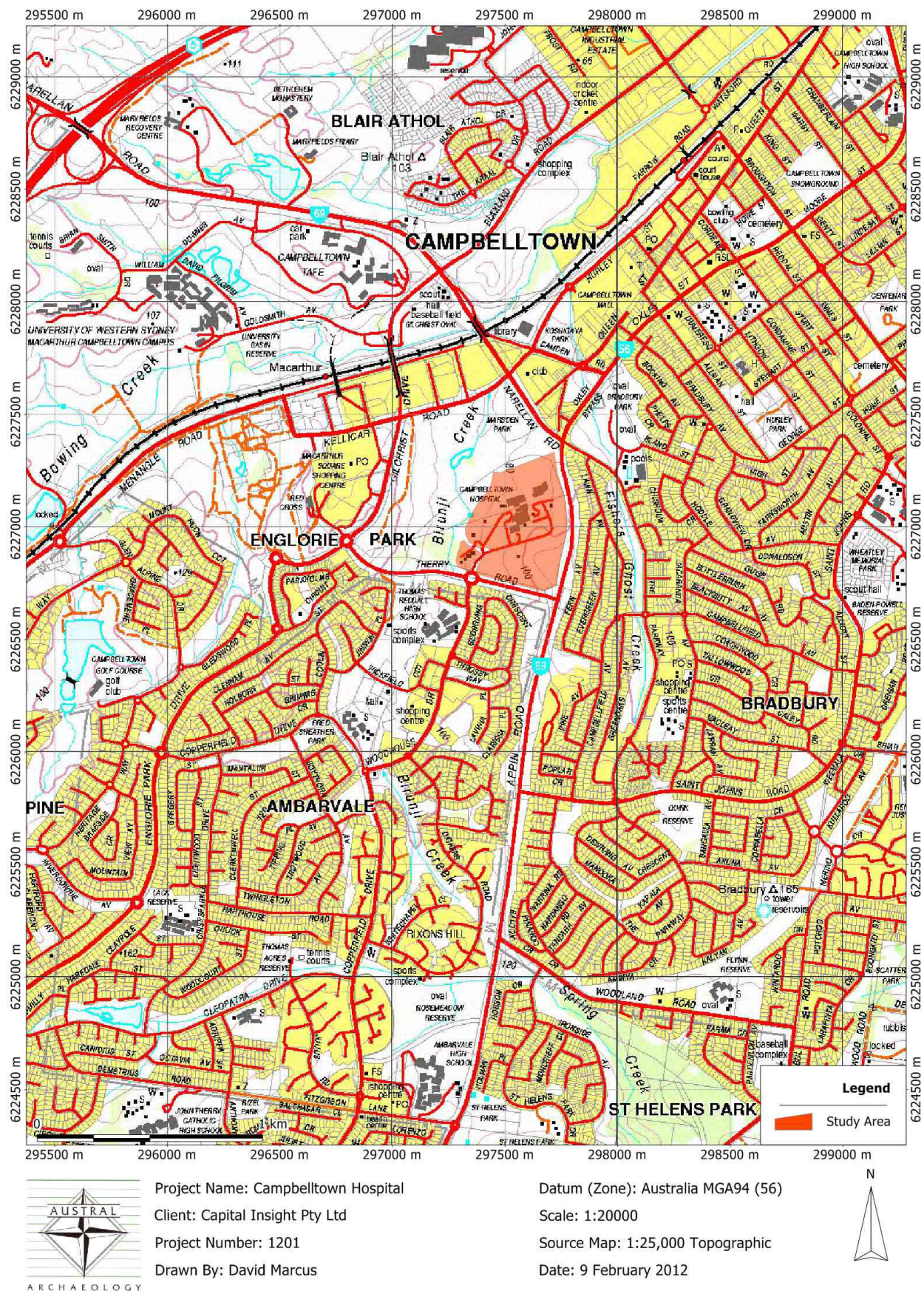


Figure 1.3 Location of the study area in relation to the surrounding area. Note that although this is the latest topographic map, the new developments to the north-west of the study area are not marked.

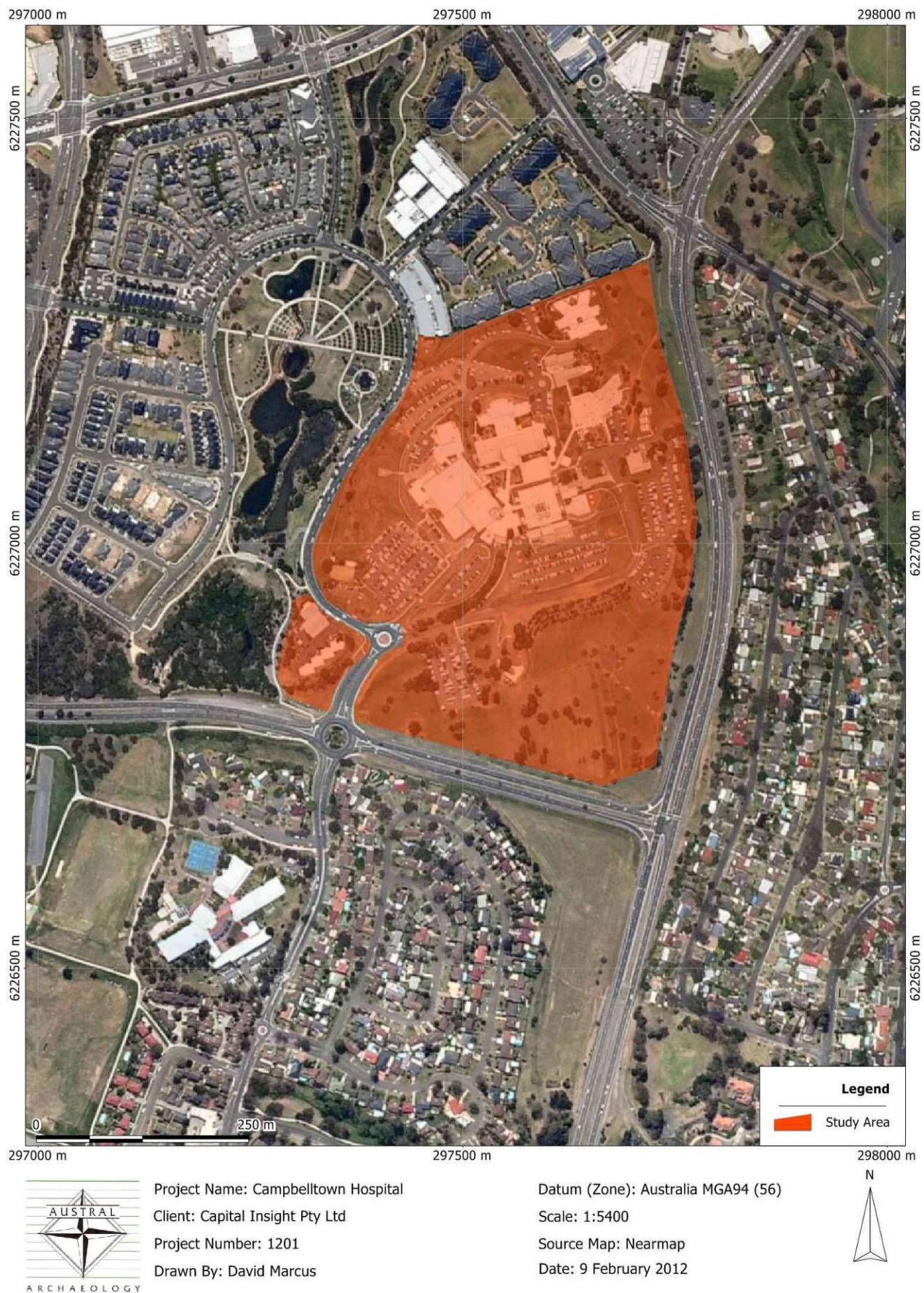


Figure 1.4 Aerial imagery of the study area.

1.2 Project Description

As part of the Masterplan 2021 document, several stages of redevelopment have been planned for the Campbelltown Hospital (Figure 1.5). The proposed works outlined for Stage 1 of the redevelopment include:

- Construction of a new acute building, link bridge and forecourt.

1.3 Predicted Impact on the Potential Archaeological Resource

The proposed development includes the external construction of new facilities, roadways and associated services.

All construction work has the potential to impact upon any Aboriginal cultural heritage which may be present within the study area, although to differing degrees dependant on the scale of the required construction work. Therefore, the upgrading of services and reconfiguration of roads are anticipated to have a moderate impact on the potential archaeological resource. In contrast, the construction of new buildings, and associated excavation work, will significantly impact upon any archaeological material present.

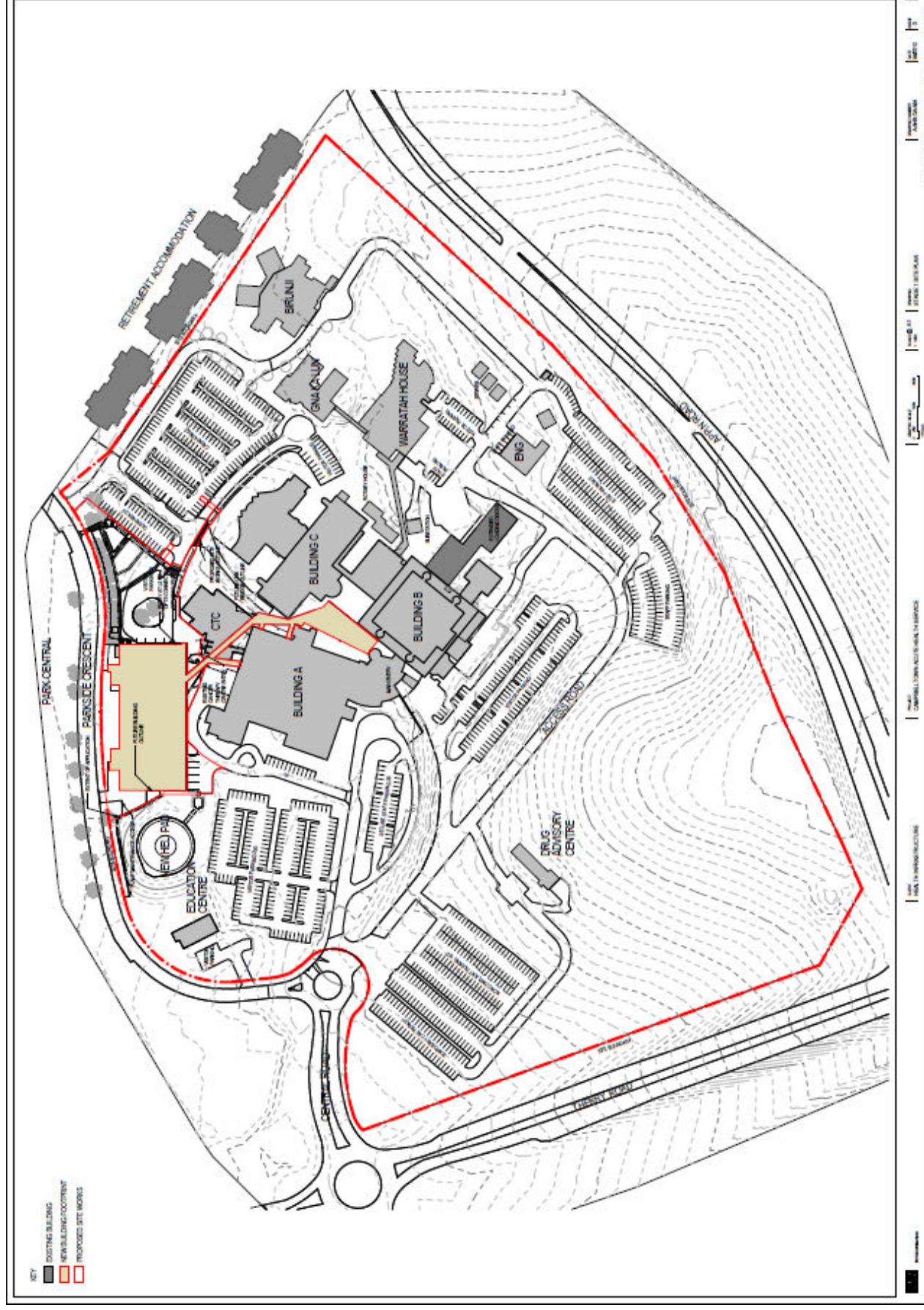


Figure 1.5 Masterplan of proposed development (From Client).

1.4 Assessment Objectives

The scope of the assessment was based on the legal requirements, guidelines and policies of the Office of Environment and Heritage (OEH), formerly the Department of Environment, Climate Change and Water (DECCW).

The scope of works includes the following:

- Assist the Proponent with meeting their requirements in line with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005).
- Undertake necessary consultation with relevant Government Agencies, local Aboriginal stakeholders (i.e., Local Aboriginal Land Council) and Campbelltown City Council in order to finalise the archaeological assessment created by GML (2011).
- Provide recommendations on best management practices for protecting Aboriginal cultural heritage and to outline the Proponents requirements in regards to current legislation.

1.5 Federal and State Legislation

Aboriginal archaeological and cultural heritage assessments in NSW are carried out under the auspices of a range of State and Federal Acts, Regulations and Guidelines. The Acts allow for the management and protection of Aboriginal places and objects, and the Guidelines set out best practice for community consultation in accordance with the requirements of the Acts.

Table 1.1 details the Australian Acts and Guidelines which have been identified as being applicable or with the potential to be triggered with regards to the proposed development.

Table 1.1: Federal and State Acts

Federal Acts

Federal Acts:	Applicability and implications
Environment Protection and Biodiversity Conservation Act 1999	This act has not been triggered and so does not apply. • No sites listed on the National Heritage List (NHL) are present or in close proximity to the study area. • No sites listed on the Commonwealth Heritage List (CHL) are present or in close proximity to the study area.
Aboriginal and Torres Strait Islander Heritage Protection Amendment Act 1987	Applies. • This Act provides blanket protection for Aboriginal heritage in circumstances where such protection is not available at the state level. This Act may also override state and territory provisions.

State Acts

State Acts:	Applicability and implications
National Parks and Wildlife Act 1974 (NP&W Act 1974)	Applies. • Section 89A – Requires that the NSW OEH must be notified of any Aboriginal objects discovered, within a reasonable time.
National Parks and Wildlife Regulations 2009 (NP&W Regulation 2009)	Provides supplemental information to the NP&W Act 1974, but as this project is a State Significant Development, it does not specifically apply.

The Environmental Planning and Assessment Act 1979 (EP&A Act 1979)	Applies. This project is being assessed as a State Significant Development under Part 4, Division 4.1 of the EP&A Act 1979. Section 89J of the EP&A Act 1979 states that the AHIP requirements of the NP&W Act 1974 do not apply. The <i>Draft Guidelines for Aboriginal Cultural Heritage Impact Statement & Community Consultation</i> (DEC 2005) are to be followed.
NSW Heritage Act 1977	This Act has not been triggered and so does not apply. No Aboriginal sites listed on the State Heritage Register (SHR) are present or in close proximity to the study area.

State and Local Planning Instruments

Planning Instruments	Applicability and implications
Local Environmental Plans (LEP)	The following LEP is applicable: Campbelltown (Urban Area) Local Environmental Plan 2002

1.6 Section Summary

Aboriginal Places and Objects, both known and unknown, are protected in New South Wales by State and Federal legislation. The proposed development is classified as a State significant project and procedures under Part 4 of the EP&A Act apply. This assessment must therefore comply with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Statement & Community Consultation* (DEC 2005), supplemented by the OEH *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010) and Part 6 of the NP&W Act and Regulations in respect to the identification of Aboriginal stakeholders.

Searches of the Australian Heritage Places Inventory (AHPI), the Register of the National Estate (RNE), the National Heritage List and the NSW Heritage Council SHR websites identified no recorded sites within the study area.

The *Campbelltown (Urban Area) Local Environmental Plan 2002*, produced in accordance with the EP&A Act, makes provision for the protection of Aboriginal heritage, archaeological sites and potential archaeological sites, but no places or objects are recorded within the study area.

1.7 Stakeholder Consultation

Stakeholder consultation for this project commenced following the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*. The OEH (2010, iii) recognises that:

- Aboriginal people should have the right to maintain their culture;
- Aboriginal people should have the right to directly participate in matters that may affect their heritage; and,
- Aboriginal people are the primary determinants of the cultural significance of their heritage.

Consultation with key stakeholder groups has been ongoing throughout the cultural heritage assessment and discussions have occurred with the registered stakeholders listed in the appendices.

To commence the consultation procedure, an advert was placed in the *Campbelltown MacArthur Advertiser*, to run on 8 February 2012, requesting the registration of cultural knowledge holders relevant to the project area by 22 February 2012. Letters were also written to the bodies suggested in Section 4.1.2 of the *Consultation Requirements (2010)* on 1 February 2012 and a search was made of the Native Title Tribunal on the same day. A copy of all relevant documents have been included in the Appendices.

As a result of the consultation procedure, the following groups are registered Aboriginal stakeholders with an interest in this project:

- Tharawal Local Aboriginal Land Council (TLALC)
- Peter Falk Consultancy (PFC)
- Darug Aboriginal Land Care Inc (DALCI)
- Tocomwall
- Darug Aboriginal Cultural Heritage Assessments (DACHA)

1.8 Project Team and Qualifications

The Aboriginal heritage assessment was supervised by Justin McCarthy (Director, Austral Archaeology) and project management was overseen by David Marcus (Archaeologist, Austral Archaeology). The report and GIS mapping was written and created by David Marcus. The report was proof-read by Alan Hay (Archaeologist, Austral Archaeology). Management recommendations were written by David Marcus in consultation with Justin McCarthy. Justin McCarthy reviewed the draft and final reports.

Justin McCarthy (B.A. Archaeology)

Justin McCarthy is the Managing Director of Austral Archaeology Pty Ltd, having started the company in 1987 in Adelaide and opened offices in Sydney in 1994 and Hobart in 1996 (now known as Austral Tasmania Pty Ltd). Prior to this Justin was an archaeological consultant to the South Australian Dept of Environment & Planning State Heritage Branch from 1983 to 1987. Justin has directed numerous projects involving Aboriginal heritage in NSW in the past 16 years and has a good working knowledge of the *National Parks and Wildlife Act (1974)* and the requirements of the OEH and the *Environmental Protection and Assessment Act 1979 (amended 2005)*. Justin has also been closely involved in consultation with Aboriginal stakeholders for a wide variety of projects including wind farms, pipeline and transmission line corridors, road construction and urban development. He has wide experience in all aspects of cultural resource management for both private and public sector clients.

Justin has directed regional and thematic heritage surveys, environmental impact assessments, conservation plans, heritage assessments, urban excavations, research projects, industrial archaeological surveys, interpretative design for historic sites, assessment of cultural landscapes and project management.

David Marcus (B.A. (Hons.) Archaeology, Ma. Archaeology)

David Marcus is an archaeologist with experience in both Aboriginal cultural heritage and historic cultural heritage projects. David has been involved as a field archaeologist and project manager, as well as conducting heritage consultation between clients and Aboriginal stakeholders. As well as conducting field surveys, he has also written and co-authored several archaeological reports. Having worked within archaeology for over ten years, David has had ample experience of carrying out background research, and is familiar with the current legislative requirements for archaeology projects.

Prior to joining Austral Archaeology, David worked as an archaeologist in a cultural heritage consultancy with offices in Victoria and New South Wales, where he was responsible for projects in both states.

Alan Hay (B.A. (Hons) Archaeology)

Alan Hay is an archaeologist working in Aboriginal Cultural Heritage. Alan has experience with Aboriginal and Historical projects and has well developed skills in the areas of historical research, survey, excavation, artefactual analysis and public interpretation. He has worked on projects in New South Wales, Tasmania and South Australia.

Apart from experience in survey and excavation some specific skills that Alan has gained include monitoring of machine excavation, trench supervision, artefact identification and cataloguing, written and graphic recording, survey equipment handling, archaeological GIS mapping and report writing.

1.9 Limitations

It should be noted that Austral Archaeology has not undertaken a full Aboriginal cultural heritage assessment of the study area but has based the information contained in this report on the work of GML (2011). As this report was not distributed to the Aboriginal community, Austral Archaeology have purely been commissioned to undertake this action in line with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010).

Where additional background research has been required for the Campbelltown area, it has been sourced from the written resources included in the Reference section below, with additional information taken from additional assessments conducted by Austral Archaeology in the Campbelltown region.

1.10 Acknowledgements

Austral Archaeology would like to acknowledge the participation of the following people who contributed to the preparation of the report:

Scott Lawlor	Capital Insight
Kate Raine	JBA Planning
Sean Brasier	Health Infrastructure
Peter Falk	Peter Falk Consultancy
Tabetha Dantoine	Office of the Registrar
Peter Schultz	NTSCORP

1.11 Abbreviations

AHIP	Aboriginal Heritage Impact Permit
AHPI	Australian Heritage Places Inventory
ATSICC	The Aboriginal and Torres Strait Islander Consultative Committee
BP	Before Present (1950 A.D.)
Burra Charter, the	ICOMOS Australia Burra Charter 1999
CBNTC	Cubbitch Barta Native Title Claimants
CMA	Catchment Management Authority
DACHA	Darug Aboriginal Cultural Heritage Assessments
DALCI	Darug Aboriginal Land Care Inc.
DCP	Development Control Plans
DoP	Department of Planning
DTAC	Darug Tribal Aboriginal Corporation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environmental Planning and Biodiversity Conservation Act 1979
GCHAC	Gunjeewong Cultural Heritage Aboriginal Corporation
GDA94	Geocentric Datum of Australia 1994
LGA	Local Government Area
LEP	Local Environmental Plan

NNTT	National Native Title Tribunal
NP&W Act	National Parks and Wildlife Act 1974, amended 2010
NP&W Reg.	National Parks and Wildlife Regulations 2009
NPWS	National Parks and Wildlife Service
NSW DEC	New South Wales Department of Environment and Conservation, later renamed DECCW
NSW DECCW	New South Wales Department of Environment, Climate Change and Water, now the OEH
NTSCORP	Native Title Services Corporation
OEH	Office of Environment and Heritage, formerly DECCW
PAD	Potential Archaeological Deposit
PSA	Potentially Sensitive Area
RNE	Register of the National Estate
SHI	New South Wales Heritage Office State Heritage Inventory
SHR	New South Wales Heritage Office State Heritage Register
S90	Section 90 of the NP&W Act
TLALC	Tharawal Local Aboriginal Land Council

2 ABORIGINAL ARCHAEOLOGICAL CONTEXT

2.1 The Cumberland Plains Archaeological Context

Archaeological investigations of the Cumberland Plains, and in particular the Macarthur, Menangle and Narellan areas, have been conducted in direct response to the spread of urban development. The limited ethnographic accounts of early settlers and explorers were once considered the primary source for archaeological enquiry. However, with the recent spread of urban development within the Campbelltown environs, archaeological investigations have undergone a corresponding increase.

The major studies which have contributed to our understanding of the Cumberland Plains, and those with direct relevance to the study area through their proximity, are outlined below. Reference is made to the main trends garnered from these investigations which serve to provide a broad framework in which to base the current study.

Aboriginal occupation of the Cumberland Plains and Nepean River Valley extends back well into the Pleistocene, or 10,000 years ago. Currently, the oldest accepted date for an archaeological site in the Sydney region is a date of about 14,700 years Before Present (BP), which was obtained from Shaws Creek Rockshelter K2, located to the north of Penrith (Attenbrow 2002:20). Relatively early dates were also obtained by McDonald *et al* (1996) for artefact bearing deposits at open site RS1 (AHIMS #45-5-0982) on Mulgoa Creek, Regentville, but the reliability of these dates is uncertain (McDonald *et al* 1996:61-62).

2.1.1 Population and Contact History

Population estimates at the time of contact are notoriously problematic as Aboriginal groups avoided the early settlers and were highly mobile. Another factor which complicates an accurate estimation is the effect of European diseases such as influenza and smallpox, which decimated Aboriginal populations soon after contact.

The present study area is thought to lie at the western boundary of the Tharawal tribe, as mapped by Tindale (1974). The Tharawal territory is believed to have extended south from Botany Bay to the Shoalhaven River and inland as far as Campbelltown and Camden (Attenbrow 2002:34) while the Gundungurra occupied the land to the west of the Tharawal (AECOM 2010:14, Niche 2010:17). However, Aboriginal people formed part of a dynamic culture which encouraged movement throughout the landscape to order to assist in the ceremonial and functional practicalities of daily life (Niche 2010:17). As such, defined borders for tribal groups need to be recognised as an artificial constraint designed by anthropologists (Organ 1990:xliii) and, in the words of Traditional Owner Glenda Chalker of the CBNTC, the area is both "Gundungurra and Tharawal tribal country" (Niche 2010:17).

The pre-contact population numbers for the study area are not known and, due to smallpox and influenza epidemics preceding the arrival of European settlers into the region (Attenbrow 2002:21), it is unlikely that the early European explorers were able to successfully grasp the traditional population size.

While early contact between Aboriginals and Europeans in the area was initially neutral, a combination of a long drought and an influx of Aboriginal people pushed off neighbouring lands resulted in escalating violence throughout 1814 to 1816 (Austral Archaeology 2011:12). The inevitable conclusion was reached in 1816, when troops under the command of Captain Wallis caused the death of a number of Aboriginal people camped at Cataract Gorge (Heritage Concepts 2007:13). This saw the end of spirited resistance, and led to an increased attempt by Aboriginal people to enter into the cultural and economic lifestyle of the European settlers.

Following the massacre, the number of Aboriginal people in the area remained low, with 63 Aboriginal people being reported as living at Stonequarry in 1838, and only 80 Aboriginal people reported at Picton in 1862 (Dibden, in AECOM 2010:14). Despite these unfortunate setbacks, there were reports of Aboriginal people in the Camden area still hunting using traditional methods and camping along the Nepean River right up to the late nineteenth century (AECOM 2010:14, Atkinson 1988:7).

However, this ethnohistory should be employed with caution and Hiscock (2008: 17) has recently argued that even very early historical accounts may not be a suitable basis for analogy. As Aboriginal groups had to change their economic, cultural and political practices in order to cope with the social impacts of disease in the historic period, he argues that it is likely that similar drastic changes happened in the past in response to “altered cultural and environmental circumstances” following the arrival of Europeans. Social disruption in the Cumberland Plains region caused by European settlement pushing Aboriginal people to the fringes of their traditional lands would have caused such drastic changes.

2.1.2 *Material Culture*

The material culture of the Aboriginal people of the Sydney region at the time of European contact was diverse, and utilised materials derived from a variety of plants, birds and animals as well as stone. Below is only a short summary of the types of material known to have been used by the Aboriginal people of the Sydney region.

Spears in the Sydney region were usually made of a grasstree spike (for the shaft) with a hardwood point. Stone, bone, shell or wood were sometimes used as barbs (Turbet 2001:40). Thin and straight spear-throwers were made from wattle (Turbet 2001:40). Fishing spears were usually tipped with four hardwood prongs with bone points (Attenbrow 2002:117, 119, Turbet 2001:42). Fish were also caught by means of shell or bird talon fish hooks (Attenbrow 2002: 117, Turbet 2001:45).

Bark of various types were used for making such diverse items as wrappings for new-born babies, shelters, canoes, paddles, shields and torches (Attenbrow 2002:Table 10.1). Resin from the grasstree was used as an adhesive for tool and weapon making (Attenbrow 2002: 116, Turbet 2001: 36). Similarly, ‘Boomerang’ is believed to be a Darug word. Various kinds of boomerangs and clubs were made from hardwoods as were such items as digging sticks (Turbet 2001:37-39, 45, Attenbrow 2002:112).

Stone artefacts are often the only physical indication of Aboriginal use of an area. The knapping of stone artefacts can indicate one of two things, the knapping of stone to create tools and the discard of these tools once they have been used, or sometimes both. The knapping of stone creates a large amount of stone debris in very little time. Large knapping events tend to occur in proximity to sources of permanent water (McDonald 2000). This is probably because the availability and resources made these good places to camp for short periods of time. Small scale knapping events can occur anywhere in the landscape and are associated with the manufacture or maintenance of stone tools as a direct result of a specific need. This implies that locations of sites away from water courses will be more diffuse.

Stone was commonly used for tools and, apart from discarded shell in coastal middens, is the most common material found in archaeological sites of the Sydney region. Stone or stone tools were used for axe heads, spear barbs and as woodworking tools, amongst other things.

Archaeological investigation has resulted in the recognition of changes in the types of stone tools used by Aboriginal people in the Sydney region through time. A sequence of changes in stone tool types in eastern NSW was identified by archaeologist F.D. McCarthy who named it the ‘Eastern Regional Sequence’ (McCarthy 1976:96-98). McCarthy identified ‘*Capertian*,’ ‘*Bondaian*’ and ‘*Eloueran*’ phases of the sequence which together appear to span the last 15,000 years in the Sydney region.

McCarthy’s sequence was the source of academic debate, with Stockton & Holland (1974:53-56) offering an alternative to McCarthy’s theory by proposing four phases of the Eastern Regional Sequence. After *Capertian*, they described the *Early Bondaian* and *Middle Bondaian* phases where Bondi points and other small tools become apparent in assemblages in Eastern New South Wales. *Late Bondaian* referred to McCarthy’s *Eloueran* phase. Stockton and Holland’s won the day and their terms are used in the Sydney region today (Attenbrow 2002: 156).

Broadly speaking, Capertian assemblages contain tools which are generally larger in size than later assemblages but also contain smaller tools, such as thumbnail scrapers and dentated saws. In the late Holocene (from approximately 5,000 years ago), backed artefacts such as Bondi points, Elouera and geometric microliths appear in archaeological assemblages in the Sydney region, and these tools are characteristically much smaller than those of earlier phases. McCarthy (1976) used these formal tools to define this period as Bondaian while Stockton and Holland (1974:53-56) referred to this period as the *Early Bondaian* and *Middle Bondaian* phases. Edge ground implements appear in region assemblages for the first time at about 4,500 to 4,000 years ago.

From about 1,600 year ago, Bondi points and geometric microliths began to drop out of use in the coastal parts of the Sydney region, although the Elouera continued to be used. This is known as the *Late Bondaian* phase. On the Cumberland Plains, however, dated archaeological sites suggest that all of these backed artefact types continued to be used “until at least 650-500 years ago, although probably not [as late as the time of] British colonisation” (Attenbrow 2002:156). In coastal areas, and possibly through the Sydney Basin, both the use of quartz and the use of the bipolar flaking technique increased through time, although this tendency is less marked on the western Cumberland Plain (Corkill 1999:135, Attenbrow 2002:153-159.).

2.1.3 Food

A range of land mammals were hunted for food, including kangaroos, possums, wombats and echidnas as well as native rats and mice (Attenbrow 2002:70). Birds, such as the mutton bird and brush turkey were eaten and it is recorded that eggs were a favourite food of the Aboriginal people (Attenbrow 2002: Table 7.3 75-76). In 1810, the diet of the Gundungurra people was described as consisting of a variety of foods including “possums, eels, snakes, blue-tongued lizards, freshwater mussels and a variety of birds” (Kohen 1982:3).

Attenbrow has noted that “Sydney vegetation communities include over 200 species that have edible parts, such as seeds, fruits, tubers/roots/rhizomes, leaves, flowers and nectar (Attenbrow 2002:76). Observations from the earliest European settlers describe Aboriginal people in the Sydney region roasting fern-roots, eating small fruits the size of a cherry as well as a type of nut and the root of “a species of the orchid” amongst other types of plant food. As Attenbrow points out, however, the settlers’ lack of knowledge of the local plant species make identification of the various plants used difficult (Attenbrow 2002:76-79).

In summary, the Cumberland Plains and the Nepean River environment provided a wide variety of plants and animals which were used by the local Aboriginal populations for artefact manufacture, medicinal purposes, ceremonial items and food.

2.1.4 Early Archaeological Models

Foley (1981) developed a general site distribution model for forager settlement patterns. Although the model presents a more sedentary occupation that was probably present on the Cumberland Plains, the general principles can be considered a useful indicator of site location across the Australian landscape.

The model splits hunter gatherer sites into two main categories; ‘residential base camps’ and ‘activities areas’. People would reside in one general location or locations, probably in proximity to a good source of permanent water and with shelter from the elements, and travel throughout the local landscape to gather resources at known locations. The right hand side of Figure 2.1 shows how this settlement pattern would look in terms of artefact discard. The majority of artefacts are deposited in proximity to the residential base camp, fewer at the various resource locations and a generally low amount throughout the rest of the landscape, mainly while travelling between activity areas and the base camp. The model however, does not take into account the use of more than one base camp in an area or changing preferences of camping areas over time; nor does it account for the movement of resources over time.

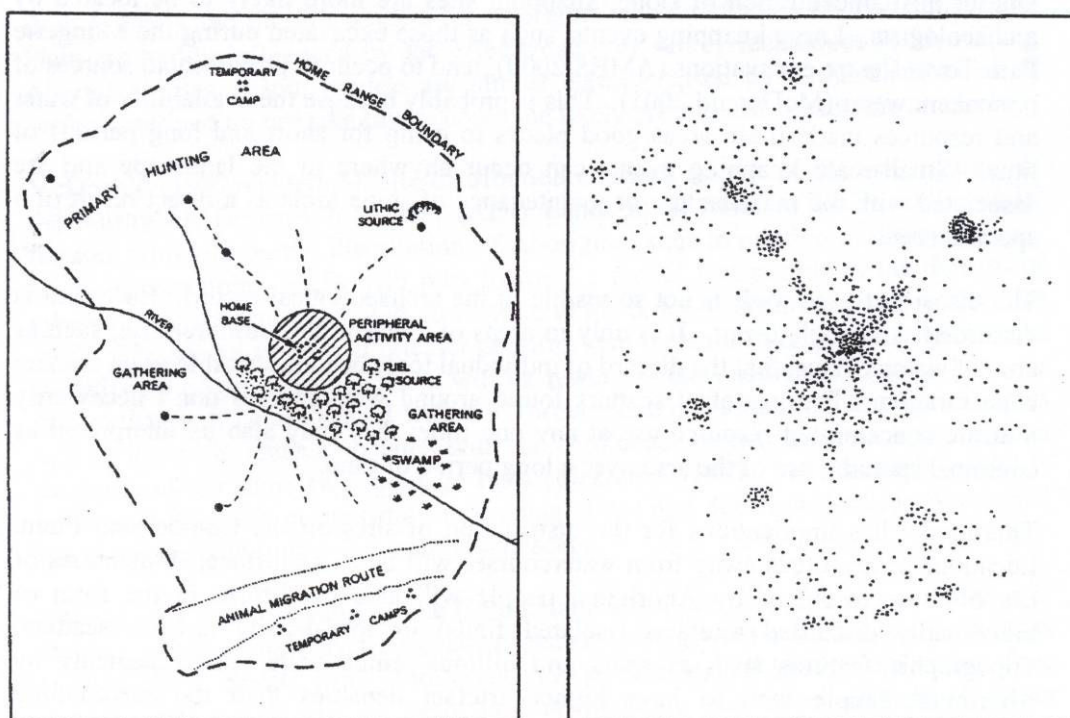


Figure 2.1 Foraging Model (Foley 1981)

Another early model was developed by Kohen in his 1986 study. Kohen created a general model of site occurrence, chronology and function for the region. The chronological component of his model posits that the Aboriginal occupation of the Cumberland Plain primarily occurred during the mid to late Holocene (approximately 4,500 BP) and was related to an increase in Aboriginal population in the area and the introduction of a new stone tool technology, the 'small tool tradition'. Prior to the mid Holocene, Kohen argues that Aboriginal occupation of the area was concentrated on and around the Nepean River and the coast.

Similarly, Smith's (1989) work represented the first stage of a National Parks and Wildlife Service (NPWS) Planning Study for the Cumberland Plain. At the time, Smith calculated that less than 0.5% of the Cumberland Plain had been surveyed and/or studied systematically and only 17 sites had been excavated. A number of surveys were conducted as part of Smith's investigation and in the 1,600 metre² site which she surveyed in the Rickaby's Creek and Londonderry area, four sites and one isolated find were located. A predictive site location model was developed by Smith for the southern Cumberland Plain based the results of her study. This included the theory that sites would be most commonly found along permanent creeks and around swamp margins. Creek flats and banks were considered to be focal topographical features for site location (Smith 1989:2).

2.1.5 *Later Work*

McDonald has successfully used stream order models to develop a predictive model for the Cumberland Plain. Stream order modelling, as a predictive tool, could be utilised to anticipate the potential for Aboriginal camp site locations in the landscape based on the order of water permanence. McDonald (1997a, 1997b, 1999 & 2000) in particular has drawn on stream order modelling in order to forecast the potential nature and complexity of sites. These models can also be used to predict site distribution and the possible range of activities carried out at a particular site as well as the frequency and/or duration of occupation.

Analysing stream order can allow researchers to locate areas of past water permanence, which would have been vital for Aboriginal people. Abundant food and other resources are more likely to occur in areas of water permanence which would in turn attract Aboriginal occupation. McDonald's excavations of open artefact scatter sites at the ADI site in St Marys provided evidence of such a correlation (McDonald 1997b:133).

According to McDonald, the range of lithic activities and the complexity of the resulting stone assemblage observed at a location of permanent water differ depending on stream order. Overall, artefact scatters in the vicinity of a higher order ranking stream reflect a greater range of activities (e.g. tool use, manufacture and maintenance, food processing and quarrying) than those located on lower order streams. Temporary or casual occupations of a site, reflected by an isolated knapping floor or tool discard, are more likely to occur on smaller, more temporary water courses (McDonald 1997a:134-135).

It is therefore possible, McDonald concluded, that stream order modelling could be utilised to make general predictions about the location and nature of Aboriginal sites on the Cumberland Plain. Water permanence (i.e. stream order), landscape unit (i.e. hill top, creek flat) as well as the proximity to artefact raw materials can result in variations in the density and complexity of an Aboriginal archaeological feature (McDonald 1997a:2000:19). Site location and duration of occupation predictions therefore relate to stream order in the following ways:

- *In the headwaters of upper tributaries (i.e. first order creeks) archaeological evidence will be sparse and represent little more than a background scatter;*
- *In the middle reaches of minor tributaries (second order creeks) archaeological evidence will be sparse but indicate focussed activity (e.g. one-off camp locations, single episode knapping floors);*
- *In the lower reaches of tributary creeks (third order creeks) will be archaeological evidence for more frequent occupation. This will include repeated occupation by small groups, knapping floors (perhaps used and re-used), and evidence of more concentrated activities;*
- *On major creek lines and rivers (fourth order) archaeological evidence will indicate more permanent or repeated occupation. Sites will be complex, with a range of lithic activities represented, and may even be stratified;*
- *Creek junctions may provide foci for site activity; the size of the confluence (in terms of stream ranking nodes) could be expected to influence the size of the site;*
- *Ridge top locations between drainage lines will usually contain limited archaeological evidence although isolated knapping floors or other forms of one-off occupation may be in evidence in such a location (McDonald, 2000:19).*

More importantly, after studying the archaeological sites recorded in a 5 kilometre radius of the current study area, Jo McDonald CHM drew the following conclusions (Jo McDonald CHM 2003:18) which were adapted by AMBS in the light of their recent excavations (2005:5):

- *Approximately half of the recorded sites were within 50 metres of creeks, while 88% of all sites were within 110 metres of creeks.*
- *Stone artefact scatters are increasingly likely on flat land surfaces, especially near creek lines.*
- *Severe land disturbance across the study area provides few places with a likelihood of containing Potential Archaeological Deposits (PADs).*
- *Aboriginal cultural heritage may be preserved below the land surface even when there is no evidence on the surface.*

Paul Irish (2006:11) further notes that in areas of the Blacktown soil landscape, as found in the study area, archaeological evidence is generally limited to the upper topsoil, or A-Horizon. The subsoil in such cases is usually a brown clayey loam with gravel, overlying a clay subsoil which is archaeologically sterile. Therefore, while PADs are frequent in the Cumberland Plains, they are limited to areas which retain the original topsoil.

Biosis, after surveying areas outside of the immediate vicinity of the Nepean River, concluded that although tributaries and gullies of the river system were the most archaeologically rich, a background scatter of artefacts was present throughout the Plains (Biosis 2006:54-55). This model was later confirmed by Biosis following test excavations which showed occupation of lowland plains only resulted in low density stone artefact sites (Niche 2010:20).

The most recent predictive model has been created by White and McDonald (2010), based on the results of the subsurface testing at the Rouse Hill development on the northern Cumberland Plains. The predictive model identified four main factors which the authors decided determined artefact density and distribution. These were:

- 1) *Stream order, with higher order streams tending to have higher artefact densities and more continuous distributions than lower order streams*
- 2) *Landform, with higher densities occurring on terraces and lower slopes, and with sparse discontinuous scatters on upper slopes*
- 3) *Aspect on lower slopes associated with larger streams, with higher artefact densities occurring on landscapes facing north and north east: and*
- 4) *Distance from water, with higher artefact densities occurring 51-100 metres from 4th order streams, and within 50 metres of 2nd order streams (White and McDonald 2010:36).*

In agreement with Niche (2010:24), it is held that these results are directly transferable to other parts of the Cumberland Plains, although the sandstone gullies associated with the Nepean River and Harris Creek are not present in the current study area.

2.2 Heritage Database Search Results

2.2.1 Aboriginal Heritage Information Management System Search Results

A search of the OEH AHIMS was undertaken on 7 April 2011 by GML (GML 2011). The results from the AHIMS search identified 40 previously recorded sites within a 5 kilometre radius of the study area (Table 2.1). None of the previously identified sites lie within the current study area (GML 2011:25).

Table 2.1: Summary of sites recorded within 5km radius of the study area (after GML 2011:26).

Feature Type	Total	%
Artefact (stone) single / scatter	37	92.5%
Potential Archaeological Deposit (PAD) + Artefact (combined)	2	5%
Scarred/Culturally Modified Tree	1	2.5%
TOTAL	26	100%

It should be noted that GML record one stone arrangement as being present on the AHIMS database. This site is MA2 Campbelltown (#52-2-3637) and the site card states that it is actually an artefact scatter and not a stone arrangement (Austral Archaeology in prep). The OEH have been notified of this error and the above table has been amended accordingly.

Furthermore, additional PAD sites and isolated artefacts originally identified by Jo McDonald CHM (2003) and re-recorded by AMBS (2005) are known to be present within five kilometres of the study area that have not been registered with AHIMS. While further details can be found in the UWS Campbelltown report (Austral Archaeology in prep), these sites have not been included in the above table.

Table 2.1 shows that there are three different site types represented by the search results: surface artefacts, PADs with artefacts and scarred or culturally modified trees. The vast majority of the registered sites are stone artefacts (both isolated finds or open artefact scatters). This site type represents 37 reported sites, or 92.5% of the overall site type frequency in the localised search. The remaining 7.5% of the sites are composed of two PADs with artefacts and a single scarred tree.

2.2.2 Other Heritage Register Search Results

Searches of the Australian Heritage Places Inventory, the Register of the National Estate and the New South Wales Heritage Branch State Heritage Register websites were undertaken and did not identify any recorded Aboriginal Objects or Places in or around the development area. No Aboriginal objects or places are listed as significant in the *Campbelltown (Urban Areas) Local Environmental Plan 2002*.

2.3 Previous Archaeological Investigations in the Vicinity of the Subject Land

Although European observers recorded various aspects of the lifestyles of Aboriginal people in the Cumberland Plain region from the beginning of European settlement of the area in the nineteenth century, it wasn't until the twentieth century that archaeological investigations of Aboriginal archaeological sites were undertaken.

Since then, archaeological sites have been frequently recorded across the region, and hundreds have been excavated. Most commonly these contain open scatters of archaeological material such as stone artefacts, engraved or pigmented images or midden material.

2.3.1 Archaeological Investigations in the Local Region

Much of the archaeological work in the local area has been undertaken as a result of development-driven management archaeology, or consultancies. Table 2.2 below outlines the details and results of some relevant archaeological consultant's reports from the region:

Table 2.2: A summary of Archaeological Consultant Reports from the Region

Reference	Study area location/description	Results	Site distribution / Conclusion
Hanrahan 1981, 1982a and 1982b	Currans Hill/Menangle Park	Nine artefact scatters located along Narellan Creek.	Only one site (N2) was considered high density, while of the nine sites, only N5 was believed to have associated PAD.
Bonhomme 1986	Currans Hill/Menangle Park	Identified archaeological deposits associated with sites N2 and N5.	Re-assessment of the sites identified by Hanrahan (1982a). Test excavation conducted at N2 and N5 showed undisturbed archaeological deposits. N5 assessed as a temporary campsite while N2 was important focus of activity at junction of ridge and valley.
Haglund 1989	Currans Hill/ Menangle Park	Archaeological excavation recovered 259 artefacts from N2 and 41 from N5.	Salvage excavation at sites N2 and N5. Haglund reports that the types of artefacts and raw materials were similar, despite difference in artefact densities.
McDonald 1990	Menangle Park	two artefact scatters recorded on ridgelines.	Notes that the geology of the study area is most likely to contain low concentration artefact scatters along ridges and creeks. Silcrete was dominant material.
English 1994	Harrington Park	Three artefact scatters and seven isolated artefacts.	Sites occurred on ridges and alongside Narellan Creek. All sites adjudged to have low archaeological significance. Silcrete was main raw material, followed by mudstone, chert and quartz.
Brayshaw McDonald 2001	Menangle Park	New artefact scatter discovered through subsurface excavation.	Test excavation revealed sites discovered by McDonald (1990) were heavily disturbed and contained no archaeological significance.
Dibden 2003	Camden Gas Project, including the area immediately SW of the current study area	Survey of large area around Menangle identifying 21 sites, including GL 18	Many sites were in areas of identified historical disturbance and were isolated artefacts. GL18 consisted of a low density silcrete artefact scatter at a creek junction, with possible PAD.
Jo McDonald CHM 2003	UWS Campbelltown (present study area)	Identified eight PSAs, six PADs and five isolated finds.	Generally located on ridgelines or in close proximity to creeks. None of the sites were registered with AHIMS.
AMBS 2005	UWS Campbelltown (present study area)	Two additional PADs and two additional isolated finds were identified.	All site were identified on or near creeks and ridgelines. As a result of the new sites, the PSAs were extended.
Dominic Steele 2005	Camden Gas Project, Menangle	Seven artefact scatter and two isolated artefacts recorded	Mostly low density artefact scatters of predominantly silcrete, located near creeks and ridges. Several sites were believed to contain PADs.
Heritage Concepts 2006	Macarthur Substation, Menangle Park	One scar tree and associated PAD, as well as one PADs based on topography and one based on the presence of isolated artefacts.	PAD 2 identified based on favourable topography for settlement which was unlikely to have been disturbed by Europeans while also allowing for quick sediment build up. The remainder of the study area outside the other PADs was also accepted to have moderate potential for subsurface deposits.
Paul Irish 2006	Macarthur Substation, Menangle Park; Supplementary Report	Refuted the Aboriginal scar tree recorded in the previous report.	Reassessment of PADs recorded by Heritage Concepts (2005).
Navin Officer 2008	Menangle Park/Mount Annan	Identification of two artefact scatters and one PAD	Sites recorded on ridges and upper slopes, away from creeks and waterlines.

Reference	Study area location/ description	Results	Site distribution / Conclusion
Biosis 2010	Camden Gas Project: Northern Expansion	28 sites identified, mainly scarred trees and artefact scatters in a variety of landforms. Also reassessed three previous sites and two PADs within the study area	Sites were assessed to be of low to moderate significance. Twelve isolated artefacts recorded and twelve artefact scatters containing no more than five artefacts. Silcrete was the dominant material, followed by mudstone.

2.3.2 *Archaeological Investigations in the Study Area*

The current study area was the subject of an Aboriginal and historical heritage assessment by GML (2011). A field survey was undertaken by GML archaeologists in April 2011 which targeted areas with the greatest potential for Aboriginal cultural heritage, although no Aboriginal archaeological or cultural material was identified (GML 2011:26). Furthermore, the study area was adjudged to have “no potential for intact Aboriginal sites, as a consequence of significant development and modification of the original landforms across the whole site” (GML 2011:26).

In conclusion, GML stated that the study area has no known Aboriginal archaeology and contains no potential for *in situ* Aboriginal cultural heritage due to the high level of European disturbance which has taken place throughout the study area (GML 2011:27).

3 LANDSCAPE CONTEXT

The natural environment of an area influences not only the availability of local resources, such as food or raw materials for artefacts, but also determines the likely presence and/or absence of various archaeological site types which may be encountered during a field investigation.

Resource distribution and availability is strongly influenced by the environment. The location of different site-types (such as rock-shelters, middens, open camp-sites, axe grinding grooves, engravings etc) are strongly influenced by the nature of soils, the composition of vegetation cover and the climatic characteristics of a region, along with a range of other associated characteristics that are specific to different land systems and bedrock geology. In turn this effects resource availability of e.g. fresh drinking water, plant and animal foods, raw materials for stone tools, wood and vegetable fibre used for tool production and maintenance.

Therefore examining the environmental context of a study area is essential in accurately assessing potential past Aboriginal land-use practices and/or predicting site types and distribution patterns within any given landscape, cultural or not. The information that is outlined below is applicable for the assessment of site potential of the current study area.

3.1 The Subject Land

The study area or subject land consists of one parcel of land located near Macarthur in the Campbelltown City Council LGA, 2 kilometres west of Campbelltown and 44 kilometres south-west of Sydney (Figure 1.1 and Figure 1.2). The study area is currently a highly developed parcel of land containing Campbelltown Hospital.

3.2 Geological Context and Soil Landscapes

The study area is located in the Cumberland Plain, south-west of the township of Campbelltown, approximately 44 kilometres south-west of Sydney. The local area includes industrial and residential properties interspersed with large tracts of pastoral land. Sparsely vegetated, open areas are still present along the larger creeklines that occur near to the study area. These include Birunji Creek and Fishers Ghost Creek, which in turn both flow into Bow Bowling Creek. The courses of all these creeks have been heavily modified as they run through Campbelltown. Eventually, Bow Bowling Creek feeds into the Georges River, which runs approximately 3 kilometres east of the study area, while the Nepean River itself runs approximately 3 kilometres west of the study area. Consequently, the wider area has a rich resource base providing Aboriginal people in the past with shelter, food and raw materials. In addition, the presence of creeks and gullies may have provided travelling corridors through the landscape.

The study area is bounded by Appin Road on the east, Central Road and Parkside Crescent on the west, Therry Road on the south and the IRT Macarthur retirement village on the north. The site is highly developed and has been used as a hospital since 1975, prior to which it was subject to continual grazing practices and heavy landscaping. The local topography is characterised by moderately sloped hills and flats, with a general south-east facing aspect.

The main physiographic unit within which the study area is located is the Cumberland Plain which consists, with the exception of the Razorback Range situate south of the study area, of low-lying, undulating plains and low hills, lying on Wianamatta Group shales and sandstones. A complex and dense network of waterways and channels are present throughout the Plain (Hazelton & Tille 1990:2).

The underlying geology of the study area, the Wianamatta Group, is a Middle Triassic deposit with major outcrops in the Liverpool to Picton and Appin to Mittagong areas. The Wianamatta Group consists of Ashfield Shale, of black sideritic claystone and limonite, underlying Bringelly Shale, of a predominantly shale sequence with sandstone. Increasing occurrences of sandstone fragments are noted in the upper-most sections of the shale, while occasional calcareous claystone, laminate and coal can also be present. Most of the igneous rocks that are found in the Wianamatta Group are of basaltic composition (Hazelton and Tille 1990:3, 27, 70).

The study area itself falls into a soil landscape identified as Blacktown (bt) but areas of disturbed soil (xx) are present immediately surrounding the study area (Figure 3.1). The soil landscape is summarised below.

3.2.1 *Blacktown (bt)*

The Blacktown soil landscape is a residual landscape characterised by low undulating rises on Wianamatta Group shale. Local relief is generally between 10 to 30 metres, while slopes are generally less than 5%, but occasionally up to 10%. Crests and ridges are broad (200 to 600 metres) with rounded tops and convex upper slopes morphing into concave lower slopes. Drainage lines are often broad and valleys are flat. Minor to moderate amounts of sheet and gully erosion have occurred in specific locales within the soil landscape (Hazelton & Tille 1990:27-28).

Topsoil consists of a friable greyish brown loam (bt1) that can contain rounded, fine gravel shale and charcoal fragments. This overlies a hard setting brown clay loam (bt2) that is classed as a subsoil. It commonly contains ironstone gravel shale fragments while charcoal and roots are rarely present. Below this is a strongly pedal, mottled brown, light clay (bt3) containing increasing amounts of gravel shale fragments. Finally, there is a light grey, plastic mottled clay (bt4) containing weathered ironstone, with occasional gravel shale fragments and roots. Soil depth or the presence of the different soil materials can vary considerably, dependant on location within the landscape (Hazelton & Tille 1990:28-29).

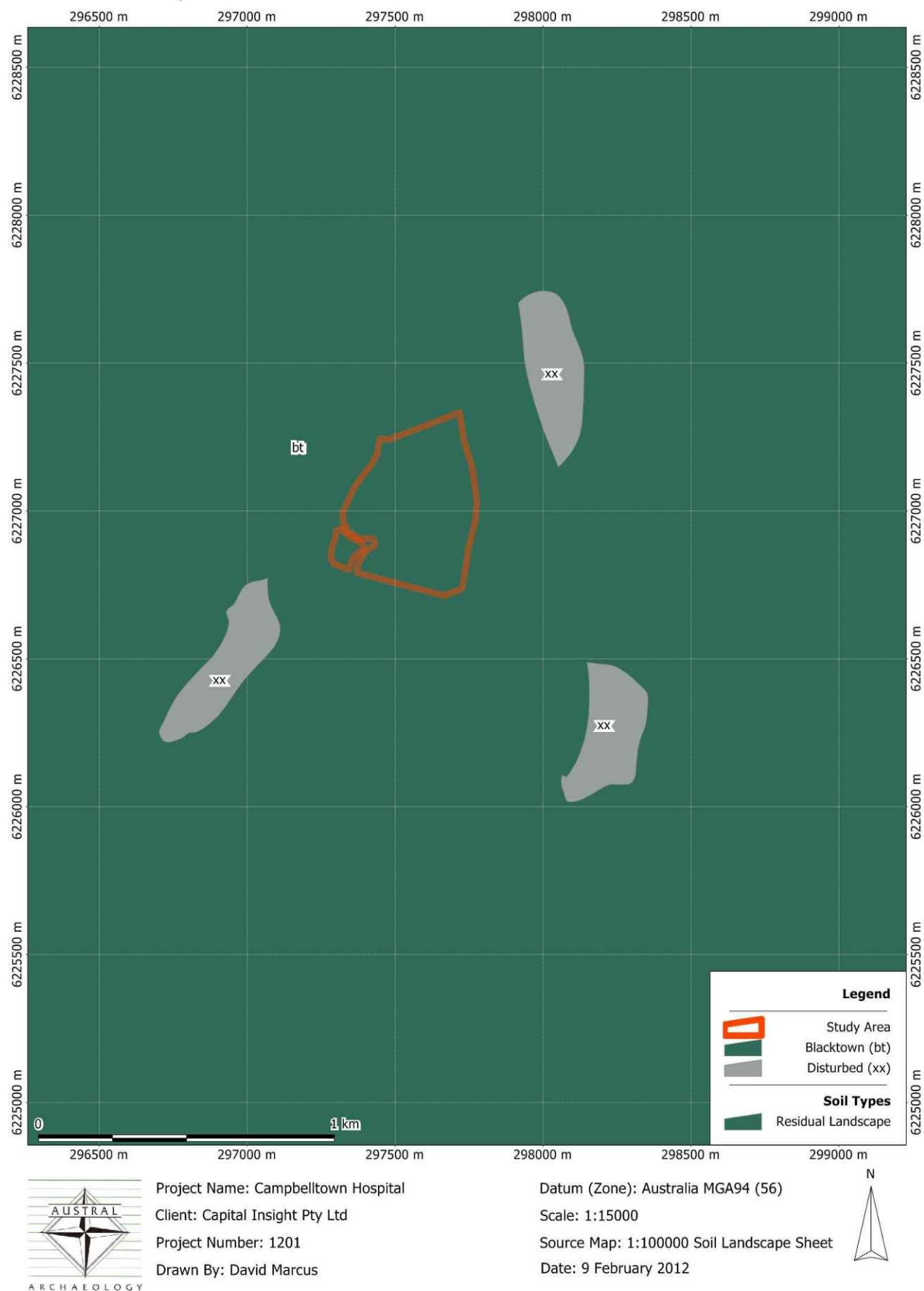


Figure 3.1 Soil landscapes of the study area.

3.3 Topography and Landform

The study area is situated on the upper portion of a gently sloping hill which runs off a ridgeline which rises in the south-eastern corner of the study area. The slope of the hill drops to the north-west, running down towards the modified creekline of Birunji Creek. The overall landscape of the study area has been heavily modified and landscaped during both the early history of the study area and the recent construction of buildings related to the hospital (GML 2011:24).

3.4 Hydrology

The study area is located within Georges River catchment that, in conjunction with the Grose River, forms one of the main water systems in central New South Wales. The major watercourses in the vicinity of the study area are the Nepean River, which flows northwards approximately 3 kilometres west of the study area and the Georges River, which flows northwards approximately 3 kilometres east of the study area. The headwaters of the Nepean River are found in the Southern Highlands, near Robertson, before it flows north-west towards Penrith and joins the Grose River to become the Hawkesbury River.

There are no water courses running through the study area. However, immediately to the east and west of the study area are two ephemeral 2nd order creeklines; Fishers Ghost Creek runs 300 metres east of the study area while Birunji Creek runs 100 metres west of the study area. Both creeks have been heavily modified and landscaped as a result of the new housing developments which now line their banks. These creeks run from south to north, before joining the larger 4th order Bow Bowing Creek to the north (Figure 3.2).

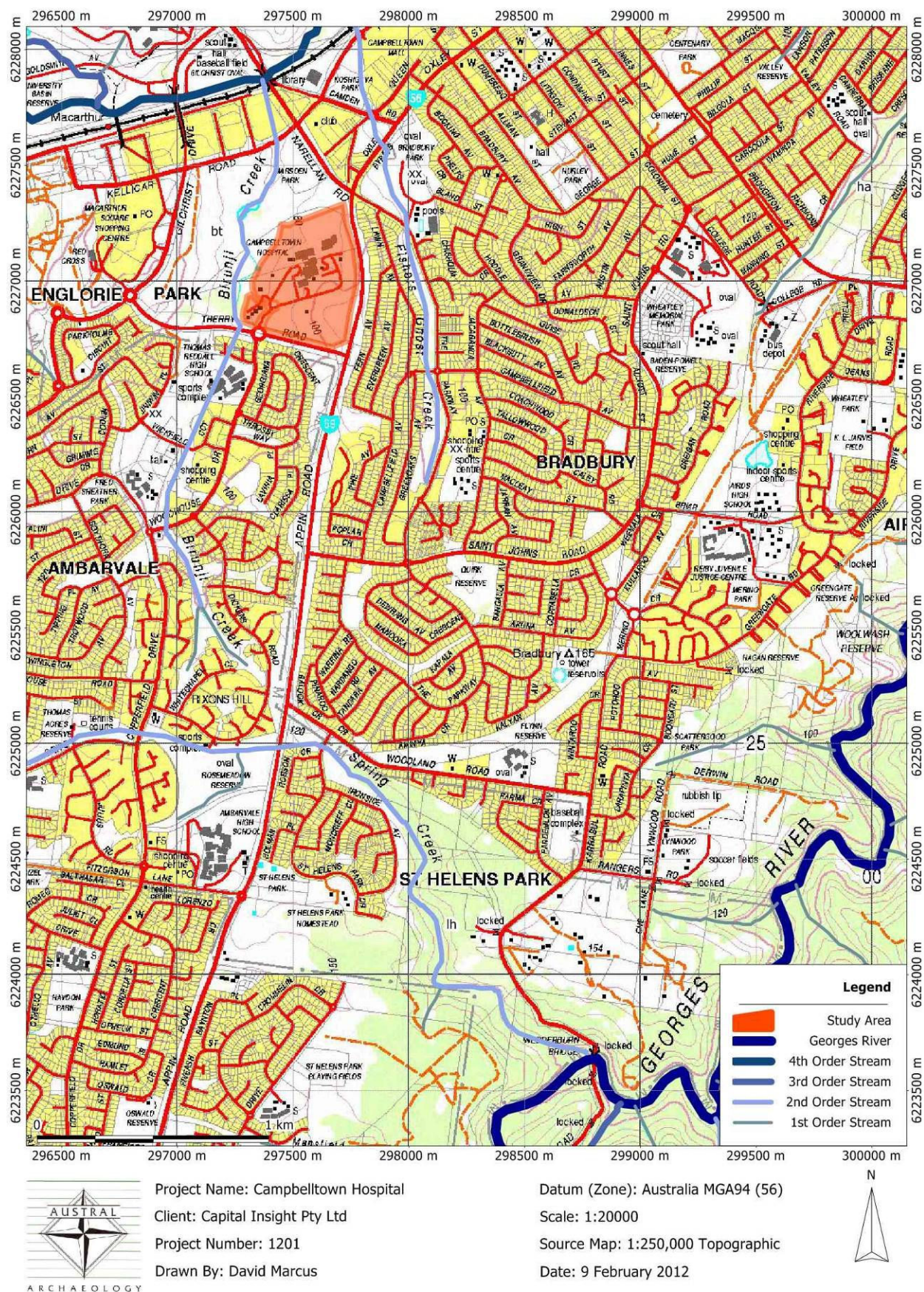


Figure 3.2 Map showing hydrology and stream order surrounding the study area.

3.5 Climate

The climate of the Cumberland Lowlands is warm temperate with a maritime influence, resulting in cool to mild winters and warm to hot summers. Average temperatures at Picton range from an summer average of 28.1°C to winter average of 16.9°C, with occasional overnight frosts. Rainfall totals are highest in the summer, with rain occurring on an average of 38 days per year and with approximately 700 millimetres of rainfall each year (Hazleton and Tille 1990:4).

3.6 Flora and Fauna

Prior to the removal of the natural vegetation, the ecological diversity of the area would have provided a wide range of resources for Aboriginal people. Aboriginal people frequenting the study area would have exploited resources from the nearby Nepean River as well those within the smaller drainage lines such as Bow Bowing Creek. Vegetation has been predominantly cleared but would have consisted of tall open-forest (wet sclerophyll forest), open-forest and woodland (dry sclerophyll forest). The areas of tall open-forest would have included Sydney blue gum and blackbutt, while open-forests in drier areas would have included forest red gum, narrow-leaved ironbark and grey box (Benson & Howell 1990:75). Smaller grasses and shrubs covering the ground would have included Kangaroo Grass (*Themeda australis*), as well as *Danthonia* Sp., *Chloris ventricose*, *Poa labillardieri*, *Aristida ramose*, *Sporobolus creber* and *Bothriochloa decipiens* (Benson & Howell 1990:72).

The study area and its nearby surroundings would have provided habitats for the usual variety of macropods found in the Cumberland Plain, most notably the grey eastern kangaroo. Meanwhile, the rivers and creeks would provide access to addition faunal resources such as fish species, a range of water birds and a variety of lizards.

3.7 Past Land Use Practices

A thorough land use history has been developed by GML in the course of their recent heritage assessment (GML 2011) and only a brief summary is provided in order to satisfactorily characterise the impacts that have occurred to the land within the study area.

Generally, the early settlement and economy of the Campbelltown Region focused on the naturally fertile soil and ideal growing conditions for European crops. Following the large-scale clearance of the native vegetation, Campbelltown gained a reputation as the “granary of the colony”, from the crops of wheat and other cereals which were grown there. After a disastrous bout of fungus all but destroyed the wheat crop in the early 1860s, large swathes of land were set aside for pastoralism, and, in particular, dairy farming (Benson & Howell 1990:75).

More specifically, the study area formed part of a land grant given to John Bolger in 1817. Despite the land grant changing hands several times during the 19th century, the land use was always primarily agricultural. Eventually, the land was subdivided and split into two separate farms following a final sale in 1874 (GML 2011:5-6).

Both farms continued to operate throughout the first half of the 20th century and are visible on the 1947 aerial photo of the area (Plate 3.1), which shows that the northern and southern farms were both used for pasture at this period (GML 2011:15).



Plate 3.1 Aerial photograph of the northern and southern farms taken in 1947, showing pastoral use of study area (GML 2011:15)

In 1955, Campbelltown Council purchased the northern farm off the owner, Donald McDonald, in order to expand the golf course which was located immediately to the north of his property (GML 2011:8). Following the sale, the new golf was completed in 1957 and is visible on the aerial photograph of 1961 (Plate 3.2). The southern farm was still in active use, and in the same year as the aerial photo, ownership was transferred from Clarence Ducat to King Dairy who owned the land until it was resumed by the State Planning Authority in 1968 (GML 2011:8).