230 Sixth Avenue, 68 Edmondson Avenue and 50 Edmondson Avenue, Austral

Aboriginal cultural heritage due diligence assessment

Prepared for Mott MacDonald on behalf of Austral 1 Pty Ltd

24 October 2016

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Glossary

AHIMS	Aboriginal Heritage Information Management System
AMBS	Australian Museum Business Services
Biosis	Biosis Pty Ltd
Due diligence code	*Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010)
GSV	Ground Surface Visibility
ICOMOS	International Council on Monuments and Sites
JMCHM	Jo McDonald Cultural Heritage Management
KNC	Kelleher Nightingale Consulting
LALC	Local Aboriginal Land Council
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	230 Sixth Avenue, 68 Edmondson Avenue and 50 Edmondson Avenue, Austral NSW
The code	The *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010)

Summary

Biosis Pty Ltd (Biosis) has been commissioned by Mott MacDonald on behalf of Austral 1 Pty Ltd to undertake an Aboriginal cultural heritage due diligence assessment for the proposed subdivision and residential development at 230 Sixth Avenue, 68 Edmondson Avenue and 50 Edmondson Avenue Austral, NSW (the Project). The Project involves the subdivision and development of one lot along Sixth Avenue and two lots along Edmondson Avenue.

Background research into the heritage values of the study area included an extensive search of the NSW Office of Environment and Heritage (OEH) Aboriginal Heritage Information Management System (AHIMS) database and a review of previous assessments in the local area. One previous assessment covering the study area was undertaken by Australian Museum Business Services (AMBS 2012a) but no previously recorded Aboriginal sites or objects were identified within the study area. Their report identified one area of moderate archaeological sensitivity within the study area around its north-eastern extent, associated with a creekline that flows approximately 120 metres to the east of the study area. The AHIMS search results identified 90 Aboriginal sites within a 4 kilometre by 4 kilometre search area, centred on the study area. None were located within the study area boundary.

A archaeological survey of the study area in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal objects in New South Wales* (the code) was conducted on 15 September 2016, attended by James Cole of Biosis, and Brad Maybury of Gandangara Local Aboriginal Land Council (LALC). During the site survey areas of previous disturbance were noted and recorded. Areas of ground surface exposure were targeted in order to identify any Aboriginal objects within the study area. No previously unrecorded Aboriginal sites or objects were located during the site survey.

The assessment did not identify any areas of archaeological potential within the study area, which has been heavily disturbed by past land use activities. As such it has been determined that no further assessment is required from an Aboriginal heritage perspective for the project to proceed.

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

Recommendation 1: Proposal to proceed without further archaeological input

The work described in this report can proceed without further assessment or approval under the NSW *National Parks and Wildlife Act 1974* (NPW Act) as no Aboriginal objects or places have been identified as occurring within the study area and the potential of locating them during the proposed works is assessed as low. This recommendation is conditional upon recommendations 2 and 3.

Recommendation 2: Discovery of unanticipated Aboriginal cultural material

All Aboriginal places and objects are protected under the NPW Act. This protection extends to Aboriginal objects and places that have not been identified but might be unearthed during construction. The following contingency plan describes the actions that must be taken in instances where Aboriginal cultural material any such discovery at the activity area must follow these steps:

1. **Discovery:** Should unanticipated Aboriginal cultural material be identified during any works, works must cease in the vicinity of the find.

2. **Notification:** OEH must be notified of the find.

3. **Management:** In consultation with OEH, GLALC and a qualified archaeologist, a management strategy should be developed to manage the identified Aboriginal cultural material. This may include the requirement to apply for an AHIP.

4. **Recording:** The find will be recorded in accordance with the requirements of the NPW Act and OEH guidelines.

Recommendation 3: Discovery of unanticipated human remains

The following contingency plan describes the actions that must be taken in instances where human remains or suspected human remains are discovered. Any such discovery at the activity area must follow these steps:

1. **Discovery**: If suspected human remains are discovered all activity in the vicinity of the human remains must stop to ensure minimal damage is caused to the remains, and the remains must be left in place, and protected from harm or damage.

2. **Notification**: Once suspected human skeletal remains have been found, the Coroners Office and the NSW Police must be notified immediately. Following this, the find must be reported to OEH and it is recommended that it is also reported to GLALC.

3. **Management**: If the human remains are of Aboriginal ancestral origin an appropriate management strategy will be developed in consultation with Aboriginal stakeholders and OEH.

4. **Recording**: The find will be recorded in accordance with the requirements of the NPW Act and OEH guidelines.

1 Introduction

1.1 Project background

Biosis Pty Ltd (Biosis) has been commissioned by Mott MacDonald on behalf of Austral 1 Pty Ltd to undertake an Aboriginal cultural heritage due diligence assessment for the proposed subdivision and residential development at 230 Sixth Avenue, 68 Edmondson Avenue and 50 Edmondson Avenue Austral, NSW (the Project). The Project involves the subdivision and development of one lot along Sixth Avenue and two lots along Edmondson Avenue.

An assessment in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (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 New South Wales* (DECCW 2010b) (the code) was conducted, in order adequately map areas of high, moderate and low archaeological potential.

1.2 Location of the study area

The study area is located within the Liverpool Local Government Area (LGA), Parish of Cabramatta, County of Cumberland (Figure 1). The study area incorporates Lot 1067 DP 2475 and, Lots A and B DP 416093 and is shown in Figure 2.

1.3 Planning approvals

The proposed development will be assessed against Part 4 of the *Environmental Planning and Assessment Act 1979* NSW. Other relevant legislation and planning instruments that will inform the assessment include:

- *Liverpool Growth Centre Precincts Development Control Plan 2014* (DCP)
- *Liverpool Local Environmental Plan2008* (LEP)
- *National Parks and Wildlife Act 1974* (NSW) (NPW Act)
- *National Parks and Wildlife Amendment Act 2010* (NSW).

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 an extensive search of the 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.
- Investigate the area of moderate potential as determined by AMBS (2012a) in order to accurately map the archaeological potential of the study area.

- Record and assess sites identified during the survey in compliance with the guidelines endorsed by the NSW Office of Environment and Heritage (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.

1.5 Aboriginal consultation

Consultation with the Aboriginal community is not a formal requirement of the due diligence process, however it is recognised in NSW that Aboriginal people are the primary determinants of the significance of their cultural heritage. A landscape may hold intangible values that can be assessed only by the Aboriginal community.

Brad Maybury of Gandangara Local Aboriginal Land Council (LALC) attended the site survey for this assessment on 15 September 2016. A copy of the draft report was provided to the LALC for their review and comment. Brad Maybury provided feedback on the draft report over the phone stating that he was satisfied with the recommendations, and emphasising the need to stop work if any unexpected Aboriginal sites are identified during the works.

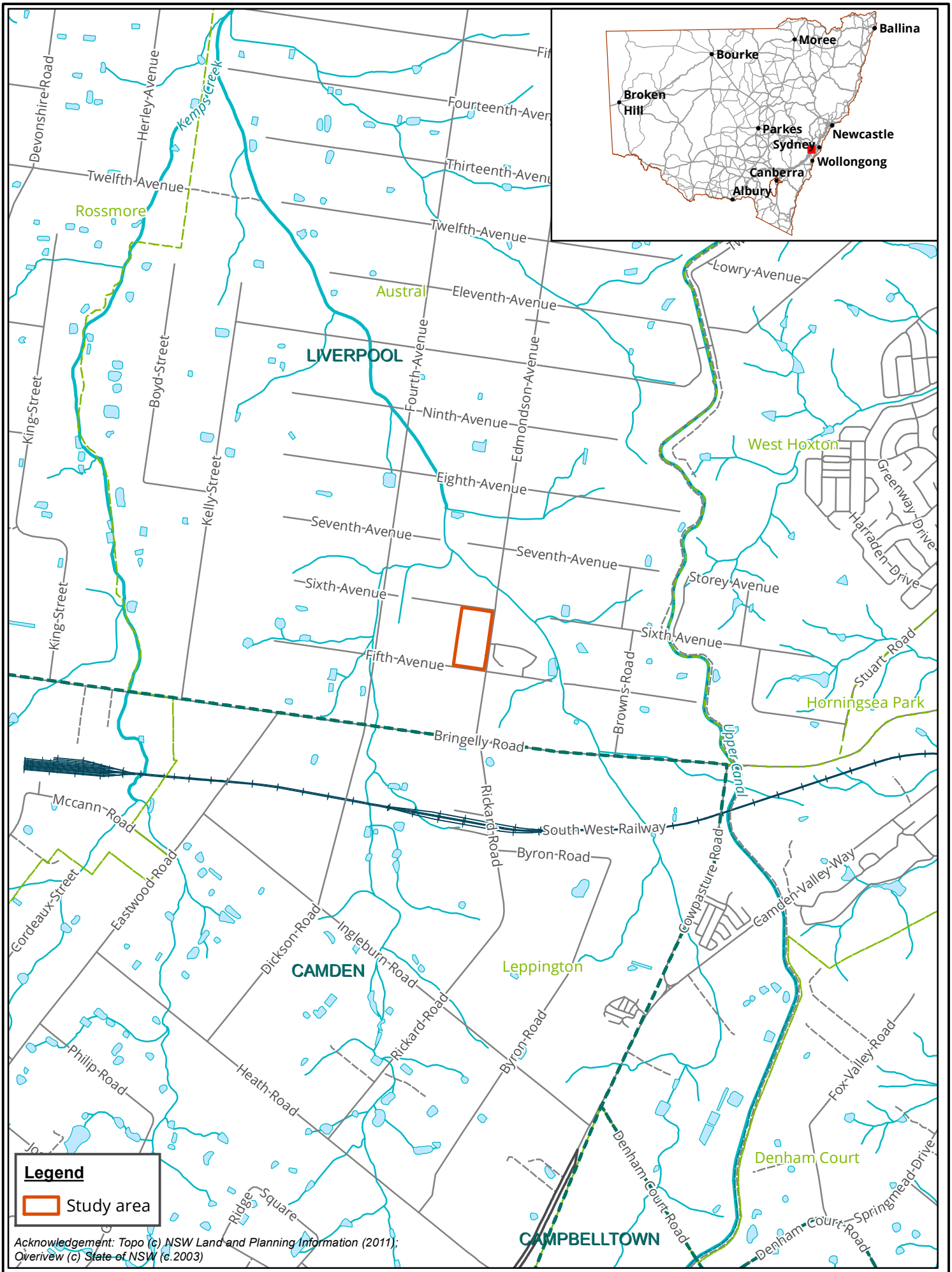


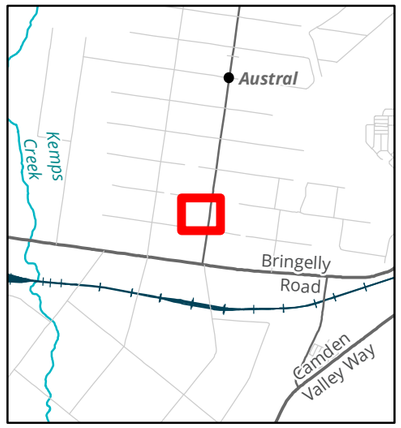
Figure 1: Location of the study area in a regional context

Matter: 22801
Date: 14 September 2016,
Checked by: JAC, Drawn by: LH, Last edited by: lharley
Location:P:\22800s\22801\Mapping\

0 250 500 750 1,000
Metres
N

Scale 1:25,000 @ A4, GDA 1994 MGA Zone 56

Biosis Pty Ltd
Ballarat, Brisbane, Canberra, Melbourne, Newcastle, Sydney, Wangaratta & Wollongong



Legend

Study area

Figure 2: Study area detail

0 10 20 30 40 50

Metres

Scale: 1:1,200 @ A3

Coordinate System: GDA 1994 MGA Zone 56

Biosis Pty Ltd

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

Matter: 22801
Date: 14 September 2016,
Checked by: JAC, Drawn by: LH, Last edited by: lharley
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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 an Aboriginal site prediction model 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 Geology, soils and landforms

The study area lies within the Cumberland Plain, which is a broad and shallow basin that stretches westwards from Parramatta to the Hawkesbury-Nepean River and southwards from Windsor to Thirlmere. It is contained within the Wianamatta Group geological formation, within the Bringelly Shale formation. This formation consists of shale with occasional calcareous claystone, laminate, and infrequent coal (Bannerman and Hazelton 1990, p. 28). Aboriginal artefact scatter sites are common across this formation, as are Potential Archaeological Deposits (PADs). The north-eastern corner of the study area consists of Quaternary alluvial deposits in association with an unnamed non-perennial stream to the north-east of the study area. These recent mud deposits of fine grained silt, sand and gravel deposited during the Quaternary period. The lack of underlying sandstone geology in this area makes other varieties of sites such as rock shelters and engraving sites are less common.

A third order, non-perennial stream runs 120 metres to the north-east of the study area. Another non-perennial, first order stream runs 300 metres west of the study area, before joining an unnamed third order stream 330 metres north-west of the study area. A number of second order, non-perennial streams lie to the west of the study area, at a minimum distance of 430 metres. These ultimately drain into the closest perennial watercourse to the study area, an unnamed fourth order stream approximately 530 metres north-north-west of the study area.

Stream order is recognised as a factor which assists the development of predictive modelling in Sydney Basin Aboriginal archaeology, and has seen extensive use in the Sydney region, most notably by Jo McDonald Cultural Heritage Management (JMCHM 2000, 2005a, 2005b, 2006, 2008). Predictive models which have been developed for the region have a tendency to favour higher order streams as the locations of campsites 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.

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

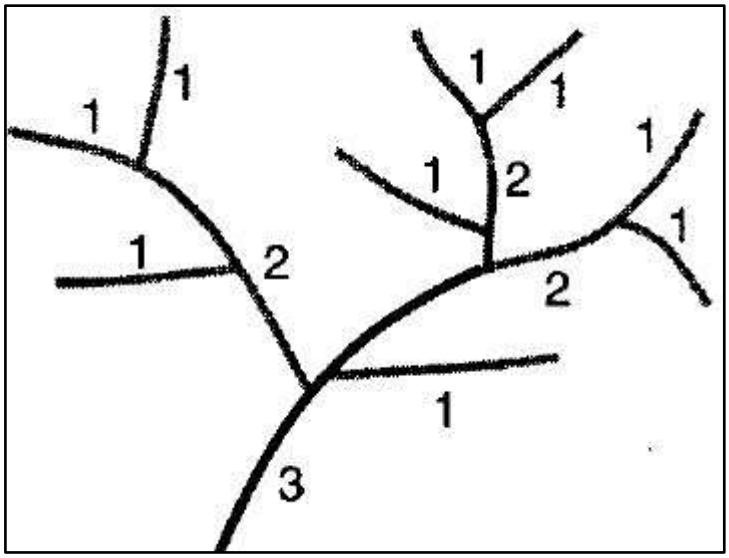


Plate 1 Diagram showing Strahler stream order (Ritter et al 1995, p. 151).

Topographically, the study area is located within a gentle slope landform, with the southern edge of the study area gently sloping down to the north east. This gentle inclination combined with the low relief of the area places the study area in a wider landscape of gently undulating rises to undulating low hills (Speight 2009, p. 47). Common landform elements within these systems include hillslopes, crests, drainage depressions, valley flats, and stream channels.

2.2 Soil landscapes

The study area is contained within the *Blacktown soil landscape*. The *Blacktown soil landscape* is 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 30 metres, with slopes of 5 per cent (Bannerman and Hazelton 1990, p. 29). The soil characteristics of this landscape are described in Table 1.

Table 1 Blacktown soil landscape characteristics (Bannerman and Hazelton 1990, pp. 29-30).

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 hard setting 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.

Soil material	Description
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 smooth-faced 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.

2.3 Flora and fauna

The *Blacktown soil landscape* typically supports dry sclerophyll forest; predominantly species of eucalypt, including Forest Red Gum, Narrow-leaved Ironbark, and Grey Box (Bannerman & Hazelton, 1990, p. 29). Broad-leaved Ironbark and White Stringybark are also occasionally present.

Within the Cumberland subregion of the Sydney Basin Bioregion there is a variety of vegetation types present, with Grey Box, Forest Red Gum, Narrow-leaved Ironbark woodland, 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 (NPWS 2003, p. 193).

Native fauna that would have been present in the vicinity of the study area include: Australian Wood Duck, White-faced Heron, Eastern Long-necked Tortoise, Eastern Water Skink, Garden Skink, Welcome Swallow, Purple Swamphen, as well as arboreal fauna including owls, Ring- and Brush-tailed Possums, and gliders (Cardno 2012).

2.4 Resource statement

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). 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).

2.5 Previous land use

The study area originally formed part of a 700 acre land grant to Thomas Carne, made in August 1819. Carne was soon occupying the land of his neighbour to the east, Matthew Pear, with a prominent hill at the eastern end of that property becoming known as Carnes Hill, giving the modern suburb of Carnes Hill its name.

In 1822, Carne advertised what had been Pear's property for sale as a most desirable farm and premises of 565 acres, containing 200 acres of felled land (100 of which had been cleared) and seven large paddocks. He

failed to sell the land and, upon returning to England in 1825 attempted to let the land and his original 700 acre grant (AMBS 2012b, pp. 17-18).

In 1887, Carne's grant and several other surrounding grants were purchased by Phillips & Company (also known as Austral Banking and Land Proprietary). These estates were combined and then subdivided into 1186 lots of about 3 acres each, with this subdivision pattern reflected in the current landscape.

In recent times, the study area has seen some residential development as well as agricultural activities in the form of animal grazing and, farming. The entirety of the study area appears to have been cleared in various stages over the course of the 19th and 20th centuries (Plate 2 and Plate 3).

The 1947 aerial (Plate 2) shows extensive vegetation clearance in the southern portion of the study area, along with a residential structure and outbuildings. Sections of the northern portion of the study area have also been cleared at this time, and a small dam is located in the north-eastern corner of the study area. The 1976 aerial (Plate 3) shows further land clearance, with most of the land deforested at this point and a building constructed in the north-western portion of the study area. A second residential building appears to have been constructed to the north of the previous structure in the southern portion of the study area during the intervening years. Current aerials show that the number of structures within the study area has grown substantially since 1976 and many previously cleared areas have since regrown, although market gardening appears to continue in the southern lots.

Plate 2 1947 aerial photograph of the study area (NSW LPI 2016).

Plate 3 1976 aerial photography of the study area (NSW LPI 2016).

3 Aboriginal context

3.1 Ethnohistory and contact history

It is generally accepted that people have inhabited the Australian landmass for the last 50,000 years (Allen and O'Connell 2003). Dates of the earliest occupation of the continent by Aboriginal people are subject to continued revision as more research is undertaken. The timing for the human occupation of the Sydney Basin is still uncertain. While there is some possible evidence for occupation of the region around 40,000 years ago, the earliest known radiocarbon date for the Aboriginal occupation of the Sydney Basin is associated with a cultural / archaeological deposit at Parramatta, which was dated to 30,735 ± 407 BP (JMCHM 2005a and 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.

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 study 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.

After the arrival of European settlers the movement of Aboriginal hunter-gatherers became increasingly restricted. 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 (Brookes *et al* 2003, p. 16). At the same time diseases such as small pox were having a devastating affect 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.

3.2 Regional context

Brayshaw McDonald (1994) completed the Liverpool Rural Lands Study which included, a broad predictive study relating to Aboriginal sites in rural areas to the west of Liverpool. The report identified that the distribution of sites was mostly dependent on topography and the bedrock formation of the area, or geology.

It identified that shelter sites, art sites, and grinding grooves were likely to occur overlying sandstone formations where the appropriate topography was present. Sites over the remainder of the Cumberland Plain were likely to consist of open artefact scatters, quarries, modified trees, and stone arrangements. The report noted that occupation within the area was likely to be similar to the northern Cumberland Plain, as the landscape and geology were extremely similar. As such, predictive site modelling was summarised from an assessment which included test excavations completed by Rich and McDonald in 1993:

- *Most of the areas tested [either with sparse or no surface manifestations] contained subsurface archaeological deposits.*
- *Sites which are on permanent water are more complex [ie they represent foci for larger groups or are used repeatedly by smaller groups over a long period of time] than sites on ephemeral or temporary water lines. Major confluences are prime site locations. Sparse sites also occur on major creeklines and not all confluences are locations of prime sites.*
- *Alluvial terraces [and other depositional environments] contain the best potential for intact archaeological remains. Some hillslope zones may also be intact and have good potential. In areas where there is deep alluvium many sites also have intact material below the plough zone. These sites often have artefact bearing deposit to a depth of 70-90cm; the plough zone is [max] 25cm deep.*
- *Temporary and minor gullies tend to have one-off or occasionally repeated Aboriginal visits in prehistory and hence low density sites.*
- *Few ridgetop sites were located by the testing programme mostly because the associated development was located close to the creeklines, but also because of the higher levels of destructive disturbance in the more elevated locations, eg housing and ploughing of shallower deposit.*
- *While much of the Rouse Hill study area had been severely disturbed over the last 200 years, the areas tested on the whole revealed intact patterns in the archaeological material.* (Brayshaw McDonald 1994, pp. 20-21).

AMBS (2012) conducted a wide ranging report, assessing the entirety of the Austral and Leppington North precincts for the Urban Form Analysis of the South West Growth Centres. Although surveys were targeted at specific properties (north of the current study area), which at the time represented accessible properties, the results of the survey were combined with the existing regional model and a review of studies within the local area in order to produce sensitivity mapping for the entirety of the Austral and Leppington North precincts.

Regionally, trends noted as influencing this sensitivity model include the following statements:

- Sites are most frequently located in close proximity to permanent water courses on creek banks, alluvial flats, or high ground.
- Large artefact scatters may be identified up to 200 – 250 metres away from water courses.
- More needs to be considered than just the presence or absence of surface artefacts when characterising an archaeological site.

The predictive model employed by AMBS stated that the most common site type occurring in the area would be stone artefacts scatters, and that undisturbed alluvial soils have the potential to be associated with stratified archaeological deposits (AMBS 2012, p. 56). The results of the survey largely confirmed this predictive model, with AMBS identifying seven new sites including six isolated finds and one artefact scatter/ PAD.

AMBS did not conduct a survey of the current study area as a part of the assessment however the archaeological sensitivity mapping has identified areas of potential sensitivity as described below. This mapping identified an area of moderate sensitivity within the current study area (Plate 4).The report defines moderate sensitivity as "artefacts in detectable densities known to occur in the area, or in similar environmental/landscape contexts within the region" (AMBS 2012, p. 72). This assessment is linked to the creeklines present in the local area, to the north and east of the study area.

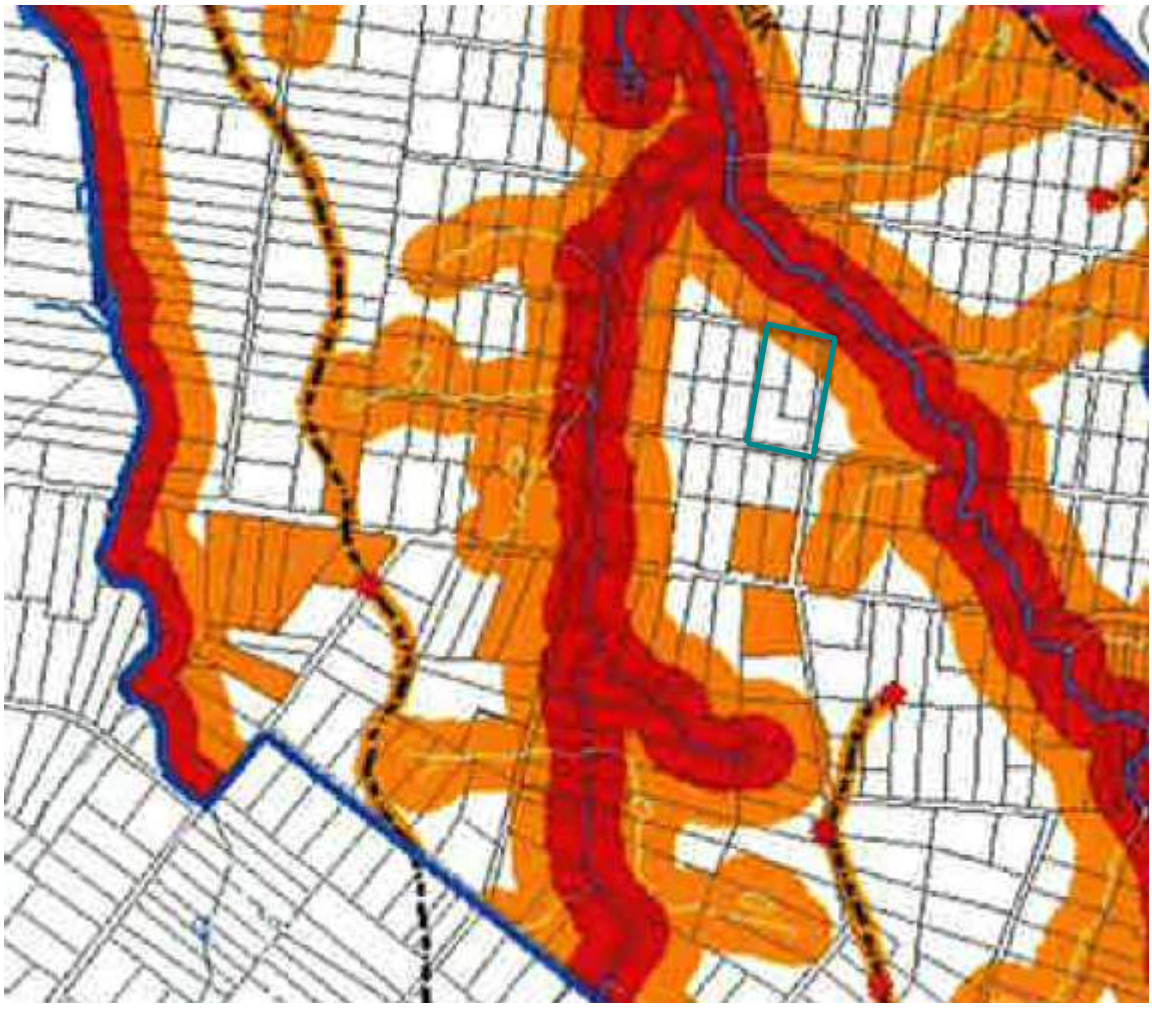


Plate 4 Excerpt from AMBS (2012, p. 74) showing areas of moderate (orange) and high (red) archaeological sensitivity. The current study area is marked in blue.

The report also notes that previous land use within the Austral and Leppington North precincts has centred on pastoralism, horticulture, agriculture, and residential developments. More recently the development of infrastructure and the expansion of residential development is likely to have further impacted on archaeological resources within the area, lessening the likelihood of there being intact subsurface deposits.

After completing this sensitivity mapping, AMBS assessed the levels of disturbance within the area, identifying that the current study area had been subject to 'gross disturbance' which eliminated its archaeological potential (Plate 5). This assessment of disturbance was based on 2012 land-use mapping.

Plate 5 Excerpt from AMBS (2012, p. 75) showing areas of moderate (orange) and high (red) archaeological sensitivity after disturbance had been assessed. The current study area is marked in blue.

Jo McDonald Cultural Heritage Management (JMCHM 2001) undertook an assessment at West Hoxton, in aid of the South Hoxton Park Aerodrome Master Plan. The background research for the area suggested that artefact scatters would likely be associated with streams, with the size and number of sites increasing with stream order. It also noted that smaller scatters and isolated finds have the potential to be identified across a variety of landforms within the landscape, including hillslopes and ridges away from water (JMCHM 2001, p. 9).

Survey efforts were hampered by land access issues, as the majority of the land in the area studied was privately owned; however a total of two artefact scatters and nine PADs were identified by the investigation,

with one previously identified site (also an artefact scatter) being relocated. The majority of the PADs were assessed as having low to moderate potential, with JMCHM noting that the true potential of sites was difficult to assess in the absence of test excavations.

Biosis (2014) undertook an Aboriginal due diligence assessment at 35 Fifteenth Avenue, Middleton Grange, in advance of a residential subdivision at the site. An area of the site had previously been designated as part of a PAD by JMCHM (2001). The site survey undertaken by Biosis determined that the area of PAD falling within the lot was heavily disturbed, and being located on a moderate slope, had low potential to contain intact archaeological deposits.

Biosis (2015) undertook an Aboriginal due diligence assessment at 50 – 56 Kelly Street Austral, in advance of a residential subdivision at the site. Similarly to the current study area, a portion of this site was within an area marked by AMBS as having moderate sensitivity, being located adjacent to a ridgeline. The site survey did not identify any Aboriginal sites or objects, or any areas of potential.

It was determined that the area marked by the previous AMBS (2012) study as being of moderate sensitivity had low archaeological potential owing to its distance from water sources and the nature of the water sources that were closest to it, which were first order drainage channels and were unlikely to be flowing often, as well as areas of localised disturbance within the study area.

Kelleher Nightingale Consulting (KNC 2011) undertook an assessment of a 10 kilometre strip of Bringelly Road in advance of a proposed upgrade (taking the road from two to four lanes in size). Predictive modelling employed by KNC suggested that artefact scatters and isolated finds were the site types most likely to be identified, where exposure and visibility were high. These sites were considered most likely to be identified in close proximity to water sources, on either flat or gently sloping landforms.

A total of 44 sites were identified in the design corridor of the proposed upgrade, all of which were either artefact scatters or isolated finds.

Biosis (2016) undertook an Aboriginal due diligence assessment at 240 – 260 Fifth Avenue, Austral, in advance of a residential subdivision at the site. Similarly to the current study area, a portion of this site was within an area marked by AMBS as having moderate sensitivity due to its proximity to creeklines. In consultation with the LALC the archaeological survey identified an area of moderate potential on a low rise and slope in an area of minimal disturbance, above the area identified by AMBS as possessing moderate sensitivity. Further archaeological assessment of this area was recommended.

3.3 Local context

3.3.1 Identified Aboriginal archaeological sites – study area

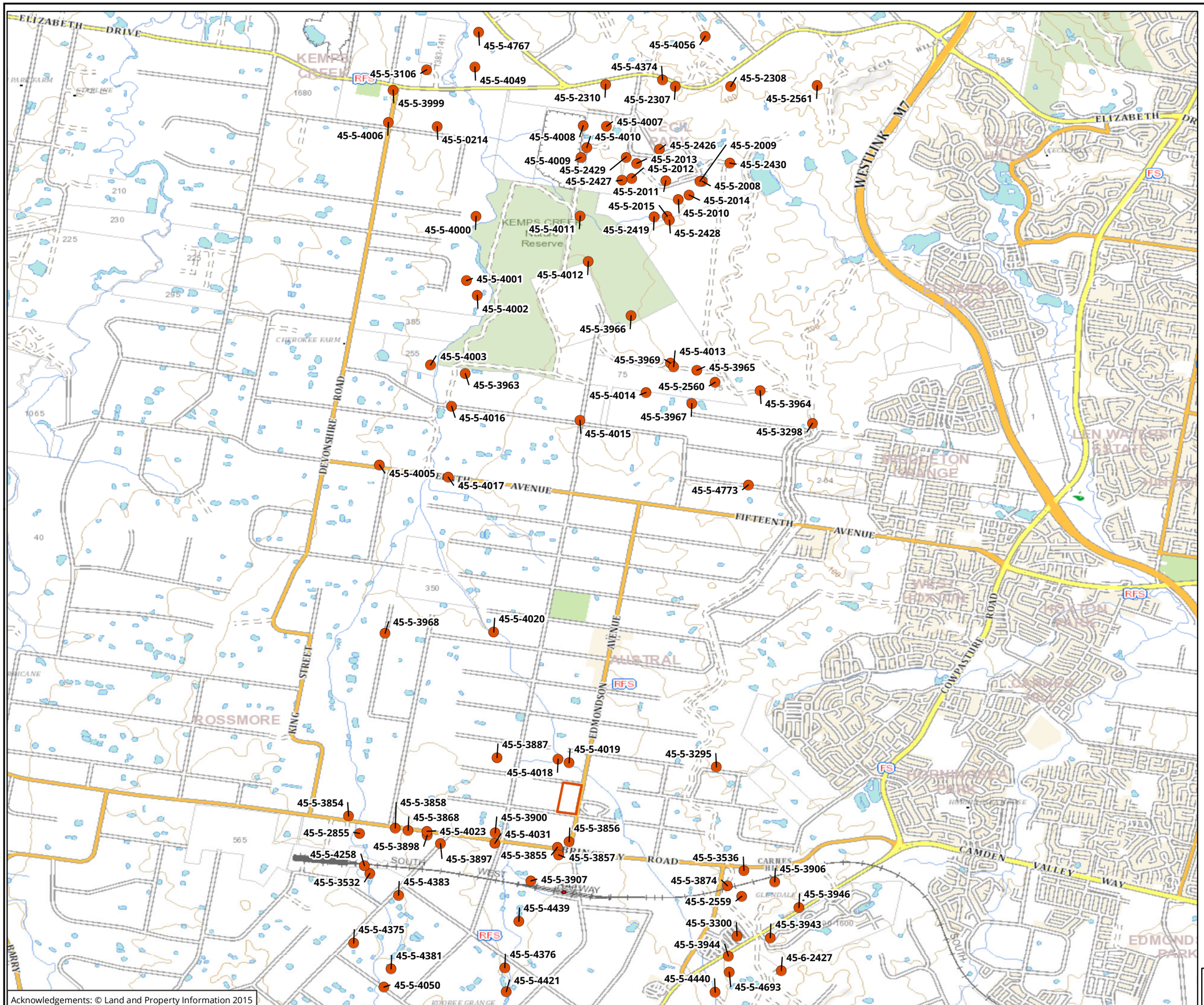
An extensive search of the AHIMS database was conducted on 9 September 2016 (Client service ID: 244138). The search identified 90 Aboriginal archaeological sites within a 4 kilometre by 4 kilometre search area, centred on the study area (Table 2). None of these registered sites are located *within* the study area (Figure 3). 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 on where notable discrepancies occurred. The AHIMS search completed for this assessment can be found in Appendix 1.

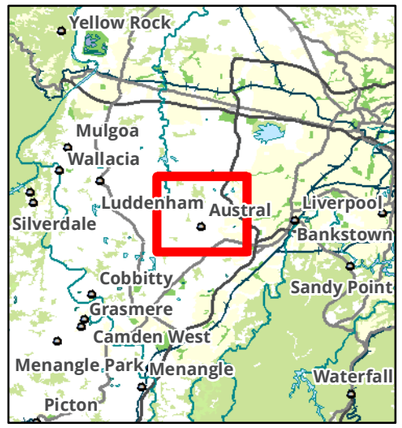
It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area. A number of registered sites exhibited more than one site type, hence why 100 'sites' are shown in Table 2 when only 90 were identified by the AHIMS search.

Table 2 AHIMS site types within the vicinity of the study area.

Site type	Occurrences	Frequency (%)
Art	1	1
Artefact	74	74
Modified tree	1	1
PAD	22	22
Shell	1	1
Stone arrangement	1	1
Total	100	100

A simple analysis of Aboriginal sites identified by the search shows that artefact sites are the most dominant site type in the area, accounting for 74% of the search results. PADs are also common, representing 22% of the search results. One burial, AHIMS #45-5-3968, is listed as located in the vicinity of the study area, but the site card shows this is in fact an isolated artefact find that has been misreported in the AHIMS register. Single art, shell and modified tree sites, as well as a stone arrangement, also appeared in the AHIMS search, at a minimum distance of 2 kilometres from the study area. Given the relative rarity of these site types in the local area and their from the study area, it is unlikely that this site type will occur within the study area. These results are consistent with the predictive modelling carried out by AMBS (2013).





Legend

- AHIMS Records
- Study area

Figure 3: AHIMS sites in the vicinity of the study area

0 360 720 1,080 1,440 1,800

Metres

Scale: 1:36,000 @ A3

Coordinate System: GCS GDA 1994

biosis

Biosis Pty Ltd

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

Matter:
Date: 14 September 2016,
Checked by: lharley, Generated by: lharley
Location:P:\22800s\22801\Mapping\22801_F3_AHIMS.mxd

3.3.2 Predictive statements

These predictive statements are based on the regional and local distribution of sites as recorded in the AHIMS register and regional and local studies focused on site distribution. The key factors required to build the predictive statements include:

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

Based on this information, predictive statements have been developed, indicating the site types most likely to be encountered during the survey and subsequent subsurface investigations across the present study area (Table 3 and Table 4).

Table 3 Definitions of the predictive statements' potential ratings.

Potential rating	Description
High	Those aboriginal sites types give this rating have been recorded in both the regional and local landscape. The landscape conditions within the focus area will be aligned with those generally associated with this site type. Although it may be unlikely to locate this site type, due to their overall moderated numbers, this location would be where you would ultimately find them.
Medium	Sites are known to occur in the regional and local landscape but not in high numbers. The landscape conditions are not precisely aligned however the site may infrequently occur in certain conditions.
Low	The site types given this rating have been recorded regionally. The site is generally considered unlikely to occur within the landform conditions present.

Table 4 Aboriginal site prediction statements.

Site type	Site description	Potential
Potential Archaeological Deposits (PADs)	Potential subsurface deposits of cultural material	**High:** PADs have been previously recorded in the region across a wide range of landforms, accounting for 22% of sites. They are likely to be present within areas adjacent to water courses or on high points in undisturbed landforms. The mapping of archaeological sensitivity completed by AMBS (2013) suggests that PADs may be located within the study area.

Site type	Site description	Potential
Flaked stone artefact scatters and isolated artefacts	Artefact scatter sites can range from high-density concentrations of flaked stone and ground stone artefacts to sparse, low-density 'background' scatters and isolated finds.	**High**: stone artefact sites are the most commonly recorded site type in the local area, accounting for over 74% of all recorded sites. Due to the distance from permanent fresh water resources, the potential for artefacts to be present within the study area is assessed as high.
Scarred trees	Trees with cultural modifications	**Low:** scarred trees are common across the wider Cumberland Plain, but have not been recorded in the vicinity of the study area. Owing to the extensive land clearance evident in aerial photography for the study area, the potential for this site type to be present is assessed as low.
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.
Quarries	Raw stone material procurement sites	**Low:** there is no record of any quarries being within or surrounding the study area.
Shell middens	Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time.	**Low:** One shell site has been recorded within the vicinity of the study area in association with Kemps Creek, There is a low potential for shell middens to be located in the study area as the first order drainage lines close to the study area are not permanent water sources.
Grinding grooves	Grooves created in stone platforms through ground stone tool manufacture.	**Low:** this site type has not been previously recorded in the vicinity of the study area, and the underlying geology of the area makes it unlikely that this site type will be present, as suitable sandstone outcrops will not be present within the study area.
Rock shelters with art and / or deposit	Rock shelter sites include rock overhangs, shelters or caves, and generally occur on, or next to, moderate to steeply sloping ground characterised by cliff lines and escarpments. These naturally formed features may contain rock art, stone artefacts or midden deposits and may also be associated with grinding grooves.	**Low:** this site type has not been previously recorded in the vicinity of the study area, and the underlying geology of the area makes it unlikely that this site type will be present, as suitable sandstone overhangs will not be present in the study area.

Site type	Site description	Potential
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.
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 any.
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 survey

An archaeological survey of the study area was undertaken on 15 September 2016, attended by James Cole (Biosis), and Brad Maybury (Gandangara LALC) in accordance with the code. 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.
- Ground truth the results of sensitivity mapping carried out by AMBS (2013).

4.2 Survey methods

The archaeological survey was conducted on foot. 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 40 m across or with a 20 m radius (Speight 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. Recording techniques were incorporated into the survey including representative photographs of survey units, landform, vegetation coverage, ground surface visibility 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 factors that contributed most to the effectiveness of the survey within the study area were the dense grass cover throughout large portions of the study area, which severely limited the potential for the identification of surface artefacts. Some low lying portions of the study area around its north-eastern corner were also waterlogged, reducing the effective survey coverage in this area (Plate 7).

Plate 6 **Waterlogged areas in the northern portion of the study area.**

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 (NSW NPWS 1997, Appendix 4). Visibility throughout the study area was low, averaging between 0 and 2 per cent. Across the majority of the study area, the dense vegetation reduced the survey visibility to effectively nil (Plate 7, Plate 8); however in some portions of the study area visibility was higher, particularly surrounding exposures caused by disturbance.

Plate 7 **Typical grass cover within the study area, view west.**

Plate 8 **Vegetation cover within the study area, view north.**

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 and Smith 2004, p. 79, NSW NPWS 1997, Appendix 4). Overall, the study area displayed areas of exposure in scours associated with disturbance, such as the dumping of construction materials (Plate 9), and clearings associated with previous earthworks (Plate 10).

Plate 9 **Area of exposure associated with the dumping of construction materials, view south.**

Plate 10 **Erosion scour in the north-eastern portion of the study area, view north.**

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.

Large portions of the study area have been subject to heavy disturbance, as a result of a number of activities. All properties that form the study area have been subject to residential development, as shown in Figure 2, and large portions of the area have also been farmed in the past as demonstrated by the historical aerial photography for the study area (Plate 2, Plate 3). The survey identified further disturbances associated with dumping and earthworks (Plate 9, Plate 10), as well as some stockpiling activities (Plate 11), landscaping, and the construction of driveways in the study area (Plate 12).

Plate 11 **Stockpiling activities within 230 Sixth Avenue, as well as outbuildings and driveways, view south.**

Plate 12 **Driveways and landscaping activited within the southern portion of the study area, view south.**

4.7 Survey results and discussion

The study area was contained within two broad landform units, both of which were assessed as a part of the survey. The north-eastern portion of the study area is contained within the flat landform, and the southern and western portions of the study area were located in the gentle slope landform, maintaining a very gentle gradient sloping down to the north. Topographical maps indicate a rough gradient of 1:40 across the study area.

The reason that no stone artefacts were identified within the study area by the survey is primarily attributed to the extremely GSV within the study area, as the majority of the ground surface was covered in dense grass or vegetation. Exposures within the study area were targeted in an attempt to identify any visible surface artefacts. The study area has also been subject to extensive clearing, and no mature trees were identified, limiting the potential for scarred trees to be identified within the study area.

The flat landform in the north-western portion of the study area is located within 200 metres of a third order ephemeral creekline, and as such has been assigned moderate sensitivity by AMBS (2012a). The site survey targeted this area to identify if there was any potential for Aboriginal sites to be present. The area has been heavily disturbed by dumping and earthworks (Plate 9, Plate 10), with no artefacts being identified in the exposures created by these activities. The flat landform in this are did not appear to provide any particularly advantageous locations for Aboriginal occupation, with no indicators being identified that this area would have been preferred over others closer to the creekline within the same landform. Discussion with the LALC identified that areas closer to the creekline or on higher ground further to the south are likely to have higher archaeological potential.

Based on the extensive disturbance within the study area, distance to water sources, and landforms present, it was concluded that there is a low potential for Aboriginal sites to be present. No Aboriginal sites or areas of potential have been identified during this assessment.

5 Conclusions and recommendations

The results of this assessment indicate there is a low potential for Aboriginal sites to be present within the study area. Therefore no further archaeological heritage assessment is required and works can proceed with caution without further archaeological assessment, in accordance with the recommendations outlined below. The results of this assessment are also demonstrated in the due diligence flowchart, provided by the due diligence code of practice (Figure 4).

5.1 Recommendations

The following management recommendations have been developed relevant to the study area and are influenced by:

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

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

Recommendation 1: Proposal to proceed without further archaeological input

The work described in this report can proceed without further assessment or approval under the NSW NPW Act as no Aboriginal objects or places have been identified as occurring within the study area and the potential of locating them during the proposed works is assessed as low. This recommendation is conditional upon recommendations 2 and 3.

Recommendation 2: Discovery of unanticipated Aboriginal cultural material

All Aboriginal places and objects are protected under the NPW Act. This protection extends to Aboriginal objects and places that have not been identified but might be unearthed during construction. The following contingency plan describes the actions that must be taken in instances where Aboriginal cultural material any such discovery at the activity area must follow these steps:

1. **Discovery:** Should unanticipated Aboriginal cultural material be identified during any works, works must cease in the vicinity of the find.
2. **Notification:** OEH must be notified of the find.
3. **Management:** In consultation with OEH, GLALC and a qualified archaeologist, a management strategy should be developed to manage the identified Aboriginal cultural material. This may include the requirement to apply for an AHIP.
4. **Recording:** The find will be recorded in accordance with the requirements of the NPW Act and OEH guidelines.

Recommendation 3: Discovery of unanticipated human remains

The following contingency plan describes the actions that must be taken in instances where human remains or suspected human remains are discovered. Any such discovery at the activity area must follow these steps:

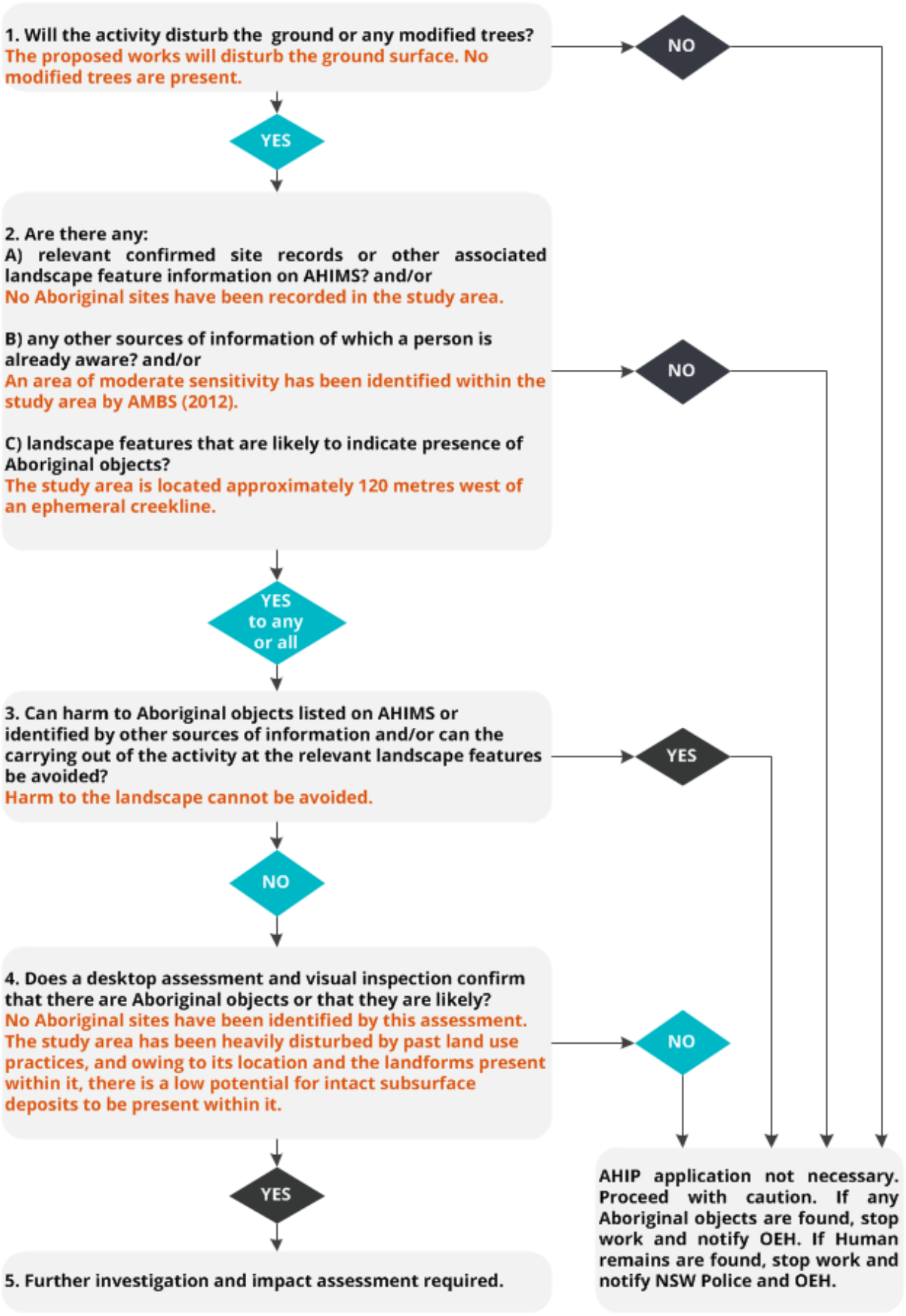
1. **Discovery**: If suspected human remains are discovered all activity in the vicinity of the human remains must stop to ensure minimal damage is caused to the remains, and the remains must be left in place, and protected from harm or damage.

2. **Notification**: Once suspected human skeletal remains have been found, the Coroners Office and the NSW Police must be notified immediately. Following this, the find must be reported to OEH and it is recommended that it is also reported to GLALC.

3. **Management**: If the human remains are of Aboriginal ancestral origin an appropriate management strategy will be developed in consultation with Aboriginal stakeholders and OEH.

4. **Recording**: The find will be recorded in accordance with the requirements of the NPW Act and OEH guidelines.

Figure 4 Flow chart of the due diligence process for the project.



References

Allen J & O'Connell JF 2003. The long and the short of it: archaeological approaches to determining when humans first colonised Australia and New Guinea. Australian Archaeology, 57: 5-19.

Attenbrow V 2002. Sydney's Aboriginal Past: Investigating the archaeological and historical records. University of New South Wales Press Ltd, Sydney.

Australia International Council on Monuments and Sites (ICOMOS) 2013. The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, 2013. Australia ICOMOS.

Australian Museum Business Services (AMBS) 2012a. Indigenous Heritage Assessment Project: Austral & Leppington North Precincts, South West Growth Centres. Report for NSW Department of Planning and Infrastructure.

Australian Museum Business Services (AMBS) 2012b. Austral and Leppington North Precincts – Historic Heritage Project. Report for NSW Department of Planning and Infrastructure.

Bannerman & Hazelton. 1990. Soil Landscapes of the Penrith 1:100,000 Map Sheet. Soil Conservation Service NSW, Sydney.

Biosis 2014. Due Diligence Advice for Aboriginal archaeological heritage for 35 Fifteenth Avenue, Middleton Grange. Report to Burton and Field Pty Ltd. Project no. 19246.

Biosis 2015. 50-56 Kelly Street, Austral: Aboriginal Cultural heritage due diligence assessment. Report to Vantage Property. Project no. 20052.

Biosis (2016). 240-260 Fifth Avenue, Austral: Aboriginal cultural heritage due diligence assessment. Report for Mott MacDonald. Authors: J Cole, Biosis Pty Ltd, Sydney. Project no. 22566.

Brayshaw McDonald Pty Ltd 1994. Liverpool Rural Lands Study Aboriginal Archaeology: Prediction and Management. Report to Don Fox Planning on behalf of Liverpool Council.

Burke H & Smith C 2004 The Archaeologist's Field Handbook. Allen Unwin, Crows Nest, Sydney, Australia.

Cardno 2012. Austral-Leppington North Precinct Biodiversity Conservation Assessment 600288/R2678v7. Report to the Department of Planning.

Dallas M 1982. An Archaeological Survey at Riverstone, Schofields and Quakers Hill, NSW. Prepared for the Land Commission of NSW.

Department of Environment, Climate Change and Water 2010a. *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales.* NSW Department of Environment, Climate Change and Water, Sydney NSW.

Department of Environment, Climate Change and Water 2010b. *Code of Practice for the Archaeological Investigation of Aboriginal objects in New South Wales.* NSW Department of Environment, Climate Change and Water, Sydney NSW.

JMCHM 2001. Southern Hoxton Park Aerodrome Master Plan: Preliminary Archaeological Assessment of Indigenous Heritage Sites. Jo McDonald Cultural Heritage Management Pty Ltd. Report to SMEC Australia Pty Ltd, Annand & Alcock and Liverpool City Council.

JMCHM 2005a. Archaeological Salvage Excavation of Site RTA-G1 109-113 George Street Parramatta, NSW. Jo McDonald Cultural Heritage Management Pty Ltd. Report to Landcom.

JMCHM 2005b. 'Archaeological Salvage Excavation of Site CG1 (NPWS #45-5-2648), at the corner of Charles and George Streets, Parramatta, NSW'. Jo McDonald Cultural Heritage Management Pty Ltd. Report prepared for Meriton Apartments Pty. Ltd.

JMCHM 2006. Archaeological Subsurface Investigations at Sepp59 Wonderland Surplus, Old Wallgrove Road, Eastern Creek. Jo McDonald Cultural Heritage Management Pty Ltd. Report to Australand Holdings Pty Ltd.

JMCHM 2008. Austral Land, Mamre Road , Erskine Park: Archaeological Salvage Excavations. Jo McDonald Cultural Heritage Management Pty Ltd. Report to Macquarie Goodman.

NPWS 1997. Aboriginal cultural heritage standards and guidelines kit. NSW National Parks and Wildlife Service Hurstville.

NPWS 2003. The Bioregions of New South Wales: their biodiversity, conservation and history. NSW National Parks and Wildlife Service Hurstville.

Ritter D, Kochel R & J Miller 1995. Process geomorphology. W C Brown, Dubuque, Iowa.

Speight J G 1998. Landform in McDonald RC & Isbell RF (eds.) Australian Soil and Land Survey Field Handbook, p.9-57. Goanna Print, Canberra Australian.

Strahler A 1952. "Hypsometric (area-altitude) analysis of erosional topology", Geological Society of America Bulletin 63(11): 1117–1142.

Strahler A 1964. 'Quantitative geomorphology of drainage basins and channel networks' in Chow, V.T. (eds.), Handbook of Applied Hydrology. McGraw-Hill, New York.

Appendices

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 : 22801

Client Service ID : 244138

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-2008	SC4;Cecil Park Shooting Complex;	AGD	56	298360	6247790	Open site	Valid	Artefact : -	Isolated Find	3857
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2009	SC5 Cecil Park Shooting Complex	AGD	56	298340	6247790	Open site	Valid	Artefact : -	Isolated Find	3857
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2010	SC6;Cecil Park Shooting Complex;	AGD	56	298160	6247600	Open site	Valid	Artefact : -	Isolated Find	3857
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2011	SC3;Cecil Park Shooting Complex;	AGD	56	298050	6247790	Open site	Valid	Artefact : -	Isolated Find	3857
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2012	SC2;Cecil Park Shooting Complex;	AGD	56	297760	6247810	Open site	Valid	Artefact : -	Isolated Find	3857
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2013	SC1;Cecil Park Shooting Complex;	AGD	56	297800	6247960	Open site	Valid	Artefact : -	Isolated Find	3857
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2014	CPSC1;Cecil Park Shooting Complex;	AGD	56	298250	6247650	Open site	Valid	Artefact : -	Open Camp Site	3857
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2015	CPSC2;Cecil Park Shooting Complex;	AGD	56	298070	6247430	Open site	Valid	Artefact : -	Open Camp Site	3857
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2419	IFSC 9;Cecil Park;	AGD	56	297960	6247420	Open site	Valid	Artefact : -	Isolated Find	
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2426	IFSC 11;Cecil Park;	AGD	56	297990	6248110	Open site	Valid	Artefact : -	Isolated Find	
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2427	IFSC 10;Cecil Park;	AGD	56	297680	6247790	Open site	Valid	Artefact : -	Isolated Find	
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2428	IFSC 8;Cecil Park;	AGD	56	298090	6247390	Open site	Valid	Artefact : -	Isolated Find	103034
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2429	CPSC 3;Cecil Park;	AGD	56	297710	6248020	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2430	IFSC 7;Cecil Park;	AGD	56	298590	6247980	Open site	Valid	Artefact : -	Isolated Find	
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2560	GLC2	AGD	56	298512	6245749	Closed site	Valid	Art (Pigment or Engraved) : -, Modified Tree (Carved or Scarred) : -, Artefact : 4	Scarred Tree,Shelter with Art	
	Contact	**Recorders**	Annie Nicholson					**Permits**		
45-5-3300	LIF-1	AGD	56	298817	6240125	Open site	Valid	Artefact : -		102442

Report generated by AHIMS Web Service on 09/09/2016 for Rebecca Morris for the following area at Datum :GDA, Zone : 56, Eastings : 295471 - 299471, Northings : 6239682 - 6249682 with a Buffer of 0 meters. Additional Info : Due Dilligence. Number of Aboriginal sites and Aboriginal objects found is 90

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact T Russell	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
45-5-3854	BRP-IF-05	GDA	56	295605	6241463	Open site	Destroyed	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Leigh Bate,Miss.Kristen Taylor					**Permits**	3742	
45-5-3855	BRP-IF-06	GDA	56	297381	6241187	Open site	Destroyed	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Leigh Bate,Miss.Kristen Taylor					**Permits**	3742	
45-5-3856	BRP-IF-07	GDA	56	297478	6241243	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mr.Leigh Bate					**Permits**		
45-5-3857	BRP-IF-08	GDA	56	297393	6241106	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mr.Leigh Bate					**Permits**		
45-5-3858	BRP-IF-09	GDA	56	296004	6241350	Open site	Destroyed	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Leigh Bate,Miss.Kristen Taylor					**Permits**	3742	
45-5-3943	LP-2	GDA	56	299202	6240304	Open site	Valid	Artefact : 5		102442
	Contact	**Recorders**	Matthew Kelleher,Mr.Mark Rawson,Kelleher Nightingale Consulting Pty Ltd					**Permits**		
45-5-3944	LP-1	GDA	56	298851	6240110	Open site	Valid	Artefact : 1		102442
	Contact	**Recorders**	Mr.Mark Rawson,Kelleher Nightingale Consulting Pty Ltd					**Permits**	3517	
45-5-3946	LP-3	GDA	56	299439	6240616	Open site	Valid	Artefact : 1		102442
	Contact	**Recorders**	Mr.Mark Rawson,Kelleher Nightingale Consulting Pty Ltd					**Permits**	3517	
45-5-3906	SWRL SITE 12	GDA	56	299228	6240872	Open site	Partially Destroyed	Artefact : 1		102442
	Contact	**Recorders**	Matthew Kelleher,Kelleher Nightingale Consulting Pty Ltd,Mrs.Jenna Weston,Ms.Cr					**Permits**	3731	
45-5-3907	SWRL SITE 13	GDA	56	297164	6240839	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mrs.Jenna Weston					**Permits**		
45-5-3963	ALN-IF-01	GDA	56	296499	6245984	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Australian Museum Consulting (AM Consulting),Mrs.Jenna Weston					**Permits**		
45-5-3964	ALN-IF-02	GDA	56	299000	6245864	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Australian Museum Consulting (AM Consulting),Mrs.Jenna Weston					**Permits**		
45-5-3965	ALN-IF-03	GDA	56	298459	6246058	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Australian Museum Consulting (AM Consulting),Mrs.Jenna Weston					**Permits**		
45-5-3966	ALN-IF-04	GDA	56	297889	6246602	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Australian Museum Consulting (AM Consulting),Mrs.Jenna Weston					**Permits**		
45-5-3967	ALN-IF-05	GDA	56	298423	6245720	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Australian Museum Consulting (AM Consulting),Mrs.Jenna Weston					**Permits**	3837	
45-5-3968	ALN-IF-06	GDA	56	295876	6243329	Open site	Valid	Artefact : 1, Burial : -		
	Contact	**Recorders**	Australian Museum Consulting (AM Consulting),Sydney Water-Parramatta,Mrs.Jen					**Permits**		

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SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-3969	2014-46	GDA	56	298236	6246127	Open site	Valid	Artefact : 2, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Australian Museum Consulting (AM Consulting),Mrs.Jenna Weston					**Permits**		
45-5-3887	BRP-S-10	GDA	56	296851	6242085	Open site	Destroyed	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Leigh Bate,Miss.Kristen Taylor					**Permits**	3742	
45-5-3897	BRP-S-11	GDA	56	296390	6241200	Open site	Destroyed	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Leigh Bate,Miss.Kristen Taylor					**Permits**	3742	
45-5-3898	BRP-S-12	GDA	56	296277	6241285	Open site	Destroyed	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Leigh Bate,Miss.Kristen Taylor					**Permits**	3742	
45-5-3868	BRP-S-13	GDA	56	296114	6241329	Open site	Destroyed	Artefact : 1		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Leigh Bate,Miss.Kristen Taylor					**Permits**	3742	
45-5-3874	BRP-S-19	GDA	56	298829	6240826	Open site	Valid	Artefact : 1		102442
	Contact	**Recorders**	Mr.Leigh Bate					**Permits**		
45-5-3900	BRP-S-10-PAD	GDA	56	296851	6241320	Open site	Destroyed	Potential Archaeological Deposit (PAD) : 1, Artefact : -		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Leigh Bate,Miss.Kristen Taylor					**Permits**	3742	
45-5-3999	PAD 2001-6	GDA	56	295825	6248852	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd ,Mr.Alan Williams					**Permits**		
45-5-4000	Artefact Sctter PAD 2002-46	GDA	56	296555	6247583	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd ,Mr.Alan Williams					**Permits**		
45-5-4001	Artefact Scatter PAD 2003-46	GDA	56	296487	6246928	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd ,Mr.Alan Williams					**Permits**		
45-5-4002	Isolated Object 2004-5	AGD	56	296478	6246591	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Extent Heritage Pty Ltd ,Mr.Alan Williams					**Permits**		
45-5-4003	Artefact Scatter PAD 2005-846	GDA	56	296202	6246065	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd ,Mr.Alan Williams					**Permits**		
45-5-4005	PAD 2006-6	GDA	56	295790	6245041	Open site	Valid	Potential Archaeological Deposit (PAD) : -		

Report generated by AHIMS Web Service on 09/09/2016 for Rebecca Morris for the following area at Datum :GDA, Zone : 56, Eastings : 295471 - 299471, Northings : 6239682 - 6249682 with a Buffer of 0 meters. Additional Info : Due Dilligence. Number of Aboriginal sites and Aboriginal objects found is 90

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits		
45-5-4006	Artefact Scatter PAD 2007-4	GDA	56	295792	6248524	Open site	Valid	Artefact : -		
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits		
45-5-4007	Artefact Scatter 2008-4	GDA	56	297641	6248524	Open site	Valid	Artefact : -		
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits		
45-5-4008	Isolated Object 2009-5	GDA	56	297443	6248524	Open site	Valid	Artefact : -		
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits		
45-5-4009	Isolated Object 2010-5	GDA	56	297432	6248202	Open site	Valid	Artefact : -		
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits		
45-5-4010	Isolated Object 2011-5	GDA	56	297479	6248304	Open site	Valid	Artefact : -		
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits		
45-5-4011	PAD 2012-6	GDA	56	297436	6247607	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits		
45-5-4012	PAD 2013-6	GDA	56	297516	6247145	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits		
45-5-4013	Artefact Scatter PAD 2014-46	GDA	56	298260	6246091	Open site	Valid	Potential Archaeological Deposit (PAD) : -, Artefact : -		
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits		
45-5-4014	Artefact Scatter PAD 2015-46	GDA	56	298032	6245823	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits	3837	
45-5-4015	Isolated Object 2016-5	GDA	56	297480	6245528	Open site	Valid	Artefact : -		
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits		
45-5-4016	PAD 2017-6	GDA	56	296388	6245649	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits		
45-5-4017	PAD 2018-6	GDA	56	296377	6244929	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Extent Heritage Pty Ltd ,Mr.Alan Williams					Permits		

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SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-4018	PAD 2019-6	GDA	56	297367	6242079	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd ,Mr.Alan Williams					**Permits**		
45-5-4019	PAD 2020-6	GDA	56	297463	6242047	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd ,Mr.Alan Williams					**Permits**		
45-5-4020	Isolated Object 2021-5	GDA	56	296796	6243361	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd ,Mr.Alan Williams					**Permits**		
45-5-4023	Artefact Scatter PAD 2024-46	GDA	56	296274	6241323	Open site	Destroyed	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd ,Mr.Alan Williams,Kelleher Nightingale Consulting Pty Ltd,I					**Permits**	3742	
45-5-4031	PAD 2032	GDA	56	296851	6241215	Open site	Destroyed	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd ,Mr.Alan Williams,Kelleher Nightingale Consulting Pty Ltd,I					**Permits**	3742	
45-5-4049	PAD 2054-6	GDA	56	296512	6249100	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd ,Mr.Alan Williams					**Permits**		
45-5-4050	PAD 2055-6	GDA	56	295942	6239731	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd ,Mr.Alan Williams					**Permits**		
45-5-4056	PAD 2063-6	GDA	56	298458	6249455	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Alan Williams					**Permits**		
45-5-4693	GML7-EL-IF4	GDA	56	298863	6239947	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Ms.Tamika Goward					**Permits**		
45-5-2559	TLC1	AGD	56	298849	6240532	Open site	Valid	Artefact : 2	Isolated Find,Scarred Tree	98739,102442
	Contact	**Recorders**	Annie Nicholson					**Permits**		
45-5-2561	GLC1	AGD	56	299314	6248786	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Annie Nicholson					**Permits**		
45-5-2307	P-CP9	AGD	56	298110	6248750	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Helen Brayshaw					**Permits**		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 22801

Client Service ID : 244138

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-2308	P-CP8	AGD	56	298580	6248760	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Helen Brayshaw					**Permits**		
45-5-2310	KC/ED2;	AGD	56	297520	6248760	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Helen Brayshaw					**Permits**		
45-6-2427	IF1;AGL Gas;	AGD	56	299200	6239780	Open site	Valid	Artefact : -	Isolated Find	98739,102442
	Contact	**Recorders**	Anthony English					**Permits**	743	
45-5-0214	Kemps Creek;	AGD	56	296100	6248300	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Ms.Laila Haglund					**Permits**		
45-5-2855	Lot 127D	AGD	56	295600	6241100	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Ms.Elizabeth White					**Permits**	1642	
45-5-3532	SWRL Site 9	GDA	56	295798	6240883	Open site	Valid	Shell : 1		
	Contact	**Recorders**	Australian Museum Consulting (AM Consulting)					**Permits**		
45-5-3536	SWRL Site 4	GDA	56	298965	6240982	Open site	Valid	Stone Arrangement : 1		102442
	Contact	**Recorders**	Australian Museum Consulting (AM Consulting)					**Permits**		
45-5-4258	SWRL 20	GDA	56	295750	6240961	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Australian Museum Consulting (AM Consulting)					**Permits**		
45-5-3106	Kemps Creek (KC PAD 1)	AGD	56	296000	6248875	Open site	Valid	Potential Archaeological Deposit (PAD) : 1, Artefact : 1		97456,98064
	Contact T Russell	**Recorders**	Jo McDonald Cultural Heritage Management					**Permits**		
45-5-3295	PP-8	GDA	56	298711	6242029	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Mark Rawson					**Permits**		
45-5-3298	PP-F3	GDA	56	299449	6245540	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Mark Rawson					**Permits**		
45-5-4383	LP10AS	GDA	56	296046	6240668	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mrs.Jenna Weston					**Permits**		
45-5-4381	LP3AS	GDA	56	296000	6239917	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mrs.Jenna Weston					**Permits**		
45-5-4375	LP1AS	GDA	56	295676	6240173	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mrs.Jenna Weston					**Permits**		
45-5-4376	ELWW1	GDA	56	296962	6239951	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Mark Rawson,Kelleher Nightingale Consulting Pty Ltd					**Permits**	3731	

Report generated by AHIMS Web Service on 09/09/2016 for Rebecca Morris for the following area at Datum :GDA, Zone : 56, Eastings : 295471 - 299471, Northings : 6239682 - 6249682 with a Buffer of 0 meters. Additional Info : Due Dilligence. Number of Aboriginal sites and Aboriginal objects found is 90

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 22801

Client Service ID : 244138

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-4439	ELWW PAD1	GDA	56	297070	6240425	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd					**Permits**		
45-5-4440	GML11-EL-IF7	AGD	56	298645	6239550	Open site	Valid	Artefact : -		
	Contact	**Recorders**	GML Heritage Pty Ltd					**Permits**		
45-5-4421	ELWW2	GDA	56	296979	6239708	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Mark Rawson					**Permits**	3731	
45-5-4374	CP AS1	GDA	56	298104	6249004	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mr.Joshua Madden					**Permits**		
45-5-4773	Sixteenth Ave Artefact Scatter 1	GDA	56	298920	6244904	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Ms.Tamika Goward					**Permits**		
45-5-4767	M12 A5	GDA	56	296537	6249457	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Navin Officer Heritage Consultants Pty Ltd,Mrs.Nicola Hayes					**Permits**		

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